# The Proliferation of Open-Source Licenses: The Cooptation of an Industrial Transition Movement by Multiple Institutions

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## Introduction

Scholars who study social movement outcomes have increasingly broadened their focus away from the state as the main target of social movements as they have increasingly acknowledged that many modern movements impact a variety of non-state institutions. The study of movement outcomes has diversified to include targets such as religious organizations (Katzenstein 1998), corporations (Soule 2009), professional associations (Taylor and Raeburn 1995), and the media and public opinion (Burstein 1998). This research has shown that cooptation, or the appropriation of social movement language or tactics by non-activists, is a major concern for movement actors. However, work on the complex relationship of cooptation and acceptance of social movement goals has still focused on the state as the main agent of cooptation. There is little research on the cooptation of social movements by non-state actors, and scholars have set to explore the problem of social movement cooptation by actors across multiple institutions (understood here as broad sectors of society such as the state and industry).

Some researchers at the intersection of social movements and transition studies have examined how social movement goals can be incorporated into industrial "regimes," a topic that is similar to cooptation in the social movement literature (e.g., Elzen et al. 2017). These researchers primarily examine industrial transition movements, which are social movements whose objectives are to fundamentally change an industry by altering its technologies, products, or industrial processes (Hess 2016b). As neoliberal policies and corporate power grows, the ability of incumbent corporations to respond to a social movement's attempt to disrupt the industry's power dynamics correspondingly increases (Trumpy 2008). In many cases, these corporations seek to dilute the threat from social movements and maintain the status quo by selectively including some goals of the social movement into their industrial products and

processes. This process is not identical to cooptation because it involves a complex mixture of selective acceptance and rejection of social movement goals. Although the transition studies literature recognizes the complexity of how the incumbents of industrial regimes respond to the challenges posed by social movements, entrepreneurs, and other niche actors, even this body of literature has yet to systematically examine the differences between the cooptation of social movements across institutional sectors, such as differences between the public and private sectors. To address this gap in the literature, I conduct qualitative analysis to examine the differences in the selective cooptation and transition processes that occur across multiple institutions. More specifically, I examine how three different institutions—nonprofit organizations, for-profit computer technology companies, and governmental organizations—have both embraced and altered the open-source movements' industrial innovation of open-source licenses.

This study builds on prior work on industrial transition and social movements by developing a multi-institutional perspective on the cooptation and institutionalization of the goals of an industrial transition movement. Integrating transition studies with the social movement literature can provide useful insights into the cooptation processes of a variety of institutions. Cooptation of a social movement does not necessarily signal a complete failure for the movement, and interactions between social movement and industry actors as well as interactions between various actors across institutions can shape the trajectory of both the social movement and the institutions. Considerations of how social movements affect multiple institutions and the interconnectivities of these various groups are necessary to gain a fuller understanding of the impact that social movements have on society.

**Background**

Since its founding in 1983, the open-source movement has had tremendous impact on the computer technology industry. Many of today's biggest technology companies, from Microsoft—once a major antagonist to the open-source movement—to Amazon and Google rely on the open-source model (DiBona, Cooper, and Stone 2006). At the heart of this model is the open-source license, which allows software to stay "open" and to be freely accessible. Richard Stallman, founder of the open-source movement, created the open-source license by reinterpreting an existing federal law that grants owners the right to put restrictions on their property (Kelty 2008). The "restriction" in this case is that anybody can use the licensed product as long as they provide the same "restriction" to everybody else. Source code not copyrighted by a license, either proprietary or open-source, is at the risk of being incorporated into projects that are proprietary. Proprietary, in this sense, means that people besides the license holder cannot access a program's source code without the expressed permission of the licensor.

Since Stallman's first open-source license, other actors, both within and outside of the open-source movement, have adopted this innovation and developed their own versions of the license with new stipulations that cater to their own purposes. Although the structure and content of subsequent open-source licenses varies, a typical open-source license begins with a clause that states that people can use, modify, and distribute the licensed work as they want (this is what makes the license open source), then it goes on to stipulate certain limitations or restrictions to these actions. The majority of these licenses further requires that the license remains with the software and that recipients have a copy of the copyright terms.

Some might argue that although the term "movement" has been used with the concept of "open source," it is not a social movement. However, definitions of a social movement vary

considerably, and the broadest definitions would encompass the reformist aspirations of the advocates of open-source software. For example, Snow, Soule, and Kriesi define social movements as "collectivities acting with some degree of organization and continuity outside of institutional or organizational channels for the purpose of challenging or defending extant authority" (2004, p. 11). Although this definition is inclusive of social movements that target a variety of institutions, Meyer and Tarrow (1998) have argued that social movements can also act *within* institutional channels to challenge societal systems. This latter conceptualization of social movements opens up the field of study even more to movements that utilize institutionalized repertoires of action and those that are not necessarily protest-oriented (Constance et al. 2014). In fact, parts of the civil rights movement utilized the judicial system to attain their goal of racial equality (Hilbink 2006), while the recycling movement sought to educate people rather than directly protesting people's behaviors (Lounsbury 2005). I will use the term "social movement" broadly to mean mobilizations of actors who seek a fundamental change in an institution.

Scholars of transition studies have particularly acknowledged that social movements lie along a continuum with "oppositional" types of movements on one end and "alternative" types of movements on the other end (Allen, FirzSimmons, and Warner 2003). The study of industrial transition movements, defined as a distinct subset of social movements whose goal is to fundamentally change an industry, such as the energy or food industries, incorporates movements along this continuum (Hess 2016b). These types of movements can be protest-oriented, such as those against coal power plants, but they can also act to provide alternatives to the status quo, such as with renewable energy or organic farming. The key actors in these movements do not have to be activists but can be academics, entrepreneurs, or, as is the case

with the open-source movement, reform-oriented members of an occupational group such as programmers (Söderberg 2008).

Although there is an ideological divide within the open-source movement between Stallman's perspectives, which emphasizes the philosophy of freedom behind the movement, and that of Eric Raymond and Linus Torvalds, which emphasizes the practical uses of open source, the goal of the movement as a whole is to provide an alternative to the proprietary system of software development through an open system in which a program's source codes are freely accessible without legal obstacles, such as proprietary copyrights or nondisclosure agreements (Bretthauer 2002, Kelty 2008, O'Mahony and Bechky 2008). Thus, following the more inclusive definition of a social movement, the open-source movement can be considered a social movement, or more specifically an industrial transition movement whose goal is to change the software industry. The study of industrial transition movements is important because as technological innovations continue to develop rapidly around the world, these types of movements, which are concerned with the societal and political effects of these technological changes, are likely to become more prominent in the future (Hess 2016b). The integration of social movements and transition studies has usefully broadened the scope of what is considered a social movement. An analysis of the cooptation of an industrial transition movement requires attention to both literatures.

***Social Movements and Cooptation***

Selznick, one of the first to examine cooptation as a mechanism of organizational adjustment, defines cooptation as "the process of absorbing new elements into the leadership or policy-determining structure of an organization as a means of averting a threat to its stability or existence" (1949, p. 34). Gamson (1975) similarly describes cooptation as a movement outcome

in which challengers gain acceptance into the policy making process but without achieving any or much of their actual goals. He distinguishes between cooptation and what he labels "full response," an outcome in which movements gain full acceptance as well as new advantages. Thus, cooptation is often seen as a way that those in power reduce the threat of social movements. These early works observe that cooptation can manifest in three main ways: when states divert social movement goals towards different ends; when states appropriates social movement language or tactics for their own uses; and when social movement actors work within rather than outside of officially sanctioned institutions (Selznick 1948, Gamson 1975, Coy 2013, Staggenborg 2013). Although these studies primarily examine state cooptation, they do provide useful insights into the process that may apply to other institutional sectors.

Zald and Ash's (1966) classic work on institutionalization attempted to explain why the process of institutionalization and cooptation occurs. They observe that over time social movement organizations tend to express more conservative goals and to make decisions that ensure their own survival, even if the new direction contradicts the movement's original objectives. Financial necessities can cause movement organizations and individuals to shift from focusing on direct action to seeking grants and delivering services that are funded by the government, industry, or foundations. Resource mobilization theory suggests that to ensure a continuing flow of resources from elites, social movement organizations will modify their goals to become more consistent with those of their patrons (McCarthy and Zald 1977, McAdam 1982[1999]). Accompanying this change is a tendency for organizations to become more bureaucratized and to contain a denser concentration of power, a process that is consistent with what Michels (1911) calls the iron law of oligarchy.

Various researchers have since provided empirical evidence for these theories. For example, Lounsbury (2005) found that, under the influence of the National Recycling Coalition, the broader recycling movement shifted its logic from a holistic to a technocratic one, which led to the spread of state recycling advocacy groups in the United States. Following this shift, the movement went from a loose structure of autonomous advocacy groups to a more hierarchical structure that spanned the nation. In their analysis of the community mediation movement that emerged in the United States during the late 1970s, Coy and Hedeen developed a four-stage model of cooptation and argued that each development in the process resulted in "the political emasculation and moral diminishment" of the movement by government organizations (2005, p. 409).

A growing number of works, primarily those surrounding alternative agrifood movements, has argued that the concept of cooptation can apply to other sectors of society besides the state. For example, corporations have altered, commercialized, and commodified aspects of the organics, fair trade, and local food movements into mainstream culture (Jaffee 2012, Constance et al. 2014). These processes have diluted the original intent of grassroots movements by weakening the standards of what is considered organic or fair-trade products and by creating more barriers of entry for small producers into these markets (Jaffee 2010, Jaffee and Howard 2010, Jaffee 2012). These findings indicate that cooptation can take unique forms in the context of different types of social movements.

Although cooptation is often seen as a detriment to social movements, the process of cooptation is not always one-directional and may coincide with partial institutionalization of the social movement's goals. A social movement's path towards institutionalization is not purely determined by the state or an industry, and institutional paths contain within them possibilities

for change and "off-path" organization (Schneiberg 2007). O'Mahony and Bechky (2008) argue that the creation of boundary organizations that allow challengers and defenders to collaborate with one another is an important step in a movement's institutionalization process. In their analysis of the open-source movement, the authors observe that boundary organizations help to determine issues of governance, membership, ownership, and control of production, thus enabling both movement actors and corporate actors to move beyond ideological and organizational differences. Similarly, Fleming and Waguespack (2007) examine how brokers and boundary spanners help to integrate disparate technological communities. These studies suggest that new organizational structures can significantly enable institutionalization.

The concept of opportunity structure can help to explain whether or not social movements successfully influence their target. In addition to the political opportunity structure, which affects the potential for movements to gain regulatory and policy changes, the social movement literature has increasingly observed the "industry opportunity structure," which focuses on the characteristics and behaviors of single corporations or entire industries (Schurman 2004). These characteristics can include the structure of an industry, the position of a firm within an industry (King 2008), and divergent organizational logics (Weber, Rao, and Thomas 2009). Both political and industry opportunity structures affect which companies or which industries movement actors choose to target (King and McDonnell 2012). Although the literature often focuses on how opportunity structures help explain a movement's success or failure, they can also help to explain the cooptation process of a social movement and the interactions between movement and industry actors.

In summary, the literature on social movements suggest that interactions between social movement and industry actors not only affect the targeted industry but also bend social

movement trajectories towards increased institutionalization. Although there is a growing body of work that considers corporate cooptation, few works have examined other non-state forms of cooptation. Furthermore, few works have explicitly considered how social movements can be coopted by multiple institutions at the same time, and differences between the cooptation of a social movement by the public and private sectors have yet to be fully examined. Moreover, the majority of these works tend to focus on protest-oriented movements and fail to consider movements that work within industries, markets, and existing instituitons. Research that integrates the social movement and transition literatures seeks to address this particular gap and to provide insight into the relationship between social movements and industry.

***Social Movements in Transition Studies***

The multilevel perspective (MLP), which is the most influential of frameworks within transition studies, elaborates on the dynamics among three main dimensions within sociotechnical systems, which are niche, regime, and landscape (Rip and Kemp 1998, Geels 2004, Geels and Schot 2007, Sovocool and Hess 2017). "Niche" refers to the institutional space where radical innovations and experimentation occur, and "regime" refers to the existing configuration of the sociotechnical system, which includes industrial corporations along with technological systems, regulatory systems, and a variety of other elements. The regime defines the dominant practices, rules, organizations, and technologies that the niche often challenges or seeks to replace. Finally, the landscape refers to the exogenous factors that can create openings for the niche to effect changes in the regime, especially the role of government policy in support of or against an industrial transition. Within this perspective, industrial transition movements advocate for technologies, products, and industrial practices that are outside the industrial regime and that challenge the incumbent actors. Many transition scholars examine how these three

dimensions interact to explain how changes occur in industries or sociotechnical systems in general.

Geels and Schot (2007) describe four specific sociotechnical transition pathways that categorize these interactions and their consequences. First, *transformation* refers to when landscape developments put pressure on incumbent actors to change the regime before niche challengers have yet to develop sufficiently. Second, d*e-alignment and re-alignment* refers to when a sudden, large disruption in the landscape breaks down the regime and provides an opportunity for niche-innovations that are not yet fully developed to compete with one another until one becomes dominant, thus leading to the re-alignment of a new regime. Third, *technological substitution* refers to when, after a landscape disruption occurs, niche-innovations have developed enough to replace the existing regime. Finally, *reconfiguration* refers to when regime actors adopt innovations that have been developed in niches to solve local problems. To compare with the social movement literature, cooptation is closest to the reconfiguration pathway, although even the reconfiguration pathway can involve significant changes in the regime in response to challenges. The general framework has recognized shortcomings, especially in its first versions (Geels 2011), but it emphasizes that fundamental industrial change is not one-directional and instead occurs through a series of interactions among various actors, with outcomes often contingent on timing and on external circumstances, such as government policy and social movement mobilizations.

The role of social movements can take many forms within a sociotechnical system. Social movements themselves can provide the opportunity for niche organizations to influence the political field and successfully challenge the regime (Hess 2016). Social movements can allow niche actors to gain policy support by placing normative pressure on regime actors (Elzen

et al. 2011) or by framing issues politically to create an avenue for political participation in previously un-politicized sectors of society, such as the marketplace (Balsinger 2010). Moreover, social movements can help establish and disseminate cognitive frameworks, norms, values, and regulatory structures that enable niche innovations to become more widely used (Sine and Lee 2009).

Besides affecting industrial change via changes in the landscape, social movements can also be the center of niche experimentation and innovation. A number of studies has examined grassroots innovation movements that argue for socially inclusive, community-based innovation processes, such as the United Kingdom's Transition Towns movement (Seyfang and Haxeltine 2012), the People's Science movement (Kannan 1990), or the technologies for social inclusion movement (Smith et al. 2003). These grassroots innovation movements provide protective spaces for grassroots innovation to take place (Seyfang et al. 2014, Hossain 2016). Researchers also specifically address the topic of industrial innovation within social movements. For example, Hess (2005, 2007) examines "alternative industrial movements," which include technology- and product-oriented movements, and argues that marketplace innovation and new product development can be an important mechanism for social change.

Several scholars have highlighted the centrality of politics and power to explain how regime actors react to these niche innovations (Avelino and Wittmayer 2015). As mentioned above, one response is for regime actors to reconfigure or coopt niche ideas by framing the political discourse surrounding niche innovations towards their purposes or by mobilizing resources to shape relevant political institutional structures (Geels 2014). Regime organizations can actively oppose policies that favor niche development (Lauber and Jacobsson 2016), or they can alter niche-innovations to become more consistent with profit-motivated, current

sociotechnical systems (Hess 2005, Smink, Hekkert, and Negro 2014). These altered niche-innovations may eventually be absorbed into the industrial regime.

In sum, these prior works theorize the role social movements play and elaborate how regime actors may react to niche innovations. Similar to social movement studies on cooptation and institutionalization, transition theories suggest that regime actors can alter the goals of social movements, such as industrial innovations, and adopt them for their own purposes. However, the transition studies literature tends to be focused on industry as its primary locus of institutional analysis and change. Social movements can impact more than their intended target (Haines 1984), and products created by an industrial transition movement can be adapted by others besides corporate actors. Although there is a growing literature on the politics of transitions (e.g. Meadowcroft 2011, Avelino et al. 2016), the role of social movements in industrial transitions remains an understudied area in the field. Furthermore, like the social movements literature, the transition studies literature could benefit from a multi-institutional perspective that examines how movements can bring about changes not only in industry but also in other institutional sectors.

***Summary***

Both social movement studies and transition studies provide useful approaches to the problem of how a social movement can impact and change an industry. The research in both literatures suggests that movement and industry actors interact within political and industrial opportunity structures to change an industry or to influence some industrial innovation. Many of these studies analyze these interactions by studying a social movement's effects on an outcome within a specific regime organization or institution. Some of the works, such as that of Soule (2009), suggest the value of examining the social movements and industry nexus as involving

both the state and industry as targets of change. This paper builds on the emergent multi-institutional perspective by analyzing more systematically how cooptation and acceptance of a social movement's occur across three institutions: the state, industry, and the nonprofit sector.

**Research Questions and Methods**

The case of open-source movement and the industrial innovation of open-source licenses provides a good empirical terrain to examine how an industrial transition movement may be coopted or selectively accepted by more than one institution. Research that elaborates on institutionalization processes and industrial innovations suggests that regime actors often do not simply absorb niche-innovations but adapt these new technologies or ideas to fit their own systems and motivations. Thus, my first set of research questions asks:

1. How do different types of institutions coopt and otherwise modify open-source licenses for their own uses? How do open-source licenses differ across these different institutional sectors?

Prior studies on sociotechnical transitions also suggest that niche innovations can proliferate gradually and be altered by niche-regime interactions over time. Regime actors may change the niche-innovation, but niche actors may also move towards greater conformity with the regime. Developments in the landscape, such as neoliberalization processes, may further influence the trajectory of these changes. Consequently, my second group of questions asks:

2. How do the trends in open-source licenses change over time and how are these trends similar or different across different institutions? Which type of licenses become more prominent over time?

Related to my first two sets of questions, as social movement and regime actors interact and adapt to one another, there may also be changes the way actors frame their actions that help

to explain the motivations for differential cooptation and acceptance of the social movement challenge. Thus, the last set of questions asks:

3. How do actors associated with different institutional sectors discuss, justify, or frame their open-source licenses? Are there changes in these justifications and frames over time?

To answer these three sets of questions, I conduct qualitative analysis of open-source licenses with a geographical focus on the United States, where the open-source movement began and is most developed. The list of these licenses comes from the Open Source Initiative (OSI, n.d.) and Free Software Foundation (FSF, n.d.) websites, which represent two of the most prominent open-source organizations that document open-source licenses. Although not inclusive of all existing licenses (there may be thousands), these websites contain the most used, well-known, and verified licenses in the open-source community. The licenses listed in these websites also tend to have the largest amount of documentation. I consider only software licenses, although the FSF has sections on different types of open-source licenses. For example, I do not consider licenses only for fonts or documentation because they have specific characteristics that are difficult to compare. If I could not find a corroborated source that specifies the publication date or the author's name, I dropped the license from my data set. Often the licenses themselves, authors' websites, the OSI and FSF websites, or news articles helped determine the history of a particular license. Out of a possible 113 licenses, the final list contained 103 licenses. The publication dates ranged from 1989 to 2014.

I categorized licenses based on four categories. These categories are social movement actors and three types of institutional sectors associated with the license author: for-profit, nonprofit, and government. The social movement group of licenses is written either by

Stallman's FSF, which is the first open-source organization, or by other individuals or groups of individuals who are associated with an open-source project and not formally recognized as a non-profit or a for-profit organization. The for-profit group contains licenses created by technology companies, and the nonprofit category contains licenses by either non-profit organizations or universities. Finally, the last set of licenses is created by government entities.

For each license, I coded for its legal features. Specifically, I coded for the following features: copyleft, sublicense, warranty, patent, trademark, and no-promotion. The term "copyleft" means that modifications of the licensed work must also be distributed under the same license terms. Copyleft licenses are different from the more permissive open-source licenses that allow derivative works to be sublicensed, or released under a different license, including in some cases proprietary ones. The warranty feature grants distributors the right to place some type of warranty, or a time limit, on either the software or services related to the software. A patent clause is either a patent grant or a patent retaliation clause. A patent grant requires that distributors give rights to use contributor's patents for all functionality of the software so that, when someone contributes to a software package, he or she cannot later sue others for using the software. A retaliation clause essentially seeks to protect the holder from any patent aggression. A trademark clause states that distributors do not have the right to use the licensor's name or symbol that represents the author or the product. Finally, a no-promotion feature means that distributors cannot use the name of the software or the author(s) for promotion purposes.

In addition to these legal features, I also observed the qualitative structure of the licenses (e.g. length and language) and coded for whether or not the license followed a formal structure that I call the standardized structure. This standardized structure typically begins with a definition of legal terms, followed by (though not always in the same order) the grant of rights, a

list of requirements and restrictions, a section on commercial distribution, a section on warranty, a disclaimer of liability, and a section called miscellaneous or "general" which contains a variety of additional notices.

Finally, for the third research question, I noted any statements, or frames, that explain why the authors created their licenses. Some licenses do not have such explanations, but those that do usually have them in a preamble or on the authors' websites. A license can contain more than one explanation or frame.

## Results

Results are presented in two sections. The first section provides general descriptive information about the open-source licenses associated with the social movement group as well as the three different institutional sectors. The second section provides an analysis of the licenses that answers the three research questions.

### *Description of Licenses by the Four Groups of Authors*

1. Social Movement organizations. The social movement group of open-source licenses contains a total of thirty-five licenses, or 34% of the all licenses, with twenty-five distinct social movement authors. Stallman developed the first general-use open-source license, the GNU General Public License (GPL), in 1989, six years after he officially founded the open-source movement. As a whole, twelve out of the thirty-five licenses (34%) are copyleft licenses, half of which were authored by the FSF. Beginning in 1995, we start to see licenses that allow holders to sublicense. A total of fifteen of the thirty-five licenses allow sublicensing (43%), and only one license (3%) explicitly grants any kind of warranty. Nine licenses (25%) explicitly contain a patent clause, and starting in the mid-1990s, licenses began to explicitly state that they do not grant trademark rights or allow distributers to use the author's name for promotional purposes.

A total of twelve licenses (34%) contain trademark clauses, and fifteen licenses (43%) contain a no-promotion clause.

Qualitatively, the majority of these licenses are relatively simple, straightforward and short, and most have very little legal jargon. Fourteen licenses (40%) display the standardized structure, the majority of which is written by only two authors, the FSF and Lawrence Rosen, who is a prominent member of the open-source community. Also of note, the social movement group of licenses contains the most unique and original forms of licenses across the four groups of authors. For example, the Beerware license succinctly allows users to do what they want but with an added clause: "If we meet some day, and you think this stuff is worth it, you can buy me a beer in return" (Kamp 2004). Likewise, the VIM License asks that distributors of the software donate to a charity that helps Ugandan children in poverty (Moolenar 1991).

2. For-profit. The for-profit group contains thirty-six total licenses, or a total of 35% of all licenses, with twenty-eight distinct authors. Netscape published the first for-profit license in 1998. The license contained a clause that allowed the company to incorporate modifications into its other proprietary programs. Eight of the thirty-six licenses (22%) are copyleft, twenty-eight (78%) allow contributors to sublicense under proprietary licenses, and fifteen (42%) allow warranties to be placed on the software. Twenty-six licenses (72%) contain a patent clause, thirty-two (89%) have a trademark clause, and thirty-one (86%) have a no-promotion clause.

Most of these licenses allow open-source and proprietary software to intermingle and often grant the company certain special rights. For example, the first versions of the Apple license allowed the company to revoke licenses at any time and required contributors to publish all modifications if they were using the software for private purposes (FSF n.d.). The Sybase Open Watcom Public License similarly contains a clause granting the Sybase company use of

any modifications and a strict termination clause (FSF n.d.). Unsurprisingly, many of these licenses are also specific to a particular program. In contrast, many of the social movement licenses are templates that can be used across multiple software programs and platforms

Qualitatively, these licenses differ from social movement licenses in terms of their length, structure, and language. A majority of the for-profit licenses (70%) are over two pages long and display the standardized structure. Many of these licenses repeatedly emphasize that the author is not liable for any intellectual property infringement or similar other copyright or patent issues that may occur. In fact, the term "intellectual property," of which the FSF website explicitly disproves, appears in twenty-two licenses (61%).

3. Nonprofit. The nonprofit group contains twenty-four total licenses, or 23% of all licenses, and eighteen distinct authors. Ten of the twenty-four licenses (42%) in this group were created by an educational nonprofit organization. The first nonprofit license appeared in 1990, just a year after the first social movement licenses and eight years before the first for-profit license. Four (17%) licenses are copyleft, eleven (46%) allow sublicensing, and two (8%) allow warranties. In terms of liabilities, twelve licenses (50%) contain a patent clause, fifteen (63%) contain a trademark clause, and nineteen (79%) contain a no-promotion clause.

The nonprofit group of licenses as a whole display characteristics of both the social movement and the for-profit groups. A total of thirteen nonprofit licenses (54%) display the standardized structure, but in contrast to the for-profit group of licenses, only eight (33%) of these licenses use the terminology of "intellectual property." A few of these licenses also include a description of the license "in plain English," or without using legal jargon.

4. Government. The government group contain only eight total licenses, or about 7% of all licenses, and five distinct authors, which include representatives from Europe, NASA, and

Quebec. Government entities only began to create their own open-source licenses in 2001. Only one license (13%) is copyleft; seven (88%) allow sublicensing but only with a specific list of licenses; and seven (88%) allow warranties. Additionally, five licenses (63%) contain patent clauses; all the licenses contain trademark clauses; and half have a no-promotion clause.

The earliest government license was specifically written for the EU DataGrid project, which is a project that provides high-capacity computing resources specifically for international scientific research. This is the only license in this group which is relatively short, containing only six clauses. The seven other licenses (88%) follow the standardized structure, though they also contain an added clause that states the legal jurisdiction of any disputes related to the license or licensed work.

***Analysis of Results***

1. Question 1: differences across institutional sectors. Although there are some similarities among the four groups of licenses, the three different institutions—for-profit technology companies, nonprofit organizations, and governmental organizations—have developed different forms of licenses than those found in the open-source movement. Table 1 shows how the legal features vary across the three institutional sectors and in comparison with the licenses of the open-source movement authors. Because of the small N, only descriptive statistics are presented.

As a whole, the group of social movement licenses tends to be more protective of keeping software open-source by not allowing distributors to sublicense or place a warranty on the software. These licenses also tend to show less concern about the authors' legal protection by not explicitly having a patent, trademark, or no-promotion features. Moreover, the overall structure of the licenses tend to be less formal with little standard document structure. In fact,

the social movement group contains several original licenses that are not found in any of the other group of licenses. This finding is unsurprising if we consider the open-source movement as a niche group, where initial innovation and experimentation takes place.

In contrast, the for-profit group of licenses is, on the whole, friendlier towards commercial interests in terms of allowances and restrictions. They tend to be more restrictive towards how open the licensed software can be. For example, most allow for sublicensing and placing a warranty on the software. For-profit licenses also tend to emphasize legal protection, with the majority stating explicit patent, trademark and no-promotion terms. These licenses tend to be more formal with a relatively standardized document structure. The majority of these licenses allow people to integrate licensed software with a proprietary system and contain loopholes that allow companies to take commercial advantage of open-source contribution.

The nonprofit group of open-source licenses contains qualities of both the social movement and the for-profit groups. All but one of the percentages in Table 1 for the nonprofit group falls between the numbers from the social movement and for-profit groups. These percentages reflect the diversity of the nonprofit authors, because they include educational organizations, open-source advocacy organizations, as well as nonprofit offshoots of commercial companies (e.g. Mozilla from Netscape). As I will discuss later, the variation in this group of licenses may also reflect the developments that occurred within and surrounding the open source movement.

Finally, government open-source licenses tend to be formal documents which contain very explicit legal guidelines. The majority of these eight licenses contains clauses regarding legal jurisdiction because, as I will also discuss below, these licenses are often created with international purposes in mind.

In short, social movement licenses tend to be less formal in structure but stricter towards keeping software open-source, whereas for-profit companies tend to modify open-source licenses towards commercial interests with a focus on liability and legal protection. Nonprofit authors consists of a diverse group of organizations and borrow traits from both the social movement and for-profit authors, whereas government organizations modify licenses to accommodate more collaborative, goals that cross legal jurisdictions.

2. Trends over time and across institutions. Figure 1 shows changes in the cumulative number of licenses by each of the four types of authors over time. In 1989, the social movement licenses were the only ones available, but by 2014 these licenses had become a minority of all the licenses. As the graph depicts, the amount of new open-source licenses created by social movement actors grew steadily throughout the 1990s to 2010 and was the dominant group prior to the 2000s. For-profit licenses have grown substantially since 1998, and government and nonprofit licenses have also become more important during the 25-year period. Figure 2 shows how the features of the licenses (summarized across all four institutions) have changed over the full time range. The number of licenses that display a standardized structure and contain clauses for legal protection (i.e. patent, trademark, and no-promotion) has increased since 1998. Licenses that allow sublicensing have also increased. Relatively speaking, the licenses that are copyleft and those that allow warranties have not grown as much as those that have the other features.

To some degree, these changes in open-source licenses mirror the developments that occurred in the open-source movement as a whole. The open-source movement was initially called the free software movement because Stallman wanted to emphasize the ideological concept of freedom (FSF n.d.). He argued that proprietary and open source systems should not

intermingle, and everything should be open, or freely accessible, without proprietary restrictions. However, during the 1990s a growing number of people in the open-source community began to disagree that free software and non-free software should not coexist (Moore 2001). In 1998, a group in the social movement community officially renamed the movement to its current popular name (i.e. the open-source movement) to make the concept of open source more appealing to businesses (Kelty 2008, Moore 2001). Around the same time, for-profit companies began to realize the potential of open source as a business model and licenses by these groups quickly developed.[1]

According to historians and several of the actors involved, the realization of the profitability of the open-source model by proprietary companies is in part due to interactions between open-source movement actors and corporate actors and also in part due to the growing popularity and profitability of open-source programs, such as Linux, during the dot-com boom of the 1990s (Moody 2001, Moore 2001, Kelty 2008). The decision of the first for-profit company to create an open-source license was influenced by a group of the company's employees who had read Eric Raymond's *The Cathedral and the Bazaar*, an essay which describes the benefits of open source as compared to proprietary systems. This group of employees convinced the head of the company to release the company's source code to compete with its competitors, such as Microsoft. Meanwhile, open-source software was also becoming a competitor to the proprietary licenses of large companies. For example, Microsoft famously named the open-source movement a major threat in its "Halloween" document, which they released in October of 1998 (Valloppillil 1998).

[1] The renaming of the movement was actually planned to take advantage of Netscape's decision to go open source. For the full history see Kelty (2008) or Moody (2001).

Even before the open-source movement officially branched off from the free-software movement in 1998, movement actors had started to create open-source licenses that were more permissive than Stallman's strict copyleft GPL. In the later years, we can see how actor interactions lead to further developments in open-source licenses. As for-profit actors entered the open-source community and certain standards developed, even new licenses created by social movement actors started to adopt the formal, legal structure of for-profit licenses. Figure 3 shows the standardization trend for only the social movement group of licenses. The number of social movement licenses with a more standardized structure have increased since the late 1990s, although this form of licenses has not become the main form of licenses for this group because, as I will later discuss, social movement actors are still experimenting with new forms of open source licenses.

Similarly, early nonprofit licenses mimicked social movement licenses in terms of structure and their lack of liability clauses. For example, the early MIT License only contains four sentences granting people the permission "to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software and to permit persons to whom the Software is furnished to do so" as long as they include the copyright and permission notice (MIT 1991). However, later nonprofit licenses began to display the more standardized structure with more emphasis on legal protection. Over time, the nonprofit group shows a similar increase as the social movement group in the number of licenses with a standardized structure and liability protection features. However, for the nonprofit group the standardized structure and an emphasis on legal protection were present throughout the 25-year period.

Government organizations took the longest to adapt open-source licenses, only beginning to create them in 2001. The majority of these licenses were actually created after 2010, which is

why this group contains the least number of total licenses. Because there are so few licenses from this group over such a limited time frame, there do not appear to be any changes in trends for this group. However, the majority of these licenses do contain the more standardized structure that became more popular in the later years.

Overall, these findings show that, although for-profit, nonprofit, and government groups adopted and altered open-source licenses first created by social movement actors, the formal structure to the licenses that the for-profit companies emphasized, to an extent, became a standard across all four groups of authors. This trend coincides with the open-source movement's shift towards commercialization. As open-source licenses became a more integrated part of the software industry, the standardized structure and set of legal protections became more common across all open-source licenses over time.

3. Framing and justification of licenses. I found four main justifications, or frames, for why authors created their licenses: "freedom," "absolute freedom," "utility," and "collaboration." Table 2 summarizes the number of each type of frame found in each group of licenses.

The "freedom" frame emphasizes open source as an ideology and conveys a dedication to protecting the open-source nature of the licensed software. For example, all of FSF's licenses contain a preamble that explains the organization's philosophical approach to creating the license, which begins in the following way:

> "The license agreements of most software companies try to keep users at the mercy of those companies. By contrast, our General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users […]When we speak of free software, we are referring to freedom, not price. Specifically, the General Public License is designed to make sure that you have the freedom to give away or sell copies of free software, that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things" (FSF 1989).

Authors who use this frame want to make sure that subsequent users cannot take away the right for others to access the licensed software. This frame is most prevalent in the social movement group of licenses, with a total of eighteen social movement licenses that contain the frame. In comparison, five for-profit licenses, zero nonprofit licenses, and two government licenses convey a similar emphasis on freedom and a dedication for keeping software open-source.

Similar to the last frame, the "absolute freedom" frame emphasizes the idea of freedom but interprets openness more as the freedom to do whatever people want with few, if any, restrictions. This frame contrasts with the basic "freedom" frame, which only ensures that the software remain open-source in the long run. For example, the "Do What the Fuck You Want To Public License" is a short license that simply states, "Everyone is permitted to copy and distribute verbatim or modified copies of this license document, and changing it is allowed as long as the name is changed" and ends by restating the title of the license (Hocevar 2004). Starting around the mid-2000s and totaling to nine by 2010, this particular frame is exclusive to later social movement licenses and parallels to an extent the shift we see during the mid and late 1990s in which licenses become more permissive and friendly towards commercial interests.[2] In other words, the appearance of this frame parallels the division within the open-source movement between "free software" and "open-source" software.

In stark contrast, the "utility" frame emphasizes how using an open-source model can lead to the betterment of a particular product. For example, the Computer Associates International Inc. (2004) states the following in their license:

> "We believe that the open source development approach can take appropriate software programs to unprecedented levels of quality, growth, and innovation. To demonstrate our continuing commitment to open source, we are releasing the Program (as defined below) under this License."

[2] The FSF website discourages people from using these types of licenses.

Similar discussions advocate for the reciprocal nature of the open-source model. Companies can make their source code available for anyone to use, but open-source programmers should then help improve their product. Here, Technical Pursuit Inc. (2007) argues for this reciprocity in a preamble to their license:

> "While there is a certain freedom in this model of licensing, it struck the authors of the RPL as being unfair to the open source community at large and to the original authors of the works in particular. After all, bug fixes, extensions, and meaningful and valuable derivatives were not consistently finding their way back into the community where they could fuel further, and faster, growth and expansion of the overall open source software base."

Thus, authors using this frame are particularly concerned with helping their organization develop their software in the long run. This frame is most prevalent in the for-profit group of licenses, with eighteen of them containing these types of justifications. In comparison, eight social movement licenses, nine nonprofit licenses, and zero government licenses contain this frame.

The "collaboration" frame emphasizes the collaborative process of the open-source model and the benefits of this collaboration. This frame was most prominent in the government licenses, as all eight government licenses contain the frame; however, three social movement licenses, four for-profit licenses, and ten nonprofit licenses also include the collaboration frame. Many of these licenses apply to cooperative projects. For example, the Apache Software Foundation (n.d.) stated on their website that the goal of their licenses is to "achieve [their] goal of providing reliable and long-lived software products through collaborative open source software development." Other licenses required a group of people working together to develop and finalize their creation. For example, NASA brought in engineers, policy makers, and members of the open-source community to discuss the creation of their open-source license (Gerty 2011). Because some of these licenses were meant to apply across multiple organizations

and in some cases across different countries, many of the authors stated that they were careful to write their licenses in such a way that would apply under a variety of laws. For example, the European Union Public License required the approval of the European Commission.

To summarize, although each group of authors utilizes a variety of frames and justifications for the creation of their licenses, one frame or characteristic tends to be more prominent in each group of licenses. Social movement authors tend to emphasize the ideology of openness and freedom. They tend to stress the importance of keeping software open and free to everyone, although a handful of later authors interpret openness as allowing people to do whatever they want without restrictions. In contrast, for-profit companies tend to acknowledge the utility of the open-source model and frame their decision to create open-source licenses as a way to improve their products. Nonprofit organizations mainly employ the utility and collaboration frames since these nonprofit organizations often exist to bring a group of people together to work on a particular project. Similarly, governmental organizations tend to use frames that emphasize collaboration across national or departmental boundaries.

**Conclusion**

Although the literature on social movements considers a wide range of social movement outcomes, few studies explicitly consider how these outcomes can span multiple institutional arenas. This project provides an example of how an industrial transition movement can differentially affect the regime of more than one institution. More specifically, I show how actors in three different institutional sectors, namely for-profit technology companies, nonprofits, and governmental organizations, have adapted the open-source movement's industrial innovation of open-source licenses to fit their own purposes.

By considering both the social movement and transition literatures, this study provides a new strategy for thinking about the outcomes of industrial transition movements. The social movement literature suggests that the outcome of social movement institutionalization can fall along a continuum with cooptation, which involves incumbents making slight changes to maintain the status quo, on one end and full response, which involves major changes by incumbents towards social movement goals, on the other end. Similarly, the transition literature suggests that the interactions between social movements and regime actors can range from reconfiguration, in which the latter preserves the industrial regime with only slight modifications, to the realignment or complete substitution of the regime. In general, the open-source movement is consistent with a mixed outcome of a partial, rather than full, response and a partial substitution with some realignment. Movement actors themselves became divided in terms of both features of the licenses and justificatory frames in a process that parallels instances in social movements where a radical flank and an accommodationist wing emerge.

But more significantly, this study shows how social movement outcomes can vary by institutional sector. The for-profit sector shows the highest level of cooptation and reconfiguration of the open-source model, whereas the nonprofit and government sectors show a higher degree of institutional change. This variation can be seen in multiple ways, as documented by differences in the uptake of different licensing features, the rate of change over time, and the different use of frames to justify and explain the licenses. Because actors across various institutions have different motivations for interacting with or responding to a social movement, the impact social movements have on a regime can vary depending on the context of the institution. Thus, when examining the effects of an industrial transition movement on an

industrial system, scholars need to consider how the movement can affect not only one but multiple institutional sectors within the regime.

This paper suggests questions for future research. Although I consider how a social movement interacts with multiple regime institutions, other studies should additionally examine the social-movement spillover effects on other niche innovations and industrial transition movements. For example, the open-source movement influenced the formation of the open-access movement, which seeks to provide academics an avenue to freely publish their works (Peters 2016), as well as the Chinese maker-movement, which consists of inventors who disregard intellectual property rights and steal from existing technologies, such as smartphones and computers, to create their own versions of these technologies (Demuth 2016). Moreover, with regards to research on the open-source movement, I only examine the creation of new open-source licenses but do not consider how these licenses are actually being used. Future studies could examine which licenses become popular and which ones have become defunct. An answer to this question can suggest which strategic adaptations and frames are more successful. Finally, there is a need to develop broader comparative studies that examine other outcomes of related social movements, such as the net-neutrality or the renewable energy movements, on multiple institutions. In summary, the multi-institutional perspective on industrial transition movements opens up a range of new problems in the fields of social movement studies and industrial transition studies.

Table 1

**Distribution of Features across the Four Groups of Open Source Licenses**

| | Copyleft | Sublicense | Warranty | Patent | Trademark | No Prom. | Standard | Total |
|---|---|---|---|---|---|---|---|---|
| Soc. mov. | 34% | 43% | 3% | 25% | 34% | 43% | 40% | 35 |
| For-profit | 22% | 78% | 42% | 72% | 89% | 86% | 70% | 36 |
| Nonprofit | 17% | 46% | 8% | 50% | 63% | 79% | 54% | 24 |
| Gov. | 13% | 88% | 88% | 63% | 100% | 50% | 88% | 8 |

Figure 1

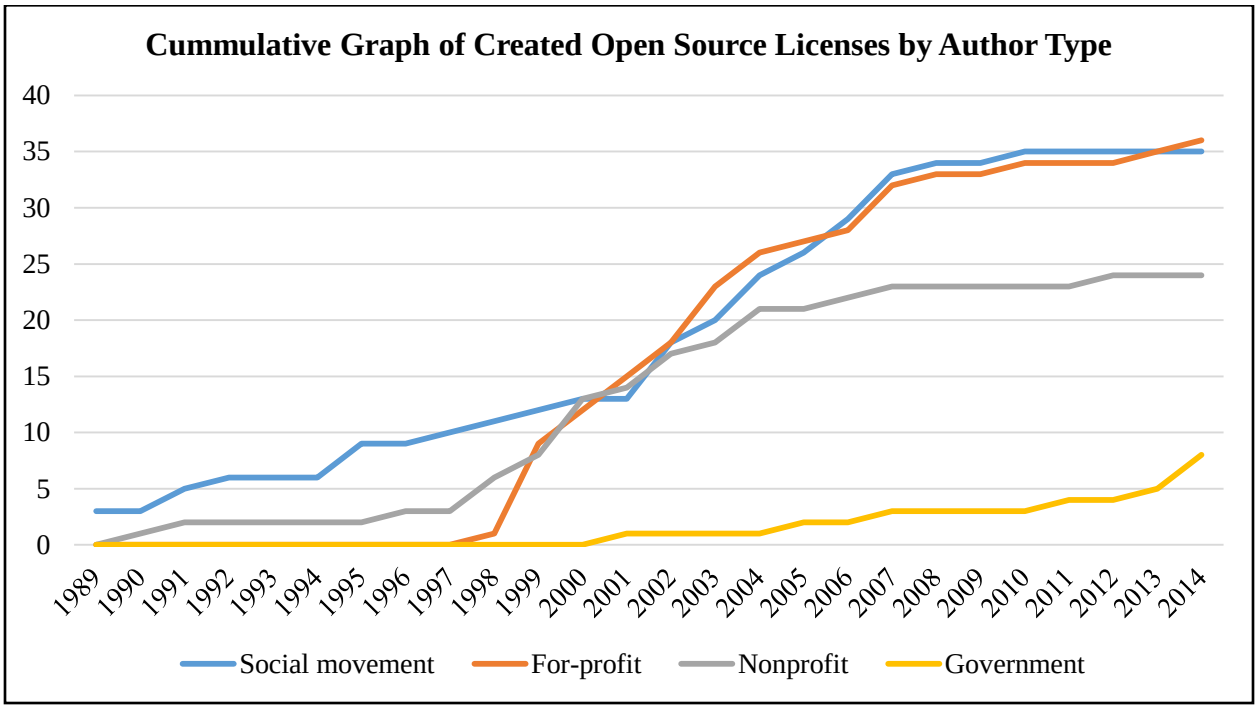

Figure 2

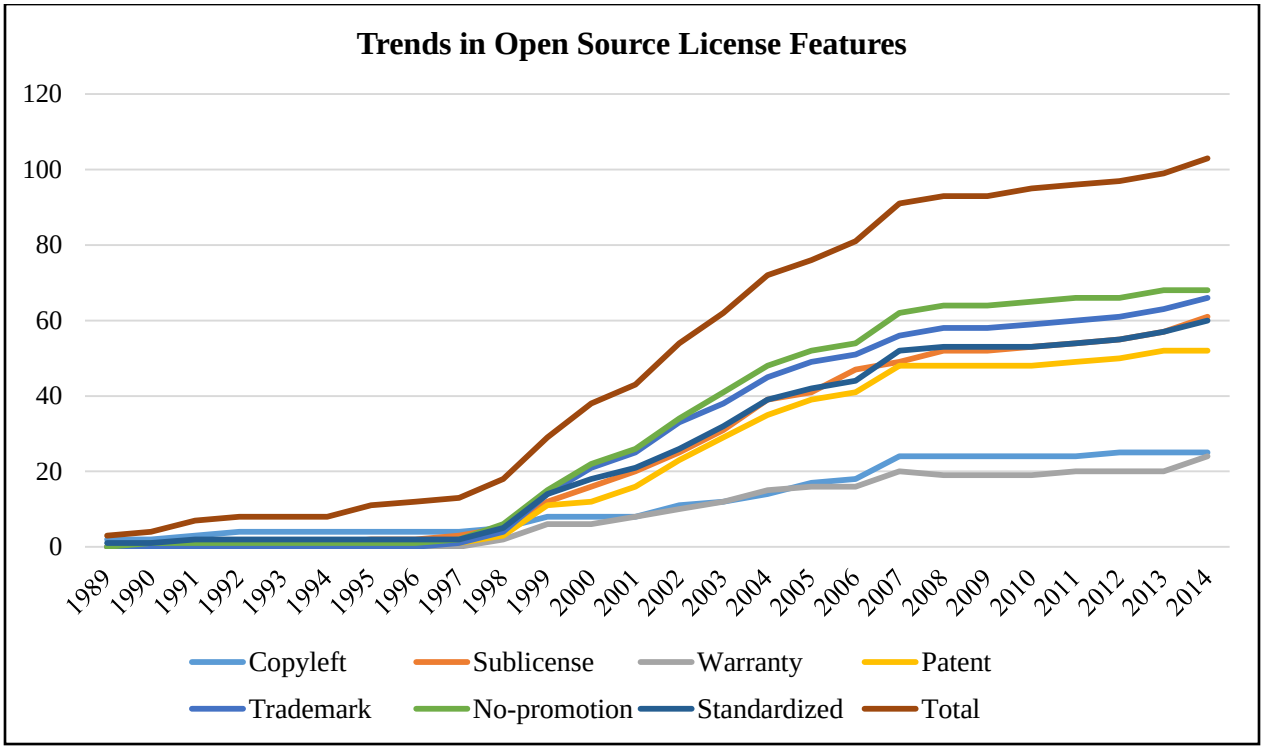


Figure 3

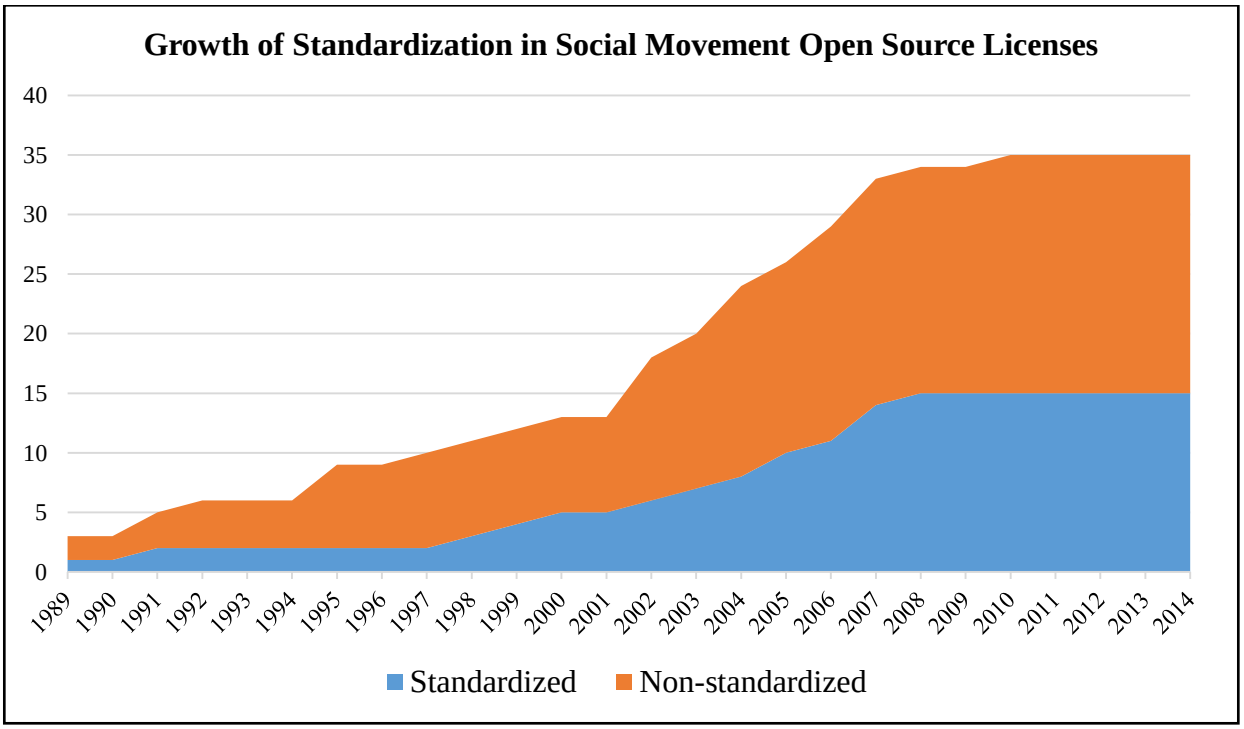

Table 2

**Number of Licenses Containing Each Frame**

| Category of Licenses | Freedom | Absolute Freedom | Utility | Collaboration | Total |
|---|---|---|---|---|---|
| Social Movement | 18 | 9 | 8 | 3 | 35 |
| For-profit | 5 | 0 | 18 | 5 | 36 |
| Nonprofit | 0 | 0 | 9 | 10 | 24 |
| Government | 2 | 0 | 0 | 8 | 8 |

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