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**‘Open Source Has Won and Lost the War’:
Legitimising Commercial-Communal Hybridisation in a F/OSS Project**

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1. Introduction

Major advances in computer and information technology now occur outside the boundaries of the firm, in communal settings where self-directed volunteers produce non-proprietary goods in Ethical-Modular Organisations or EMOs (O’Neil, 2015). Firms have embraced EMO-produced Free and Open Source Software (F/OSS) and are paying the salaries of developers in F/OSS projects (Gonzalez-Barahona and Robles, 2013; Mansell and Berdou, 2010; Riehle et al., 2014). Aside from limiting the number of firm employees who sit on project boards (as is the case in GNOME for example), there are few formal processes delineating how F/OSS projects should deal with paid workers. Examples include bounty programs, companies like TideLift, and initiatives such as the recent Community Bridge by The Linux Foundation or the GitHub Sponsors program, as well as explicit crowdfunding by F/OSS developers.

At first glance, the coming together or ‘hybridising’ of commercial and communal systems represents a challenge for both parties: firms paying workers to participate in F/OSS projects must relinquish control of the contributions of their employees, or risk compromising these persons’ status in the project (Benkler, 2013). Conversely volunteers being paid by firms could lead to project autonomy being compromised, conflicts of interest arising, and trust amongst participants being undermined. Is this the case? In this article, we show that the firm-project hybridising process is both widely accepted within a F/OSS project, and the source of fundamental challenges to the F/OSS development model. We present the results of an online survey of participants in Debian, a voluntary F/OSS project where the results of work are socialized,¹ which garnered more than 1,400 responses (including 261 Debian Developers), and we complement it with in-depth interviews with 13 Debian Developers. We show how commercial interests unfold in a F/OSS project, and how these interests are defined by project participants.

We draw from the neo-institutional literature which describes institutions as ‘supra-organisational patterns of activity through which humans conduct their material life in time and space’, as well as

‘symbolic systems through which [people] categorize their activity and infuse it with meaning (Friedland and Alfort, 1991: 232). We analyse wages being paid by firms to participants in Debian as an original example of an organisational hybridisation process. As Friedland and Alfort (1991) point out, institutions are potentially contradictory and accordingly make multiple ‘institutional logics’ (legitimate goals and principles that guide behaviour) available to individuals and organisations. The clash of divergent institutional logics (or organisational hybridity) can lead to conflict. Tensions can result from hiring policy, as in the case of social enterprises which bring together employees with backgrounds in development and banking (Battilana and Dorado, 2010). In contrast, though people can be hired or directed to complete a task by firms within a F/OSS project, such contractual arrangements will always be subordinated to the non-commercial, or communal, or ethical-modular institutional logic which binds participants together. We accordingly posit that the intermingling of commercial and communal logics will need to be legitimated (Creed et al., 2002; Suddaby and Greenwood, 2005). We analyse the discourses used to legitimise firm-project cooperation as well as the organisational mechanisms which facilitate this cooperation. We find that one legitimation is closely aligned to the ethical-modular institutional logic, and aims to erase the commercial/communal divide, whilst another seeks to ‘professionalise’ work relations in the project. The article is structured as follows: the next section defines the ethical-modular institutional logic as well as the motivations which lead firms and projects to cooperate. Section 3 presents our case study, the Debian F/OSS project, and outlines our research questions. Section 4 presents our quantitative and qualitative data collection methods. The next two sections describe our findings. We show that paid work is rife in Debian, and that employee status (whether working for a non-profit, a firm, or self-employed) is closely associated to rhetorical legitimations and organisational mechanisms in section 5. We discuss what this means for the understanding of the wider political economy of F/OSS and of commercial-communal hybridisation in section 6. Conclusions are provided in section 7.

2. Background: Firm-project collaboration

The steady rise during the 1990s in the usage and delivery capacity of the Internet led to the development of massively distributed online projects where self-governing volunteers collaboratively produce public goods. Notable examples include GNU/Linux F/OSS distributions such as Debian, the Apache HTTP server, the GNOME desktop and the LibreOffice project, as well as the Wikipedia encyclopedia. These projects have generated a wealth of terminological innovation such as ‘crowdsourcing’, ‘wikinomics’, and the ‘wisdom of the crowd’ (Brabham, 2013; Surowiecki, 2005; Tapscott and Williams, 2006). However focusing on ‘crowds’ does not account for the fact that non-rival public goods are being produced. Benkler (2006) initially referred to ‘commons-based peer production’, then characterized ‘peer mutualism’ as ‘voluntaristic associations that do not depend on direct or delegated power from the state, such as proprietary strategies’ (Benkler, 2013: 217). Collaboration amongst ‘peers’ is central, but employees in commercial firms also use collaborative techniques (Bezroukov, 1999). Following Raymond (1999), Demil et al. (2013) identified a ‘bazaar style’ of governance. In contrast to markets and hierarchies, ‘bazaar governance’ has low incentive and control mechanisms and relies on open licences and self-directed participation. Online volunteer associations do have low controls, but suggesting that they have low incentives obviates the distinction between commercial and ethical logics: motivations are high, but they are not financial.

2.1. The ethical-modular institutional logic

In the neo-institutional literature, which seeks to explore the interplay of organisations and cultural frameworks, institutional logics (or orders) are taken-for-granted understandings that guide behaviour in fields of activity (Friedland and Alford, 1991; Suddaby and Greenwood, 2005). Thornton et al. (2012) contrast a ‘community’ institutional order based on a common boundary, the belief in trust and reciprocity between participants, the commitment to community values, the importance of ego-satisfaction and reputation, etc., from a ‘corporation’ institutional order based on corporate hierarchy, the market position of the firm, bureaucratic roles, etc. Legitimate activity and goals in peer projects are self-directed, in contrast to hierarchically directed work in firms. We define the institutional logic of online voluntary associations as ‘ethical’, because participants are motivated by self-fulfilment and

the common good. This was borne out by our interviewees when they characterised their motivation to contribute to Debian:

‘[Debian has] more impact on improving the world.’(DD1) ‘I mean, of course participating in Debian has a strong ethics point; nobody will deny that, but I don’t think it’s the only thing. I mean, working in a software distribution that has global reach and is important and has I think a lot of moral points for doing something of worth, something I like. This is something I am fascinated with.’ (DD2)

In F/OSS labour is communal and outputs are orientated towards the further expansion of the commons; while the commons are the chief resource in this mode of production (Söderberg and O’Neil, 2014). We also define the institutional logic of peer projects as ‘modular’, because the production of commons occurs in a decentralised fashion. Some degree of modularity has been adopted by firms, but division into autonomous components which can be developed in parallel is the default setting of all peer projects, as this allows asynchronous investments by individuals with varying competencies (Benkler, 2006).

Modular governance and the ethical logic are recursively intertwined, mutually constituting one another. We therefore refer to modularity not only as a design feature, but also in terms of political economy. In contrast to workers in traditional commercial firms, where control of intellectual property (IP) and strategic decision-making capacity are restricted, volunteer producers have the capacity to socialize the product of their labour: participants in F/OSS projects individually agree for there to be no restrictions on who profits. Free IP licences such as ‘copyleft’ enable contributors to relinquish exclusive property rights over the resource they have created. This ethical dimension of F/OSS is exemplified by the ‘four freedoms’ to use, copy, modify, and distribute code, in contrast to closed or proprietary code (Stallman, 2002).

2.2. Firm and project motivations for cooperation

EMOs were originally deemed operationally superior to commercial organisations by some proponents, who argued that open systems reach correct results more effectively than closed or proprietary ones, because of the flexible manner in which massive numbers of reviewers can address defects or ‘bugs’ (Moglen, 1999; Raymond, 1999). The benefits of ethical-modular and commercial collaboration are a staple of management scholarship (Bonaccorsi et al, 2006; Dahlander and Magnusson, 2008; Demil et al., 2013). A primary motivation of firms is that outsourcing labour to volunteer projects lowers production costs. Firms may also wish to improve the quality of F/OSS software which could threaten one or more corporate competitors. Further, Nagle (2018) argues that firms who engage in the apparently irrational behaviour of helping to produce open code which can help their competitors, actually benefit from the learning accrued by their employees during the process. Firm engagement strategies include establishing completely new projects, working with existing EMOs, or attempting to influence the direction of development in existing EMOs (Dahlander and Magnusson, 2008). Well-known examples of firms which support F/OSS projects include information technology giants such as Google, Microsoft, and Facebook. One study found that 75% of ‘core’ modules in GNOME were maintained by developers affiliated to firms (Mansell and Berdou, 2010); another, that 23% of authors working on the Linux kernel were paid for their work, as were between 10 and 20% of developers in GNOME, Netbeans IDE, KDE and KVM (Riehle et al., 2014). In Debian, which adheres very closely to the ethical logic, previous studies of copyright attached to code found that between 6 and 7% of code contributed to Debian was owned by firms (Robles et al., 2007). F/OSS generally does not require authors of specific pieces of code to ‘give up’ their copyright; authors remain copyright owners of their work but release it under a license that allows the work to be freely used, distributed, and modified. On the other hand, developers employed by firms generally have, as part of their work contracts, agreements that stipulate that their work is owned (in the copyright sense) by the firm, so legally speaking it is the firm that contributes and ‘owns’ the code, even though that specific version of the code is freely licensed. In sum, firms are paying developers in F/OSS projects, but the question of what this means for participants, for the project, and for the analytical understanding of how hybridisation occurs has not been addressed in the literature.

3. Case Study and Research Design

3.1. Debian

Debian is a GNU/Linux operating system composed entirely of F/OSS, originally released in 1993 by Ian Murdock. Between January and May of 2017, 1,368 individuals contributed to the project (Debian Contributor list, 2017). The Debian Project is supported by a community active in more than 60 countries (Perrier, 2014) and the Debian operating system is used all over the world, as well as in the International Space Station (Bridgewater, 2013). Debian is famous both for its robustness and its strict adherence to F/OSS principles (Coleman, 2005; 2012) which makes it an ideal candidate to study how communal and commercial logics interact. It represents an attempt to make the ‘bazaar’ viable, with norms aiming to reduce tensions, but also moral, with institutions aiming to reduce unequal relations (Auray, 2007). The project has a highly developed governance structure. Its Social Contract spells out goals and its Constitution defines rules. This includes the process whereby every Developer can launch a referendum (‘General Resolution’) on any issue concerning the project, as well as procedures governing the yearly election of the Debian Project Leader (DPL). DPLs have no powers of control: their role is one of external representation and of synthesis of new proposals (O’Neil, 2009, 2014). There are several categories of participants, such as non-uploading contributors; Debian Maintainers, whose ability to release new versions (‘upload rights’) of software components (‘packages’) included in Debian are limited; and Debian Developers, who can upload without restrictions any package and also have the right to vote on major project-wide decisions.

Firm influence in Debian is occasionally discussed. For example, it is ‘common knowledge’ among Debian Developers that participation in Debian will result in a contributor being targeted for recruitment by companies, including Google (P., 2014). Overt firm support in Debian takes the shape of monetary sponsorship of Debian’s annual conference, DebConf; of in-kind donations of server hardware; and of events such as Google’s annual Summer of Code (GSoC), a training programme where the firm supports the attendance of students, while participating F/OSS projects invest the

necessary mentoring efforts. The main advantage for the project is not the produced code, as the mentoring effort is significant, but rather retaining long-term contributors after the end of the yearly GSoC (O'Neil, 2015).

3.2. Firm-project collaboration in Debian

There is however no precise measure of the extent and impact of paid work in Debian. We seek to ascertain whether members of the Debian community are contributing as non-waged volunteers or as paid contributors. Our first research question is:

RQ1: What proportion of contributors to Debian are paid by firms?

How is waged labour perceived by the community? Mansell and Berdou (2010) write that workers being paid by firms to contribute to the commons does not affect the 'cooperative spirit' of F/OSS projects. Is this the case in Debian? We address the issue by researching to what extent paid work is openly discussed amongst participants, and what it entails for the allegiance of developers. Our second research question accordingly probes individual perceptions of firm influence:

RQ2: To what extent do developers acknowledge and discuss paid work in the project, and how does paid work affect their loyalty to the project?

Hybrid organisations combine different institutional logics (Battilana and Dorado, 2010; Pache and Santos, 2010). We seek to understand how commercial and communal logics actually hybridise. More specifically, since we posit that hybridisation requires legitimisation, identifying rhetorical strategies as well as enabling organisational mechanisms will enable us to unpack how hybridisation operates in the project. Our third research question is thus:

RQ3: How is hybridisation occurring in the project? Are rhetorical legitimisation strategies and organisational mechanisms being deployed?

4. Data Collection

4.1. Quantitative data

We created a survey using the online LimeSurvey tool. In addition to questions on motivations for contribution and employer interest in the Debian project, we gathered demographic information, including age, country of residence, education level, and status within the project. The survey was conceived and administered jointly with members of the Debian community, which explains the extraordinarily high response rate (we received 1,479 responses). It was announced on Debian lists on November 6, 2016 and remained open until December 4, 2016.

Whilst there are approximately 1,000 Debian Developers, it is estimated that only 300 are currently active in the project (private communication with the Debian Account Managers²); the response rate of 261 for this category was thus very high. Project members engaged in dialogue with one another and with the survey administrators about the survey; there was strong interest within the community in the survey results.³

4.2. Qualitative data

The second phase of the research project involved in-depth semi-structured interviews with thirteen Debian Developers based in Western Europe and Central and North America. Participants were recruited at DebConf in August 2017. Interviews were conducted in French and English by phone or videoconference in late August 2017. We documented the Developers' age, gender, employment status and whether they were paid to work on Debian, then enquired about a range of issues such as whether employers directed Debian work, whether participants had witnessed efforts to hide firm interests, whether they felt conflicted about their allegiance, etc. After completing transcripts, we performed an iterative process of thematic analysis (Fereday and Muir-Cochrane, 2006) by carefully parsing the transcripts for emerging themes, then cross-checking amongst authors for validity. The

survey and interviews were approved by the University of Canberra Human Research Ethics Committee.

5. Legitimising paid work in Debian

5.1. Prevalence of paid work in Debian

Survey participants were overwhelmingly male (95%) and between the ages of 30-50 (73.4%). They were highly educated (86.8% have obtained an undergraduate degree, and 42.5% have a Masters' degree). Table 1 presents a cross-tabulation of work status and of status within the project.

Table 1 (All participants)

*What is your current "formal" status in the Debian project? * Which of the following best describes your current work status? Cross tabulation*

		Which of the following best describes your current work status?						
		Employed	Contractor/ Self-employed/ Independent worker	Owner / manager of my company	Unemployed	Retired	Total	
What is your current "formal" status in the Debian project?	Project Member ("DD")	Count 203	32	12	8	1	256	
		% of Total 21.6%	3.4%	1.3%	0.9%	0.1%	27.3%	
	Project Member, non-uploading	Count 12	3	0	1	0	16	
		% of Total 1.3%	0.3%	0.0%	0.1%	0.0%	1.7%	
	Debian Maintainer	Count 67	7	1	8	0	83	
		% of Total 7.1%	0.7%	0.1%	0.9%	0.0%	8.8%	
	Contributor or with no formal project association	Count 227	54	20	31	4	336	
		% of Total 24.2%	5.8%	2.1%	3.3%	0.4%	35.8%	
	User (every other Debian user)	Count 183	28	12	20	4	247	
		% of Total 19.5%	3.0%	1.3%	2.1%	0.4%	26.3%	
	Total	Count 692	124	45	68	9	938	
		% of Total 73.8%	13.2%	4.8%	7.2%	1.0%	100.0%	

Overall 73.4% of respondents were employees, 13.4% were contractors or self-employed, and 4.8% manage their own business. Debian Developers or DDs (79%) and Maintainers (80%) were more likely to be in waged work than Contributors (67.5%) or users (74%).

Table 2 (All participants)

Do you run Debian on your work computer?				
		Frequency	Percent	Valid Percent
Valid	Yes	569	38.5	67.6
	No	273	18.5	32.4
	Total	842	56.9	100.0
Missing		637	43.1	
Total		1479	100.0	

Please note. 'Missing' means the number of potential respondents who have not responded. 'Valid' refers to the breakdown of responses excluding 'Missing'.

67.6% of respondents declared that they run Debian on their computers at work (73.6% for DDs).

DDs have the capacity to influence the strategic direction of the project, so their attitude towards firm influence in the EMO is of particular interest. Table 3 shows that of the 216 who answered this question, only 54 (25%) asserted that their firm was a stakeholder in Debian.

Table 3 (Debian Developers)

Does your firm engage with the Debian project or consider itself a stakeholder in Debian?				
		Frequency	Percent	Valid Percent
Valid	Yes	54	20.7	25.0
	No	162	62.1	75.0
	Total	216	82.8	100.0
Missing		45	17.2	
Total		261	100.0	

This should be contrasted to Table 4, which cross-tabulates status within the project to whether participants are being paid to produce F/OSS. 928 respondents answered the question 'Are you paid to contribute to Debian?', 170 (18.3%) in the affirmative (the definition of 'contribute' in this case was left to the respondent). 253 Developers addressed the questions, with 93 (36.8%) answering in the affirmative; this is a significant figure. As expected, this proportion is much higher than that of Maintainers (18%), Contributors (15%) and Users (6%).

Table 4 (All participants)

What is your current “formal” status in the Debian project? * Are you paid to contribute to Debian?
Crosstabulation

What is your current “formal” status in the Debian project?			Are you paid to contribute to Debian?		Total
			Yes	No	
What is your current “formal” status in the Debian project?	Project Member (“Debian Developer”)	Count	93	160	253
		% of Total	10.0%	17.2%	27.3%
	Project Member, non uploading	Count	3	13	16
		% of Total	0.3%	1.4%	1.7%
	Debian Maintainer	Count	15	68	83
	% of Total	1.6%	7.3%	8.9%	
	Contributor with no formal project association	Count	45	297	342
		% of Total	4.8%	32.0%	36.9%
	User (every other Debian user)	Count	14	220	234
		% of Total	1.5%	23.7%	25.2%
Total		Count	170	758	928
		% of Total	18.3%	81.7%	100.0%

Few Developers spend a significant amount of their paid time working on Debian (only 3 report spending more than 80% of their work time contributing to Debian). Table 5 indicates that 70 respondents, or 79.5% of valid responses, report spending 0-20% of their work time contributing to Debian.

Table 5 (Debian Developers)

How much of your work time is spent contributing to Debian?			
	Frequency	Percent	Valid Percent
Valid	0-20%	70	26.8
	21-40%	11	4.2
	41-60%	2	.8
	61-80%	2	.8
	81-100%	3	1.1
	Total	88	33.7
Missing	173	66.3	
Total	261	100.0	

In order to elucidate perceptions of paid work in the project, we asked participants questions about whether they have co-workers who are also Debian contributors (Table 6) and whether they acknowledge their firm in the project (Table 7).

Table 6 (All participants)

		Do you have coworkers that are also Debian contributors?			Total
		Yes	No		
What is your current "formal" status in the Debian project?	Project Member ("Debian Developer")	Count	100	126	226
		% of Total	14.0%	17.6%	31.6%
	Project Member, non uploading	Count	5	9	14
		% of Total	0.7%	1.3%	2.0%
	Debian Maintainer	Count	23	47	70
		% of Total	3.2%	6.6%	9.8%
	Contributor with no formal project association	Count	81	177	258
		% of Total	11.3%	24.7%	36.0%
	User (every other Debian user)	Count	34	114	148
		% of Total	4.7%	15.9%	20.7%
Total	Count	243	473	716	
	% of Total	33.9%	66.1%	100.0%	

The highest number of participants who answered positively whether they have co-workers who also contribute to the project were Debian Developers (100), followed by Contributors with no formal project association (81). In relative terms 226 Developers answered the question with 44.2% responding in the affirmative whilst 258 Contributors responded, 45% positively.

Table 7 (All participants)

Do you publicly acknowledge your organization (employer, client, etc.) when contributing to Debian on paid time?				
		Frequency	Percent	Valid Percent
Valid	Yes	79	5.3	54.5
	No	66	4.5	45.5
	Total	145	9.8	100.0
Missing		1334	90.2	
Total		1479	100.0	

Whilst 170 participants declared they are paid to contribute (see Table 4), 145 participants weighed in on whether they publicly acknowledge the organisation paying them when they are contributing to Debian during paid time, with only 79 (54.5%) responding in the affirmative (Table 7). This suggests that a significant amount of paid contributions to the project are made without formally recognizing the interest third-party organisations have in Debian. If we narrow the focus to Developers (Table 8) we find that 81 addressed the question of whether they publicly acknowledge the entity paying them, with a higher proportion (58%, N: 47) answering in the affirmative.

Table 8 (Debian Developers)

Do you publicly acknowledge your organization (employer, client, etc.) when contributing to Debian on paid time?				
		Frequency	Percent	Valid Percent
Valid	Yes	47	18.0	58.0
	No	34	13.0	42.0
	Total	81	31.0	100.0
Missing		180	69.0	
Total		261	100.0	

The number of Debian Developers answering the question ‘Do you communicate with co-workers about your firm’s interests in Debian?’ was much lower: only 52 responded, out of which 41 (78.8%) said ‘yes’ (Table 9). The high proportion of positive responses suggests a strong desire to communicate about Debian with co-workers (in the case of those who addressed the question), whilst the overall low response rate compared to related questions such as whether one is being paid to produce F/OSS (Table 4, 253 respondents) or even whether paid employment is acknowledged (Table 8, 81 respondents) might indicate a reluctance to confront the possibility of conflicts of interest.

Table 9 (Debian Developers)

Do you communicate with co-workers about your firm's interests in Debian?				
		Frequency	Percent	Valid Percent
Valid	Yes	41	15.7	78.8
	No	11	4.2	21.2
	Total	52	19.9	100.0
Missing		209	80.1	
Total		261	100.0	

To be sure, this low response rate could also be caused by DDs working in different areas of a firm and consequently not interacting with each other.

In terms of the embodiment of firm interests within the project, our qualitative data suggest that developers are keenly aware of boundaries and employ techniques such as purposefully using their corporate or professional email address to signal whether their contributions originate from paid work time, or not. Clarity about who is speaking is particularly important if exploitative tendencies are deemed to be at work in firms:

We changed the way we do things in our team because it was a very internally focused team and they basically just saw Debian as, ‘We can get the code and then we can do whatever we want internally’ [...] Not just give back [to the project] because it is right but also long term that just makes much more sense because there is so much overlap in the work. So it is just a much more sustainable approach. I might say, ‘We at [firm x]’ and then I say, ‘Well, we at Debian.’ I think it is very important to be aware and to make it clear who are you speaking for. (DD3)

To the question of whether they are more passionate about their job or the project (Table 10) a high number of Debian Developers answered ‘neither’ (105, whilst 94 chose ‘Debian’, and 30 ‘job’). The ‘neither’ number was similarly high for Contributors with no formal project association (108), however the numbers who chose ‘Debian’ (80) and ‘job’ (62) were much closer, as was the case with

Users ('Debian' 56, 'job' 29). Unsurprisingly DDs are more invested in the project than other categories of respondents.

Table 10 (All participants)

What is your current "formal" status in the Debian project? * Do you feel more passionate about your (paid) job or about Debian? Crosstabulation

		Do you feel more passionate about your (paid) job or about Debian?			Total
		Debian	(Paid) job	Neither / equal	
What is your current "formal" status in the Debian project?	Project Member ("Debian Developer")	Count 94	30	105	229
		% of Total 13.2%	4.2%	14.8%	32.3%
	Project Member, non-uploading	Count 4	4	6	14
		% of Total 0.6%	0.6%	0.8%	2.0%
	Debian Maintainer	Count 25	12	27	64
		% of Total 3.5%	1.7%	3.8%	9.0%
	Contributor with no formal project association	Count 80	62	108	250
		% of Total 11.3%	8.7%	15.2%	35.2%
	User (every other Debian user)	Count 56	29	68	153
		% of Total 7.9%	4.1%	9.6%	21.5%
Total	Count 259	137	314	710	
	% of Total 36.5%	19.3%	44.2%	100.0%	

All interview participants expressed strong loyalty to the project, over their employer. Most Developers had been active in Debian for a long time:

A lot of people join Debian much earlier than joining any company, and a lot of people have changed more companies than Debian. (DD4)

People have loyalty to their employer and understand that they are paying the bills – but I also think, at the end of the day, most people who are really serious about F/OSS put the project as number one. I mean if you ask someone to do something bad they're not going to do it. Either they are going to convince you that it doesn't make sense or they are going to block it or something. (DD3)

5.2. Rhetorical strategies and organisational mechanisms

Interviewed developers fell into three categories: developers were either employed by a non-profit institution, by a large IT firm, or they worked as freelancers. A clear finding arising from the interview data is that the type of work developers engaged in consistently matched the type of rhetorical strategies they put forward, as well as the organisational mechanisms they referred to. The alignment between employee status, organisational mechanisms and legitimization is summarised in Table 11.

Table 11

Alignment between employee status, organisational assemblages and practices, and legitimization				
Employee status	Firm requirement	Organisational assemblages and practices	Rationale and legitimization	Current/future tension
Employed by non-profit	N/A	N/A	‘Mission aligned with Debian’	N/A
Employed by firm	Specific needs	Use of firm email; Project-centered team; Presentation at Debconf	Firm/project synergy (including use of free licenses by firms); Peaceful coexistence	Firm may require feature incompatible with project
Self-employed	Maintain old version of distribution	Dunc Tank; LTS	Making the bazaar viable; Distinct identity emerges; Project diversity	Challenges volunteer participation

Absence of legitimation strategies and of organisational mechanisms

Our central point is that the activity of firm employees and of F/OSS project participants is understood as being structured by different institutional principles or logics – a commercial logic for firms, a communal logic for projects. Discursive legitimations and concrete practical arrangements are needed for organisational hybridity to function, for firms and projects to cooperate. We define these practical arrangements as *organisational mechanisms and practices* which enable firm-project collaboration. These mechanisms can be classified in two categories: those occurring in firms, such as project-centered teams, and those occurring in the Debian project, such as work groups which introduce new behavioural guidelines. Other practices, such as presentations of firm projects during DebConf or the use of professional emails to signal that work on the project was paid for by a firm, are in effect located both in firms and projects.

In some cases it can be observed that no organisational mechanisms or legitimation strategies are present. This occurs when a firm is like a project, that is to say when it's not a firm: in case A, Debian Developers are employed by non-profit organisations. These Developers describe a close fit between the institutional logics governing the project and that governing their employers. This is why there are no specific requirements by the firm and no need for new practical mechanisms to emerge.

It's not exactly the [non-profit] giving me assignments to do something in Debian, but there's a lot of overlap within what we do in our work with Debian. (DD5)

First phase of legitimation (around licenses): firm-project synergy

Before unpacking rhetorical legitimation strategies, it is useful to remind ourselves of the intensity and depth of firm-project collaboration. A recent example of firm engagement is when Google adopted Debian as its internal operating system (instead of its derivative Ubuntu) in 2017. Several Developers mentioned that firms such as Google are supportive of their employees attending DebConf, Debian's annual conference. However, as mentioned earlier, Google's actions are only the latest example of a long line of commercial firm investments in F/OSS. This phase began in the late

1990s, after the rebranding of Free Software as ‘Open Source’, firms such as IBM, Oracle and Sun committed to finance F/OSS projects; in 2002 IBM developers started formally contributing to Apache and Linux (Broca, 2013). The overwhelming majority of Linux code is now being written by employees of firms such as Intel, Red Hat, AMD, Novell and Google (Linux Kernel Contributor Statistic, 2019). A key turning-point was when firms renounced proprietary code in favour of its robust and cost-free alternative: intellectual property ceased being an obstacle to communal-commercial hybridisation and became instead the means for firms to tap into an enthusiastic volunteer workforce. Debian Developers who are employed by large firms accordingly adopt the theme, whose seeds were planted by firms’ adoption of open licensing, of the synergy between firm and project labour. This convergence is not universally applied, with for example social media apps being used by many DDs, despite not existing in an open, F/OSS variant:

People have come and given talks at DebConf about how open source has both won and lost this war, because it powers pretty much everything like this Linux kernel on my phone, and at the same time, most of the software running on it is proprietary. (DD4)

Despite firms adopting open source licenses in some areas only, firms and projects are portrayed as inexorably coming together. In addition to open source licenses, IT firms have also embraced the ethical logic of self-actualisation, which can then be mobilised to characterise creative work irrespective of its commercial or communal aim:

I don’t think there’s a distinction between when I work for the project or when I work for the company, it’s more like, have I done something cool, have I done something that I’m happy about? (DD4)

In the case of firm employees, firm and project work convergence is facilitated not through formal ‘boundary organisations’ (O’Mahony and Bechky, 2008) such as foundations, but through looser, transient and emergent organisational mechanisms which encompass a wide variety of more or less

formalised arrangements. Organisational mechanisms include presentations by firm employees at DebConf, signalling procedures such as using corporate email addresses to indicate that a contribution originates from paid work time, and participation in Debian-focused teams or networks within firms. Employees who are Debian Developers are in a unique position to achieve desirable results for their firm.

We wanted to have HTTPS support in the installer because here at [firm y] we use HTTPS for everything and Ubuntu had it, but Debian didn't and we were basically forking the Debian installer in order to be able to have this HTTPS support and, yes, we can do it but it is a lot of work so we worked with the Debian installer team, we did part of the work and they did part of the work so that in the end we got to have HTTPS support in the installer [...] Whenever we have to fork then we need to work extra to maintain those forks, we can do it, it's a tool that we have but we prefer not to do it if possible, so we prefer to work with upstreams, with Debian [...] If we add a patch then we want this patch to be integrated. (DD6)

In addition to open licensing and self-fulfilment a necessary condition for the commercial and ethical logics to be reconciled is the assurance that this reconciliation is not detrimental to the project. The same developer asserts:

Yes, it was an interest of [firm y] to have HTTPS support but at the time I agreed with this interest, right, I wouldn't have done it if I hadn't agreed with it. [...] If there was a 'secret' [firm] interest I would not follow it, no, no, whenever we have an interest we are forward in saying, for example, 'We want HTTPS support' or— there were issues with licences, with packages that were not correctly licenced so we talked to the maintainer saying, 'Hey, we want this to be correctly licenced', and things like that, we are really straightforward in what we want and, no, I don't think it's a good idea to try to hide your goals because people will figure them out and then it would sour relationships. (DD6)

Yet the coming together of ‘closed’ and ‘open’ systems may well cause some turbulence in the future. The synergistic rationale is threatened by two contradictions. The first has to do with preferred system architectures, which may lead some firms to fork from the project:

[Firm z] does create Debian packages that are non-standard or rather they don’t necessarily follow Debian policy. And I know that’s intentional, now at what level of the company that was decided I don’t know. But I think one of the interests they had was probably to try to make it a little more common. Because they also created packages for Red Hat systems and a number of other systems, Ubuntu, etc. And so they were trying to make things behave the same across the different systems. [...] I think the Debian packages for most of the [firm z] stuff puts everything under a single top-level directory in /opt. And does not divide up the files and put them in the places that they might go in a more traditional package. (DD7)

In this case, the argument is over technical compatibility rather than the morality of the respective logics. By contrast the second zone of conflict serves as a reminder that commercial and communal logics differ in some important respects. Clashes may occur not over the individual rights of code producers, since firms embrace free licensing. Instead they stem from the discrepancy between how firms and project consider *users*, with firms ever-more eager to collect information about user behaviour, potentially violating F/OSS privacy principles:

A lot of corporate interests push these days towards larger-scale data collection. The software’s being configured more and more to collect analytics basically; collect statistics about which buttons you’re pressing and what you’re doing and which features of the product you’re using, and ship all that information back to the company. That could easily make a company want to have its own packages because Debian is probably going to insist on that stuff being turned off by default, if not removed entirely. (DD7)

Second phase of legitimation (around waged labour): making the bazaar sustainable

After employment by non-profits and by firms, a third kind of worker being paid to produce F/OSS code in Debian is self-employed and operates within a dedicated network specifically created to service smaller companies who use older versions of Debian. The Debian Long Term Support (LTS) Project was launched in 2014 to offer 5-year support to older distribution versions: the second phase of legitimization is more recent. A small independent firm was set up by a Debian Developer as an intermediary between firms and members of LTS. What is notable about the following statement by one of this firm's organisers is that a commercial rationale is being openly expressed, with references to 'competition' from a rival project and to 'clients':

And, in parallel to that, there is also Ubuntu which popularised this LTS concept with a 5-year support which in a way did create a kind of competition for Debian, and we did hear sometimes about firms migrating from Debian to Ubuntu, only because of their LTS support. [...] Well after, in terms of work to be done, yes in that case we have a list of packets which correspond to our clients' priority packages and on the other hand we have the Debian security tracker which has all the open security problems and we cross-check both, we first take on the security issues on packets used by our clients and when we've done those, we deal with the rest. (DD8)

A DD working for a major firm described LTS in these terms:

But it's a very well-defined space, right, fix security bugs identified in this particular version of Debian, right, fine, it's not the end of the world. (DD4)

According to another Debian Developer involved in LTS, this activity is accepted by the community, provided it is perceived as not harming the project:

A: I mentioned more than once that I was doing something for a customer.

Q: Mhm and what happened, how did they react, behave, what did they say? Was it positive or negative?

A: Nothing.

Q: Nothing.

A: Which is usual.

Q: Okay.

A: Because I was not doing anything that will affect anybody else also. (DD9)

Large firm employees emphasise that their paid activity slots seamlessly into Debian. In contrast informal networks created by self-employed developers which offer support to smaller firms feature organisational mechanisms which challenge project norms of behaviour: LTS depends on distinct practices such as specific email lists, rules, codes of behaviour, and reminders of what is acceptable, resulting in a disciplining of working relationships within the project:

I've never seen contributors paid in LTS insult another Developer you know, whereas that happens... that happens quite... maybe not very often, but it does happen every now and then [in Debian] that people express themselves in a way that is, shall we say... unpleasant for the person opposite! (DD8)

The emergence of these new practices, which inject professional elements into the more freewheeling project environment, is recent:

I think the perhaps less notable impact, more subtle, is the progressive change in mentalities and the way waged work in Debian is perceived! It's already happened a few times to see paid contributors mention quite openly on Debian lists that they would be OK to do this or that project, but that well it was big and not necessarily much fun, and that if they could be paid they would gladly do it whereas a few years back no-one would have dared to mention this kind of thing. [...] At the moment it works the opposite way, to take part in this system

you already... have to be a Debian contributor which means you have to do something else!

(DD8)

6. The political economy of hybridising F/OSS

Our goal was to determine how the hybridising of commercial and communal logics occurs in the Debian project. We found that 18.3% of project participants were paid to contribute; the number for DDs was much higher, 36.8% (RQ1). We determined that 54.5% of all contributors and 58% of Developers discussed paid work in the project, though the response rate was very low, as it was for the question of whether paid work was discussed with co-workers, indicating a reluctance to address the issue. In terms of the sense of allegiance of developers we found that Developers were more passionate about and more loyal to the project (RQ2). Finally we found that two contradictory rationales are being deployed to justify paid work in Debian, each one being accompanied by organisational mechanisms (RQ3).

It is notable that the existence of paid work within Debian is now accepted as uncontroversial. Previous attempts to institutionalise waged labour in Debian took the shape of the ‘Dunc Tank’ proposal to remunerate Developers in 2006.⁴ The aim was to speed up the release management process.

While Dunc Tank was an external effort, the perception was that Debian itself was paying Debian people, which is highly controversial (DD3).

Some participants felt this proposal betrayed the ethical values of the project, and a General Resolution expressing support for the then-Debian Project Leader was amended to disassociate support for the DPL from DPL-supported projects such as Dunc Tank; this amendment was narrowly defeated (Debian, 2006). There are clear differences: LTS does not apply to the current version of the project, and furthermore is not organised centrally within Debian. Nonetheless LTS does involve

directly paying Developers for Debian-related work, so it is significant that it has not evoked strong adverse reactions.

In contrast to the situation in social enterprises which pit development and banking logics against one another (Battilana and Dorado, 2010), in Debian hybridisation is not occurring through open contradiction and contestation between the communal and commercial logics, as the corporate voices of employees are muted by firms' embrace of open source licenses and employee self-fulfilment: there is no 'identity schism' (Battilana and Dorado, 2010) between polarising logics. Yet our study does bring to light contrasting understandings of what it means to contribute to a peer project, and of who can afford to produce F/OSS.

For Richard Stallman, whose opinions have historically carried some weight in this debate, F/OSS produced by free labour will always be preferable to non-free software produced by decently paid waged labour: the defence of the 'four freedoms' (to use, copy, change, and redistribute modified versions of software) matters more than the fair distribution of profits stemming from software development (Broca, 2018). This normative stance was made very early in the history of free software. In the *GNU Manifesto*, R. Stallman contends that 'there is nothing wrong with wanting pay for work, or seeking to maximize one's income', but only 'as long as one does not use means that are destructive'. Indeed 'extracting money from users of a program by restricting their use of it is destructive' (Stallman, 1985). Over the years, when asked to comment on the valuation of open source companies and the fact that they benefit from unpaid voluntary labour, R. Stallman has given the same answer: these issues are secondary. They are mainly 'a distraction from what really matters: that these programs (e.g. free software) are available for everyone to use in freedom and community' (Stallman, 2018). In other words, the free software movement should consider software as *resources* upon which users have certain *rights*, not as products of a *labour* that deserves *monetary retribution*. Hence, free riding that is not based on enclosing code but on free labour is not a major concern. An illustration of this view's pervasiveness occurred when open source firm Redis attempted to introduce

a new ‘Commons Clause’ licence to limit Amazon’s free riding and was denounced as ‘clueless’ by prominent F/OSS community members (Vaughan-Nichols, 2019).

Yochai Benkler’s near-canonical accounts of peer production (2006, 2013) also insist on the altruistic or passionate intrinsic motivations of peer producers, who will need to find means of subsistence outside peer production. A few voices have also risen from within the F/OSS community against generating funds to compensate developers for their labour. The simplicity and elegance of F/OSS code is born of necessity, goes this argument; the introduction of money means developers will start embellishing code to fill the amount raised, resulting in ‘consultant ware’, needlessly complex software which requires expert advice to run; if intrinsic motivations are replaced by the marketplace, the ‘magic and beauty’ of F/OSS will be lost, according to the creator of the popular Ruby on Rails open source Web application framework (Heinemier Hansson, 2013). Studies of F/OSS developer motivations have uncovered a range of views on the matter, with one interviewee expressing resistance to payment on the grounds that ‘(...) as far as I am aware, there would seem to be an inverse correlation to [financial] motivation and actual ability as a developer’ (Krishnamurthy et al., 2014: 634).

In contrast, other actors in the F/OSS community have claimed that ‘open source has a working-for-free problem’, with some launching firms with the explicit aim of providing independent open source maintainers with a reliable income (Pennington, 2019). In the same vein a candidate for the 2019 Debian Project Leader election proposed in his election platform that Developers should be able to make Debian their careers if they chose to, thanks to increased firm involvement and grants (Michlmayr, 2019). A few months later the issue was revived on Debian’s *Project* list where it generated a robust debate, with some Developers arguing that introducing financial rewards risked distorting Debian’s emergent and self-directed means of determining the relative value of project goals (debian-project, 2019)

This perspective acknowledges the reality of firm support for F/OSS but argues that the highly distributed nature of this support, as well as the ethical norms of F/OSS, guarantee project autonomy. Yet this rejection of financial rewards in the project fails to address the social stratification which results in 1.5% of F/OSS developers being female, against 28% for proprietary software (David et al, 2003; Kuechler et al, 2012; Dryden, 2013). Indeed the relationship of ethical-modular organisations to existing social hierarchies is seldom evoked in terms of class, with gender often framed as the most significant source of power imbalances (Nafus, 2012). That voluntary labour in ethical-modular organisations is only accessible to a minority is obvious. However it is not only women who do not have the disposable income, cultural capital, or family support to engage in unpaid labour (Huws, 2013).

Our data reflect these tensions. When an interviewee asserted that producing F/OSS at work allowed him to ‘save on [his] free time’ (DD10), the motivation seems to be entirely hedonistic. In contrast others point out that the work they are doing is ‘not gratifying’ (DD8). This more prosaic conception views participation as a form of necessary drudgery which deserves fair compensation. This led another participant to question the social basis of the ethical-modular logic:

Who can contribute for free? I ask myself, who has the privilege to do that, who are they, well they are white men, upper middle class, which means there is a political dimension which is brought by these people into the project. These people have a certain posture, a certain opinion, which naturally conforms to a whole section of society. I think that in this respect there is fundamentally a problem. If there is no risk of burnout at least there is an issue of representativity as people are not compensated for their participation in the project. (DD11)

If volunteer work is intrinsically linked to a form of social domination (only those with the requisite cultural and economic capital may take part), this has implications for a peer project’s long-term viability. It may well be possible for volunteer projects to persist and even thrive in a technical sense

with a highly restricted membership base; but there might come a time when this restricted base is viewed as exclusive or even discriminatory, and popular use and support might dwindle accordingly.

7. Conclusions

Our quantitative and qualitative analysis provides clear and novel evidence of the extent, perception and impact of paid work within the Debian project. Paid work is widely accepted, but rarely acknowledged or discussed. We have shown that the process of hybridisation between commercial and communal logics occurs in two ways. A first phase of legitimation blurred the distinction between firm and project work. This synergy depended on firms embracing open source licenses.

Organisational mechanisms and practices include presentations at DebConf and the use of professional email accounts. Nonetheless large firms may pose threats to the project: a firm forking would entail losing a major user, whilst establishing a different standard also has huge ‘commercial’ implications. Yet firm employees do not emphasize commercial rationales and instead mainly refer to communal ones, with firm enrolment framed in terms of ethically enabling passionate labour. This legitimation, which papers over the foundational difference between communal and commercial logics, is challenged by how user privacy is considered in projects and firms. It also raises the question of whether firms are ‘free riding’ on the volunteer labour of project contributors who are not employed by firms. This question is far from new, with early research into F/OSS noting that firms were ‘harvesting the altruism’ of volunteer developers (Haruvy et al., 2003), resulting in a relationship between ‘altruistic individuals and selfish firms’ (Rossi and Bonaccorsi, 2004). Yet this old question takes on new significance with the central position that F/OSS now occupies in the digital economy; as does the related question of the fair sharing of the benefits of this free labour. This in turn calls attention to the fact that the economic model of commons-oriented peer production has yet to be articulated with social rights and social welfare (Maurel, 2019).

Conversely, a second, emergent legitimation phase focuses on how volunteer modular labour can operate in a sustainable fashion. This contradicts the absolute freedom of traditional F/OSS by

introducing new organisational mechanisms between the commercial and communal worlds, such as work groups within the project and associated norms of professional behaviour. Our analysis of the organisational hybridising process thus implies an updating of the motivational issues which preoccupied researchers fifteen years ago (Lerner and Tirole, 2002; Haruvy et al., 2003), as we show that motivations and values are linked to the employment status of Developers.

Domination in projects used to be expressed through an internal/external dichotomy, with certain categories of people being unable to take part in the project. The introduction of commercial interests may allow more entities to take part in the project, but does not reduce domination, which is expressed differently: through a hierarchy of contributors. Some are employed by large firms and able to hedonistically work on exciting code, whilst others are self-employed with their only option being to carry out drudge work.

The project's ethical-modular or communal logic depicts Debian as free from mercantile interests. Although large firms do play a role in Debian via paying some Developers' salaries, the influence these firms exert on the project is either unacknowledged or minimised by Developers. Money has long been a 'taboo' subject in F/OSS (Eghbal, 2016). As long as financial transactions occur outside Debian, they will not affect it, goes the argument. It remains to be seen to what extent this economic model (in which the self-directed production of public goods is supported by revenue generated outside itself) will be reshaped by emergent forces seeking to connect peer production to waged labour on the one hand, and to new forms of social rights on the other.

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¹ <https://www.debian.org>

² Raw data about active participation in Debian can be found at <https://contributors.debian.org>

³ The full survey results are available here: <http://peerproduction.net/issues/issue-10-peer-production-and-work/preliminary-report-debian-survey/>

⁴ ‘Dunc Tank’ was the code name of an experiment run in December 2006 by a group of Debian Developers, including the then Debian Project Leader, to raise funds to pay the stipends of the then Debian release managers in order to speed up the release of the next version of the Debian operating system. The involvement of the then Debian Project Leader and the difference in treatment of release managers v. the rest of Debian volunteer developers which would have resulted meant that Dunc Tank stirred a great deal of controversy within Debian, leading commentators to wonder whether the project was about to collapse. See Ris (2006) for an account in the *Linux Weekly News*.