

The London School of Economics and Political Science

Open or Closed? The Politics of Software Licensing in Argentina and Brazil

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Declaration

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Abstract

Whether software is licensed under terms which ‘close off’ or make accessible the underlying code that comprises software holds profound implications for development due to the centrality of this good to contemporary life. In the 2000s, developing countries adopted policies to promote free and open source software (F/OSS) for reasons of technological autonomy and to reduce spending on royalties for foreign produced proprietary software. However, the adoption of such policies varied across countries.

Focusing upon Argentina and Brazil, two countries that reflect contrasting policy outcomes in promoting F/OSS, I explain why and how different policies came to be adopted by analysing the way in which institutions and patterns of association affected the lobbying power of advocates and opponents of F/OSS promotion. Advocates are generally weak actors, yet they might strengthen their lobbying power through embeddedness within political and state institutions which offer opportunities to mobilise resources and forge ties with political decision-makers. Opponents are generally strong, business actors, yet their lobbying power may be attenuated by weak concentration in business association, reducing their capacity to mobilise and coordinate support.

In Argentina, where F/OSS advocates’ institutional embeddedness was weak and concentration in business association was strong, the government was prevented from promoting F/OSS, despite signs that it wished to do so. In Brazil, where F/OSS advocates’ institutional embeddedness was strong and concentration in business association was weak, the government promoted F/OSS despite vociferous opposition from amongst the largest firms in the world.

Based on empirical data encompassing interviews, media reports and documents gathered from government, business and activist sources, my research informs understanding of the political origins of policy choice in an area where existing academic explanation has tended to emphasise the role of economics or ideas. I also contribute to theory in comparative political economy by identifying the mechanisms by which patterns of association and institutions affect actors’ lobbying power.

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List of Abbreviations

<i>ABES</i>	<i>Associação Brasileira das Empresas de Software</i> (Brazilian Association of Software Firms)
<i>APR</i>	<i>Acción por la Republica</i> (Action for the Republic, Argentina)
<i>ASL</i>	<i>Associação Software Livre</i> (Free Software Association, Brazil)
<i>ASLE</i>	<i>Ámbito de Software Libre en el Estado</i> (Free Software Ambit within the State, Argentina)
<i>ASSESPRO</i>	<i>Associação das Empresas Brasileiras de Tecnologia da Informação</i> (Association of Brazilian IT Firms)
<i>Banrisul</i>	<i>Banco do Estado do Rio Grande do Sul</i> (State bank of Rio Grande do Sul, Brazil)
<i>BPO</i>	Business process operations
<i>BRASSCOM</i>	<i>Associação Brasileira de Empresas de Tecnologia da Informação e Comunicação</i> (Brazilian Association of Information Technology and Communication Companies)
<i>BSA</i>	Business Software Alliance
<i>CATI</i>	<i>Comitê da Área de Tecnologia da Informação</i> (Committee for IT, Ministry of Science and Technology, Brazil)
<i>CEGE</i>	<i>Comitê Executivo do Governo Eletrônico</i> (Electronic Governance Executive Committee, Brazil)
<i>CELEPAR</i>	<i>Companhia de Tecnologia da Informação e Comunicação do Paraná</i> (State data processing company of Paraná, Brazil)
<i>CESSI</i>	<i>Cámara de Empresas de Software y Servicios Informáticos de Argentina</i> (Chamber of Argentinean Software and IT Services Firms)
<i>CICOMRA</i>	<i>Cámara de Informática y Comunicaciones de la República Argentina</i> (Argentine Chamber of IT and Communications Firms)
<i>CISL</i>	<i>Comitê Implementação do Software Livre</i> (Committee for the Implementation of Free Software, Brazil)
<i>CNPq</i>	<i>Conselho Nacional de Desenvolvimento Científico e Tecnológico</i> (National Council for Scientific and Technological Development, Brazil)
<i>DATAPREV</i>	<i>Empresa de Tecnologia e Informações da Previdência Social</i> (Social Security Administration IT Company, Brazil)
<i>Educ.AR</i>	<i>Portal educativo del estado argentino</i> (Argentinean government education portal)
<i>F/OSS</i>	Free/open source software
<i>FENADADOS</i>	<i>Federação Nacional dos Empregados em Empresas e Órgãos Públicos e Privados de Processamento de Dados, Serviços de Informática e Similares</i> (National Federation of IT Workers, Brazil)

<i>FENAINFO</i>	<i>Federação das Empresas de Informática</i> (Federation of IT Firms, Brazil)
<i>FINEP</i>	<i>Financiadora de Estudos e Projeto</i> (Funding Authority for Studies and Projects, Ministry of Science and Technology, Brazil)
<i>FISL</i>	<i>Fórum Internacional de Software Livre</i> (International Free Software Forum, Brazil)
<i>FONSOFT</i>	<i>Fondo Fiduciario de Promoción de la Industria del Software</i> (Fiduciary Fund for the Promotion of the Software Industry, Argentina)
<i>FRI</i>	<i>Foro de Responsables Informáticos</i> (State IT Administrators Forum, Argentina)
<i>FVL</i>	<i>Fundación Via Libre</i> (Free Path Foundation, Argentina)
<i>HCDN</i>	<i>Honorável Câmara de Deputados de la Nación</i> (National Chamber of Deputies, Argentina)
<i>ITI</i>	<i>Instituto Nacional de Tecnologia da Informação</i> (National Institute of Information Technology, Brazil)
<i>MC</i>	<i>Ministério das Comunicações</i> (Ministry of Communications, Brazil)
<i>MCT</i>	<i>Ministério da Ciência e Tecnologia</i> (Ministry of Science and Technology, Brazil)
<i>MDIC</i>	<i>Ministério do Desenvolvimento, Indústria e Comércio Exterior</i> (Ministry of Development, Industry and Foreign Trade, Brazil)
<i>ME</i>	<i>Ministerio de Educación</i> (Ministry of Education, Argentina. 2007 onwards)
<i>MEC</i>	<i>Ministério da Educação</i> (Ministry of Education, Brazil)
<i>MEcon</i>	<i>Ministerio de Economía</i> (Ministry of Economy, Argentina)
<i>MECyT</i>	<i>Ministerio de Educación, Ciencia y Tecnología</i> (Ministry of Education, Science and Technology, Argentina. Up until 2007)
<i>MinC</i>	<i>Ministério da Cultura</i> (Ministry of Culture, Brazil)
<i>MinCyT</i>	<i>Ministerio de Ciencia, Tecnología</i> (Ministry of Science and Technology, Argentina. 2007 onwards)
<i>MNC</i>	Multinational Company
<i>MPOG</i>	<i>Ministério do Planejamento, Orçamento e Gestão</i> (Ministry of Planning, Brazil)
<i>MRE</i>	<i>Ministério das Relações Exteriores</i> (Ministry of Foreign Relations, Brazil)
<i>MTEySS</i>	<i>Ministerio de Trabajo, Empleo y Seguridad Social</i> (Ministry of Labour, Employment and Social Security, Argentina)
<i>ONTI</i>	<i>Oficina Nacional de Tecnologías de Información</i> (National IT Office, Argentina)
<i>PJ</i>	<i>Partido Justicialista</i> (Justicialist Party, Argentina)

<i>PROCEMPA</i>	<i>Companhia de Processamento de Dados do Município de Porto Alegre</i> (Data processing company of the municipal government of Porto Alegre, Brazil)
<i>PROCERGS</i>	<i>Companhia de Processamento de Dados do Estado do Rio Grande do Sul</i> (State Data Processing Company of Rio Grande do Sul, Brazil)
<i>PS</i>	Proprietary software
<i>PSDB</i>	<i>Partido da Social Democracia Brasileira</i> (Brazilian Social Democracy Party)
<i>PSL</i>	<i>Projeto Software Livre</i> (Free Software Project, Brazil)
<i>PT</i>	<i>Partido dos Trabalhadores</i> (Workers Party, Brazil)
<i>SEPIN</i>	<i>Secretaria de Política de Informática</i> (Secretariat for IT policy, Ministry of Science and Technology, Brazil)
<i>SERPRO</i>	<i>Serviço Federal de Processamento de Dados</i> (Federal Data Processing Service, Brazil)
<i>SICPME</i>	<i>Secretaría de Industria, Comercio y de la Pequeña y Mediana Empresa</i> Secretariat for Industry, Commerce and SMEs, Argentina)
<i>SLTI</i>	<i>Secretaria de Logística e Tecnologia da Informação</i> (Secretariat of Logistics and IT, Ministry of Planning, Brazil)
<i>SME</i>	Small/medium sized enterprise
<i>SoLAr</i>	<i>Asociación Civil Software Libre Argentina</i> (Civil Association for Free Software, Argentina)
<i>TCU</i>	<i>Tribunal de Contas da União</i> (Court of Audit of the Union, Brazil)
<i>UCR</i>	<i>Unión Cívica Radical</i> (Radical Civic Union, Argentina)
<i>UPMPM</i>	<i>Universidad Popular Madres de Plaza de Mayo</i> (Popular University of the Mothers of the Plaza de Mayo, Argentina)

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1 Introduction

At the turn of the millennium, developing countries around the world began to consider and adopt policies to promote free and open source software (F/OSS).¹ In contrast to ‘closed source’ proprietary software (PS), F/OSS is licensed under terms which make the underlying source code freely available to inspect, modify, distribute, compile and run.² These attributes offer a range of benefits for development, not least the opportunity to avoid paying royalties on imported PS (Ghosh, 2004; May, 2006; Wade, 2002; Weber, 2003; Weerawarana and Weeratunga, 2004). Yet the degree to which developing countries have sought to take advantage of these benefits through policy has varied; though many countries have embraced F/OSS, many countries have adopted or maintained policies that favour PS instead.

The development implications of policies that affect the way in which software is licensed are profound, yet our understanding of cross-national variation in these policies remains limited. This thesis addresses this gap in our understanding of this important phenomenon.

Prevailing explanations of software licensing policies tend to stress the role of agency and ideas. In mainstream media commentary, for example, F/OSS promotion is regarded as a response to the domination of the global software industry by US firms, principally Microsoft, and is purportedly associated with governments of a leftist, nationalist orientation (see Festa, 2001). Academic studies of F/OSS policies in developing countries reflect a similar emphasis on agency and ideas in explaining these policies. In her analyses of the politics surrounding the Brazilian government’s promotion of F/OSS, Schoonmaker (2007; 2009) provides an explanation for F/OSS promotion that tends to privilege the role of agency and ideas, by focusing upon the

¹ Throughout this thesis, free software and open source software will be considered one and the same for simplicity. It is however important to point out that free software and open source software are distinct and licensed under different terms that hold important implications. Free software may not be relicensed under terms that would ‘close-off’ the source code and requires code with which it is merged to also be licensed under free software terms. By contrast, open source software may be relicensed under different terms and thus ‘closed’ and does not require code with which it is merged to be relicensed under open source terms (Carranza Torres, 2004; Söderberg, 2008: 37; St. Laurant, 2004; Vaidhyanthan, 2003: 156).

² Although the ‘free’ in free software refers to *freedom* or liberty rather than meaning free as in gratis, a corollary of this freedom is that F/OSS may be used without the need to pay licensing fees.

rationale and goals that motivated this policy. Kapczynski (2008), attending to how the politics of framing influence policies relating to F/OSS more generally and Shaw (2008; 2011), in accounts of how bureaucrats' technocratic expertise and social ties enabled these actors to precipitate F/OSS promotion in Brazil, similarly provide explanations that stress the role of agency and ideas. Although these explanations of policy are insightful, they offer incomplete understanding of why or how policies came to be adopted. It is unclear, outside ideas in themselves, why certain ideas prevailed over others in influencing policy choices, or, why F/OSS advocates were more successful than the purveyors of alternative ideas in translating their ideas into policy. Ideas may play an important role in shaping policy choices, but they are likely to be intertwined with interest-based and institutional factors that may be equally if not more important in driving policy outcomes (Drahos, 2008; Hall, 1997). To understand more fully the reasons for policy choice, it is necessary to incorporate into analysis consideration of the characteristics of surrounding interests and institutions that mediate actors' capacities to influence policy.

The limitations of agency and ideas in explaining cross-national variation in software licensing policy are illustrated with regard to Latin America. In general, patterns of policy variation in this region appear to corroborate an association between political bias. The most emphatic promotion of F/OSS occurred under the governments of Hugo Chávez in Venezuela and Rafael Correa in Ecuador – governments of a leftist, populist orientation (Conaghan, 2011; López Maya, 2011) generally viewed as amongst the most radical in the region (Levitsky and Roberts, 2011; Panizza, 2009; Philip and Panizza, 2011). By contrast, the policy was conspicuous by its absence in countries such as Mexico and Colombia, where governments were right of centre and closely aligned with the US (see Burton, 2011; Livingstone, 2011; Raby, 2011). F/OSS promotion was also either absent or tenuous amongst more moderate leftist governments such as those of Ricardo Lagos and Michelle Bachelet in Chile and Tabaré Vázquez in Uruguay (see Lanzaro, 2011; Roberts, 2011). Such patterns of variation chime with Jorge Castañeda's (2006) notion of the "two lefts". Whilst F/OSS promotion appeared consistent with the "wrong left" which is characterised as populist, "nationalist [and] strident", it was apparently resisted by the "right left", which is depicted as market orientated, "reformist, and internationalist". Yet away from the more extreme examples of leftist and rightist bias, the role of ideas appears less significant in explaining policy

variation. Under the governments of the Kirchners in Argentina and Lula in Brazil – two mutually contrasting exponents of Castañeda’s two lefts – policy outcomes diverged from what trends in the wider region would have predicted.

The Kirchner governments typified Castañeda’s “wrong left”. Considered populist and leftist (Panizza, 2005), displaying recalcitrance towards the IMF and international creditors in negotiating repayment of Argentina’s debt and an increasing propensity to intervene in the market (Etchemendy and Garay, 2011; Panizza, 2014; Riggiorzi, 2009; Tussie, 2009), the Kirchner governments’ appeared quintessential proponents of F/OSS. Yet the policies of the Kirchners were amongst the most favourable to PS anywhere in South America. Whilst calls to promote F/OSS in the public sector were resisted, the government worked with Microsoft to deliver policies across a range of areas. Symbolising the Kirchner governments’ embrace of PS, Cristina Fernandez de Kirchner made a point of receiving Microsoft CEO Steve Ballmer to much media fanfare in the presidential palace.

In contrast to the Kirchners, Lula and his governments were extolled by Casteñeda as models of the “right left”. Viewed as moderate, continuing the market-orientated policies of the preceding Cardoso administration (Hunter, 2008; 2011; Panizza, 2009; Power, 2008) and maintaining cordial ties with the US (Vigevani and Cepaluni, 2007), the political bias of the Lula governments suggested they would resist F/OSS promotion. Yet under Lula, Brazil became synonymous with F/OSS, arguably doing more to promote F/OSS than any other country anywhere else. Promoting F/OSS across a range of policy areas, the government even pushed for F/OSS’ development benefits to be acknowledged in international fora. In a move that symbolised his government’s resolve in promoting F/OSS, President Lula rebuffed Bill Gates’ attempts to hold an audience with him.

In this thesis I explain software licensing policy in Argentina and Brazil, South America’s largest economies and most politically influential countries, where policy outcomes deviated from trends in wider Latin America and what prevailing explanations of these policies would have predicted. In doing so, I provide new understanding of the politics of software licensing by demonstrating how policy is shaped by surrounding conditions as well as ideas and agency. In addition to showing

the relative importance of different causal factors in bringing policies about in Argentina and Brazil, I also contribute to understanding of how politics may shape policy more broadly by identifying and explicating the mechanisms by which causal factors operate. Presenting findings based on extensive fieldwork based research, I not only redress the limited academic scholarship that the politics of software licensing have so far received but also a lack of empirical knowledge surrounding policies, an issue signalled by frequent citation of anecdotal information from press and Internet sources in wider academic discussion of these policies (see Lerner and Schankerman, 2010: 157; Weber and Bussell, 2005: 76).

Through a theoretical framework informed by scholarship in comparative political economy, I argue that two factors – one concerning institutions, the other the organisation of interests – accounted for most of the variation in policy across Argentina and Brazil. Institutions and the organisation of interests condition the capacity of the actors that surround software licensing to translate their preferences into policy by mediating their lobbying power. The way in which interests are organised influence actors' lobbying power by affecting actors' ability to mobilise resources and support. Institutions may affect actors' lobbying power by offering access to resources that can facilitate mobilisation of support and by providing ties that may enable access to political decision-makers.

I argue that the Kirchner governments adopted policies that favoured PS because PS advocates' lobbying power was strong on account of strong cohesion in the organisation of the software sector whilst F/OSS advocates' lobbying power was weak on account of their isolation from incumbent political forces and the state. Strong sectoral cohesion enhanced PS advocates' lobbying power by increasing their ability to mobilise and coordinate the sector whilst F/OSS advocates' isolation from government limited their lobbying power as they possessed limited capacity to mobilise resources and lacked ties with political-decision makers.

I contend that the Lula governments adopted policies that favoured F/OSS because F/OSS advocates lobbying power was strong due to strong participation by these actors within incumbent political parties and the state whilst PS advocates' lobbying power was weak on account of fragmented organisation in the software sector. F/OSS

advocates' strong embeddedness within the government strengthened their lobbying power by offering resources and ties to political-decision makers whilst low cohesion in the organisation of the software sector attenuated PS advocates' lobbying power by reducing their capacity to mobilise and coordinate the sector.

Software and Development

Due to the centrality of software to contemporary life – a phenomenon by no means restricted to more affluent countries as the pervasiveness of software grows with ever cheaper technology – software lies at the heart of opportunities for development. Software is integral to contemporary production (Evans, 1995; Schware, 1992a) and productivity across the economy as a whole (Marques, 2009), the information economy (Ó Riain, 2004; Singsangob, 2003) and technology generally (Manovich, 2013) and is subsequently key to economic success. Comprising code that embodies rules, software also represents an “architecture of control” which may be used to monitor, regulate and govern populations (Albrecht and McIntyre, 2005; Graham, 2005; Kapczynski, 2008: 823; Lessig, 2006: 38; Lyon, 2003; 2009). By affecting human rights, civil liberties and democracy, software poses political as well as economic implications for development. The way in which software is licensed affects who controls as well as who benefits from this technology and the state plays a key role in determining who these actors are by influencing the prevalence of different software licensing schemes through the policies that it adopts.

Software has become increasingly significant to development as knowledge has grown more important to the generation of wealth (Castells, 2010a). As its importance has risen, knowledge has become vital to power in the international system, underpinning not only economic strength but also coercive capacity (Strange, 1994). The ascendance of knowledge has been accompanied by an attendant rise in efforts to protect knowledge through property rights (Coriat and Orsi, 2002; Evans, 1997a; Landes and Posner, 2004). With production and trade in information based goods dominated by the US and other developed nations, these countries have headed efforts to protect knowledge, advocating a notion of intellectual property (IP) as private property and raising levels of IP protection.

Championing their interpretation of IP as the means to harness the economic potential of knowledge (Chang, 2002), developed countries have pressed for stronger protection of IP to be implemented in developing countries (Drahos and Braithwaite, 2002; Maskus, 2000; Sell, 2003; Sell and Prakash, 2002; Sum, 2003). But whilst strong IP protection benefits IP owners, it raises the costs of knowledge for users, impeding knowledge transfer and follow-on innovation. Where strong protection of IP protects developed countries' competitiveness in knowledge based industries, it negatively affects net importers of knowledge based goods in the developing world, contributing to a 'digital divide' between the global North and South.

Because of the significance that ICT holds for wealth creation, the way in which property rights are applied to ICT has major ramifications for welfare distribution within and between developed and developing countries, as well as rates of innovation and economic growth (Weber and Bussell, 2005). Property rights in ICT thus represent one of the principle determinants of the balance of power between North and South, facilitating the maintenance of economic and political power asymmetries that favour the North. Although the North's superior power advantage suggests its continued dominance over the South, these dynamics are by no means predetermined due to the potential of technological change to precipitate economic, social and political transformation (Boas and Dunning, 2005; Schumpeter, 1994).

Despite the constraints IP places on flows of informational goods and knowledge from North to South, innovations in IP, made possible through technological change, offer new opportunities for developing countries to bridge the digital divide. F/OSS represents perhaps the most radical of these innovations, inverting the notion of IP as private property by licensing software under terms that allow its unrestricted use, reproduction, distribution and adaptation (Rodriguez, 2005; St. Laurant, 2004). As the North pressures Southern countries to enforce IP rights, F/OSS allows compliance with high levels of IP protection whilst avoiding payment of licensing fees for PS (May, 2006).

Benefits of F/OSS

F/OSS may offer political and economic benefits that are absent with relation to PS. Those benefits that are perhaps most widely cited relate to the use of software, principally the fact that use of F/OSS forgoes the necessity to pay license fees. As detractors of F/OSS are quick to point out, use of F/OSS is not necessarily cost free as license fees may represent just one of a number of costs associated with using software (Lerner and Schankerman, 2010) yet it may avoid financial expenditure. Opportunities for avoiding license fee payments are particularly important in developing countries.

As fees for PS licenses sold in developing countries tend to reflect prices in developed countries, the lower purchasing power of users in developing countries means licensing costs as a share of the total cost of IT ownership are considerably greater (Ghosh, 2003; May, 2006; Sum, 2003: 383). As developed countries, principally the US, dominate production of PS (Singsangob, 2003), F/OSS also allows developing countries to spend elsewhere scarce foreign exchange that would otherwise be used to pay royalties for foreign PS (Wade, 2002).

F/OSS allows users to escape what Wade (2002: 452) describes as the “software-hardware arms race”, where new releases of PS tend to require ever increasing computing power that necessitates expenditure on more powerful hardware. A wide range of F/OSS systems software together with the opportunities that F/OSS offers for software customisation allow continued utilisation and improved performance of older, less powerful hardware that is likely to be in abundance in developing countries.

F/OSS may increase user independence, by avoiding the lock-in associated with proprietary systems. PS firms use limited compatibility with competing goods to increase switching costs and thus maintain customers. Proprietary standards allow PS firms to raise revenue through planned obsolescence. F/OSS interacts with open standards that reduce dependence on particular suppliers.

The opportunities F/OSS offers for software to be modified allow software to be adapted to user-defined needs (Weerawarana & Weeratunga, 2004: 30). This

characteristic of F/OSS allows developing countries rather than foreign vendors to determine how software is used by providing opportunities to adapt software to local needs.

By allowing software source code to be studied, F/OSS facilitates acquisition of skills and knowledge that make it ideal for use in education (Deek and McHugh, 2007: 317; Lerner and Tirole, 2005: 112). Embodying peer production and the practice of hacking F/OSS also promotes learning at a more fundamental level by encouraging an understanding of technology as something that may be manipulated, developed or produced by the individual themselves for their own ends rather than supplied by a firm as a ‘black box’.³

Software Production

As firms in developed countries dominate production of PS, developing countries are likely to be net importers of PS (Correa, 1996; Shadlen et al., 2005). Switching from PS to F/OSS offers opportunities to reduce import bills whilst generating local economic activity (Weerawarana & Weeratunga 2004).

A dominant share of PS imports is likely to correspond to systems software and generic applications in horizontal, mass market segments. These areas of the market are characterised by “low application specificity” and “high interest in reproduction” and PS firms operating in these market segments rely heavily on appropriation (Softex, 2005a). The availability of free and open source alternatives to PS systems and horizontal applications software offering functionality equivalent to that offered by their PS counterparts means imports of PS may be easily substituted with F/OSS. At the same time, such substitution presents limited threats to local production and provision of services associated with software. Economies of scale are important in information based industries, creating barriers to entry for firms in developing countries. The importance of economies of scale tends to favour first movers (Evans and Wurster, 1997) and as US corporations were the first to colonise the realm of software, the

³ Contrary to the popular media framing of hacking as nefarious and inimical to the public good, hacking refers to the creative pursuit of experimenting with, adapting, fixing or enhancing technological artefacts (see Söderberg, 2008). Hacking may be conceived as both a productive activity and ‘learning by doing’.

software industry is predominantly concentrated in the hands of US corporations. Because foreign firms already generally dominate areas of the market where PS firms depend heavily upon appropriation, local producers of software often operate in other areas of the market. Local firms often compete in niche market segments, such as in Enterprise Resource Planning (ERP) and accounting software where knowledge in local laws and regulations offers them a competitive advantage (López, 2003; Marques, 2009). Software in these areas of the market is less generic, interests in reproduction are lower and firms depend less upon appropriation of the software itself. Because local producers are less dependent on appropriation, F/OSS not only presents lower threats to these firms but might also offer benefits. In areas of the market where dependence upon appropriability of software is low, F/OSS presents commercial opportunities.

Businesses might profit from F/OSS through a range of business models and strategies in areas such as embedded software, and low and high value added services encompassing software customisation, training, support and maintenance (Softex, 2005a). Due to firms' inability to appropriate F/OSS source code, the economic rents associated with these opportunities are generally lower than those associated with PS (Söderberg, 2008). However, in developing countries, the service orientated business opportunities that F/OSS offers may be valuable in generating more highly skilled employment (Weerawarana and Weeratunga, 2004).

Perhaps the most important economic benefit that might be derived from F/OSS concerns the ability to harness the productive capacity of networks through peer production. The production of F/OSS – where software is produced by developers or hackers connected through computer networks via the Internet – embodies peer production (Benkler, 2002; 2006). Across society generally, F/OSS enables knowledge transfer and human capital accumulation that is impossible under PS. This facet of F/OSS suggests greater efficiency in the utilisation of knowledge that might stimulate commercial activity. Whilst high-fixed costs present an issue for development where a PS model is utilised, because F/OSS harnesses network production, it helps to overcome this issue. The economic upshot of F/OSS is not as simple as "PS firms losing revenue", but about harnessing the network production. Unlike firms' revenues, the economic benefits of network production are hard to quantify, not least because some of

the benefit encompasses consumer savings. Yet, as with technology generally, these benefits are likely to affect productivity across the economy as a whole.

Democracy

As well as economic benefits, F/OSS also offers political benefits. F/OSS facilitates democracy by reducing costs and thus increasing social access to software. Because access to F/OSS is not dependent upon a market transaction, F/OSS frees users from the market and thus control by market forces. However, there is also another dimension to the way in which F/OSS facilitates democratisation. The source code which comprises software represents rules which restrict, govern and control social behaviour (Lessig, 2006; Silveira, 2004: 42). By controlling access to source code, the terms under which software is licensed determine who may set these rules as well as view them. If society is to be democratic, these rules need to be formulated through public input and be subject to public scrutiny. Such input and scrutiny is denied by PS because it closes off access to source code, effectively permitting dictatorship by software. If the state is to uphold democratic principles, the software it uses must be licensed under free/open source terms.

Autonomy

The independence from vendors that F/OSS offers software users is inherently political. Domination of systems and generic applications software by US PS firms means use of this software leaves countries exposed in security terms. In the wake of the Snowden revelations (Mazzetti and Schmidt, 2013), use of technology for the purpose of covert surveillance and espionage has gained a high profile, yet such use is by no means new (see Aldrich, 2011; Todd and Bloch, 2003). In relation to PS specifically, rumours of a NSA backdoor in Microsoft Windows emerged in the late 1990s (Campbell, 1999; Todd and Bloch, 2003: 52). The ubiquity of Windows makes it an ideal intelligence gathering platform and use of Windows for this purpose is consistent with the notion that Microsoft was not broken up following its US antitrust suit because of its importance to US interests (see Peritz, 2010: 205). In the same way that openness enhances accountability, so too does it enhance security by allowing code to be audited (U.S. Department of Defense, 2006: 7). F/OSS may also contribute to autonomy by

increasing self reliance in IT (Weerawarana and Weeratunga, 2004). As touched upon above, the opportunities that F/OSS offers to adapt and learn about software allows developing countries to become more self-reliant in IT by facilitating the capacity to produce this good.

Rationale for the State to Intervene in the Way Software is Licensed

Although F/OSS offers a range of potential benefits for development, these benefits look unlikely to be realised in the absence of state intervention because the incentive structures and economics that surround software licensing tend to militate against F/OSS gaining greater prevalence. Interests tend to aggregate around selective benefits, incentives for aggregation rising with the size of benefits and extent to which free-riders may be excluded (Olson, 1965; 1982). Whilst rivalrous and excludable characteristics provide strong incentives for firm formation and investment in advertising around PS, non-rivalrous and non-excludable attributes mean these incentives will be weak in the case of F/OSS. As an upshot, public awareness of PS is disproportionate to that of F/OSS (Comino and Manenti, 2005). The effects of these knowledge asymmetries on F/OSS' prevalence interact with other factors which tend to further diminish awareness of F/OSS in the wider population. Information goods such as software are characterised by high fixed costs of production and low marginal costs of reproduction which mean competition is based on economies of scale – as firm size becomes decisive to competing on price, markets are prone to capture by a single firm as only the strongest survives (Lerner and Schankerman, 2010; Shapiro and Varian, 1999). As mentioned above, economies of scale tend to favour first movers and in market segments where PS gained popularity before F/OSS, PS has tended to maintain a dominant market share. The tendency for tipping in markets for informational goods is further intensified by network effects, where a good's value increases with its popularity (Weber, 2003). Network effects are associated with positive feedback and where goods benefit from these effects, they will become more popular. By the same token, where goods enjoy limited popularity, positive feedback will act to diminish popularity. Another facet of information goods which combines with the general dynamics that surround F/OSS to limit its wider adoption concerns the fact that information goods are experience goods, where their value only becomes apparent with use. If the existing dominance of PS, together with low publicity and network effects lead to scarce awareness of F/OSS in

the population, even where awareness exists users are unlikely to recognise interests in F/OSS until they use it.

How the State Might Promote F/OSS

The state might influence the prevalence of F/OSS through a range of policies. Government use of software may play a central role in a wider strategy to promote F/OSS (Weerawarana and Weeratunga, 2004). Software usage within the government affects software use in wider society because citizens have to interact with the software deployed by government to access government services (Lerner and Schankerman, 2010; Rens, 2011). The state also represents one of the largest IT users and may also influence use of software in wider society through demand (*ibid.*). As well as raising awareness and encouraging use of F/OSS within the public at large, government use of F/OSS may stimulate economic activity linked to F/OSS (Schoonmaker, 2009a; Weerawarana and Weeratunga, 2004). Education is another strategic policy area for the promotion of F/OSS because it may raise awareness, engender recognition of F/OSS' value through use, facilitate learning and encourage the harnessing of peer production, raising implications for productivity across the economy. F/OSS might be promoted through education by adopting F/OSS in schools and incorporating study of F/OSS within the teaching curriculum. Policies aimed at improving social access to ICTs are another arena in which F/OSS might be promoted. As with education, social access policies may raise awareness and engender recognition of F/OSS' value within the wider population. Social access policies include the provision of access to computers and the Internet through public computer centres and initiatives to make computer ownership more affordable. Sectoral policies may be used to stimulate economic activity around F/OSS and may dovetail with initiatives to adopt F/OSS in the public sector, education or programmes to promote social access to ICTs. F/OSS may offer opportunities to create local employment in service related activities such as training, maintenance and customisation that might increase IT self sufficiency in more peripheral areas. Industrial policies may dovetail with policies in other areas, such as government use of software, education and social access to ICTs. Foreign policy offers governments opportunities to promote F/OSS on the international stage. Such policies might include collaboration with other states, lobbying for F/OSS to be adopted through international organisations or recognised at international meetings and fora.

Defining Software Licensing Policy

In the context of this research, the term ‘software licensing policy’ will be used to refer to national government initiatives backed by senior politicians that affect the way in which software is licensed. These initiatives may include ‘non-action’, occur in any policy area and do not necessarily acknowledge the way in which software is licensed. This definition is important for several reasons. Firstly, it avoids conflation with the adoption, implementation and enforcement of legislation relating to the protection of software under copyright. In the research, the focus is upon the terms under which software is licensed, not whether it is licensed or not, or whether it is being used, reproduced or distributed in contravention of these licensing terms, i.e. piracy. Secondly, policy is distinguished from the purchasing decisions and initiatives of government IT administrators that are likely to be motivated solely by financial and technical concerns rather than a political logic. Thirdly, policy is not restricted to ‘IT policies’ *per se*. Precisely because software is so pervasive, policies in virtually any policy area may involve software and thus affect the way in which software is licensed. In the research, policies will be separated into five categories: government use, where technology is adopted or procured; economic, encompassing employment as well as industrial/sectoral policies; education; social access to ICTs; and foreign policy, i.e. declarations and positions in international fora. Fourthly, inclusion of initiatives that make no reference to software licensing is important because where initiatives involve PS, it is in PS vendors’ interests that the way in which software is licensed is viewed as a non-issue. Framing of the technical as non-political constitutes a deliberate strategy on the part of actors that seek to control technology to exclude other actors that might debase their power (Evangelista, 2005). Fifthly, it is important to recognise ‘non action’ as a policy because this option often reflects PS firms’ preferences. Whilst individual firms have interests in policies favouring their products, PS firms publically advocate ‘letting the market decide’ how software is licensed as their market position places them in a strong position to out-compete F/OSS.

Defining Policy Variation

To identify policy variation across countries and associate it with implications for software use and covariation in potential causal factors, the ways in which policy might

vary must first be defined. This task may be fulfilled by constructing a typology of software policy. Figure 1-1, below, provides a typology that captures variation expected to affect the way in which software is licensed.

The x-axis relates to whether a policy favours F/OSS or PS, or seeks a neutral position with regard to how software is licensed. The y-axis relates to the advocated level of intervention that a policy encompasses, raising implications for the degree to which policy will affect the way in which software is licensed. Intervention is categorized at three levels, the first being “absent or low”, where a policy encompasses non-action or declarations. The second level, “active”, encompasses agency in pursuit of a policy objective, but does not resort to coercive measures such as mandates. An active policy may involve the provision of goods including education but also recommendations or preferences. Such a policy would encompass the provision of computers in educational initiatives, schemes to increase social access to ICTs, publicity and internal government guidelines or directives. The third level, “mandate”, encompasses a statutory obligation to use software licensed under particular terms or to follow a process intended to ensure that software adoption or procurement decisions consider the way in which software is licensed.

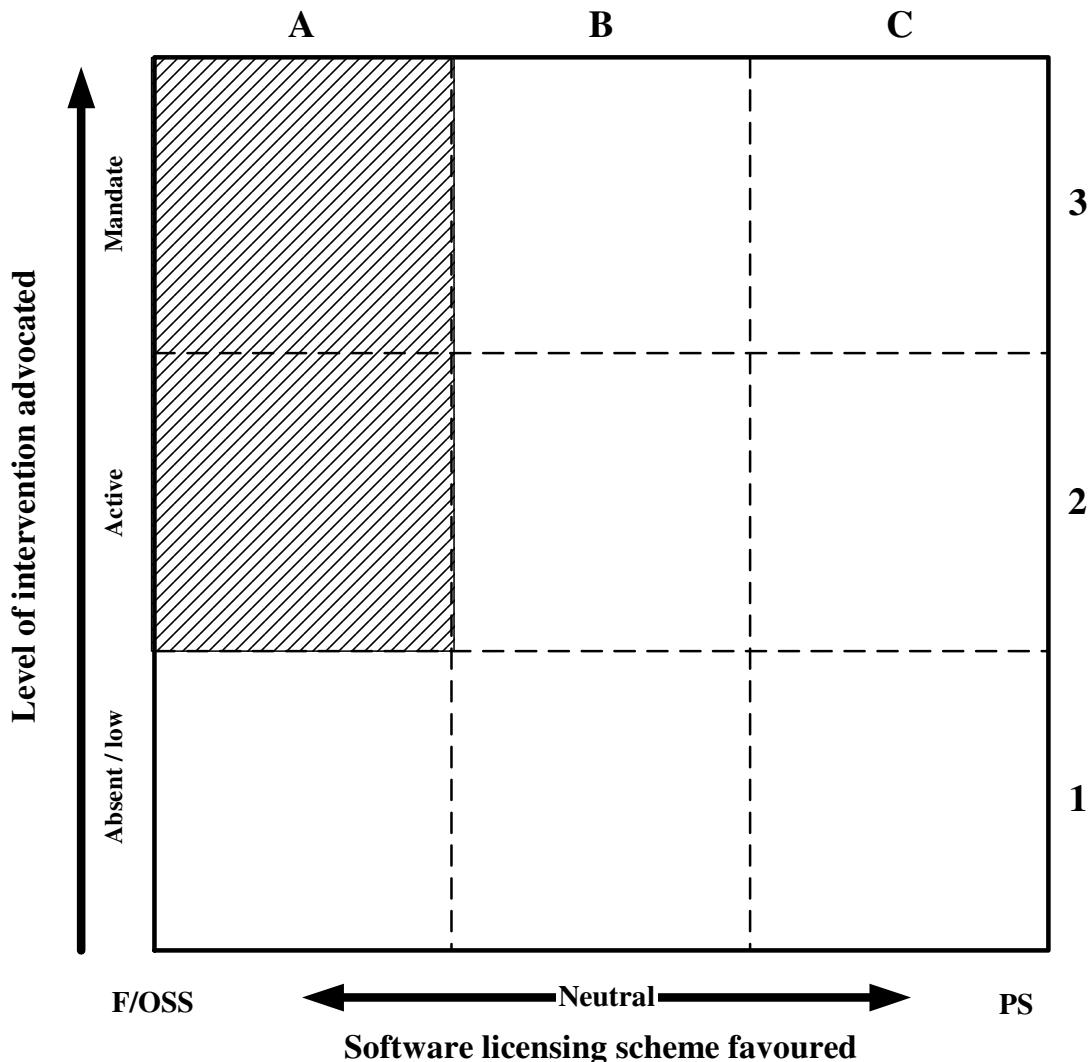
Further to the variation captured in the x and y axes of the typology, policy might also vary in terms of implementation. Whilst the research is concerned with this variable, with politics forming the focus of the research, emphasis is placed on whether a policy went ahead – whether resources were released, actions took place or a policy was enforced – rather than its effectiveness. Policy implementation will be captured by including in the typology only those initiatives where there exist reasonable grounds to suggest a policy was carried out.

Another way in which policy may vary concerns whether or not a policy’s effects upon software licensing are expressed or made explicit in policy objectives. Where an initiative favours software licensed under a particular licensing scheme, whether discrimination is expressed or not, such an initiative serves to promote a particular way of licensing software. This variation is captured in the typology by detailing policies where discrimination is acknowledged in black and those where discrimination is unexpressed or implicit in grey.

The implications a policy bears for the way in which software is licensed may be discussed with relation to the quadrant within which a policy falls inside the typology. It is argued that only policies falling in quadrants A2 and A3 – corresponding to the cross-hatched area in Figure 1-1 – are likely to make a significant difference to the prevalence of F/OSS. Precisely because the dominance of PS is so entrenched, only active discrimination in favour of F/OSS is likely to increase its prevalence. Policies falling in A1 are thus likely to have little effect in terms of increasing usage of F/OSS. ‘Neutral’ policies are unlikely to disrupt the market dominance of PS, even if they seek to ensure all licensing options are considered. The notion of taking a ‘neutral’ stance in IT adoption emerged in the early 2000s (CompTIA, n.d.), and as this idea was pushed by PS advocates (see ISC; Lueders, 2005; Microsoft, n.d.; Moody, 2006; Oksanen et al., 2005; Sasso, 2004), it appears that it suited their interests.⁴ Even if a policy actively seeks ‘neutrality’ (B2) or mandates that all software licensing schemes should be considered when adopting or procuring software (B3), the incentives facing public administrators are likely to lead to decisions that favour use of PS, as will be discussed in Chapter 2. Statements expressing support for neutrality or non-action (B1) favour the continued dominance of PS. Explicit promotion of PS (C1-3) is unlikely not least because the market dominance of PS, together with advertising and network externalities, makes such a policy unnecessary. However, where policies involve large scale use of PS, they represent *de facto* promotion of PS regardless of whether such promotion was deliberate and would be plotted in quadrant C2. If policies falling in A2 and A3 reflect a pro-F/OSS stance, those plotted in B1 and C2 are suggestive of a pro-PS position.

⁴ Of course, in so far as technology reflects values, ‘neutral technology’ is an oxymoron.

Figure 1-1 – Typology of Software Licensing Policies



Variation in Software Licensing Policy across Latin America

In this section, the typology presented in Figure 1-1 is employed to compare software licensing policies across Latin America between 1999 and 2010. The time-frame under observation begins in 1999 because it was in this year that the first legislative proposals for the promotion of F/OSS emerged (Hahn, 2002). F/OSS only began to gain wider recognition within the IT industry at the end of the 1990s (Moody, 2001), making policy comparisons before 1999 pointless. From 2000 onwards, a wave of legislative projects to favour the use of F/OSS appeared as the issue of software licensing gained political recognition (CSIS, 2008; Hahn, 2002). Partly for the scarcity of reliable data and partly for limited space, the comparison presented here has been restricted to South

American countries, Cuba and Mexico. The comparison is split into two time periods, 1999 to the end of 2002 or T1 which corresponds to the period prior to the Lula and Kirchner governments and 2003 to 2010 or T2 which corresponds to the period in which these governments were in power.

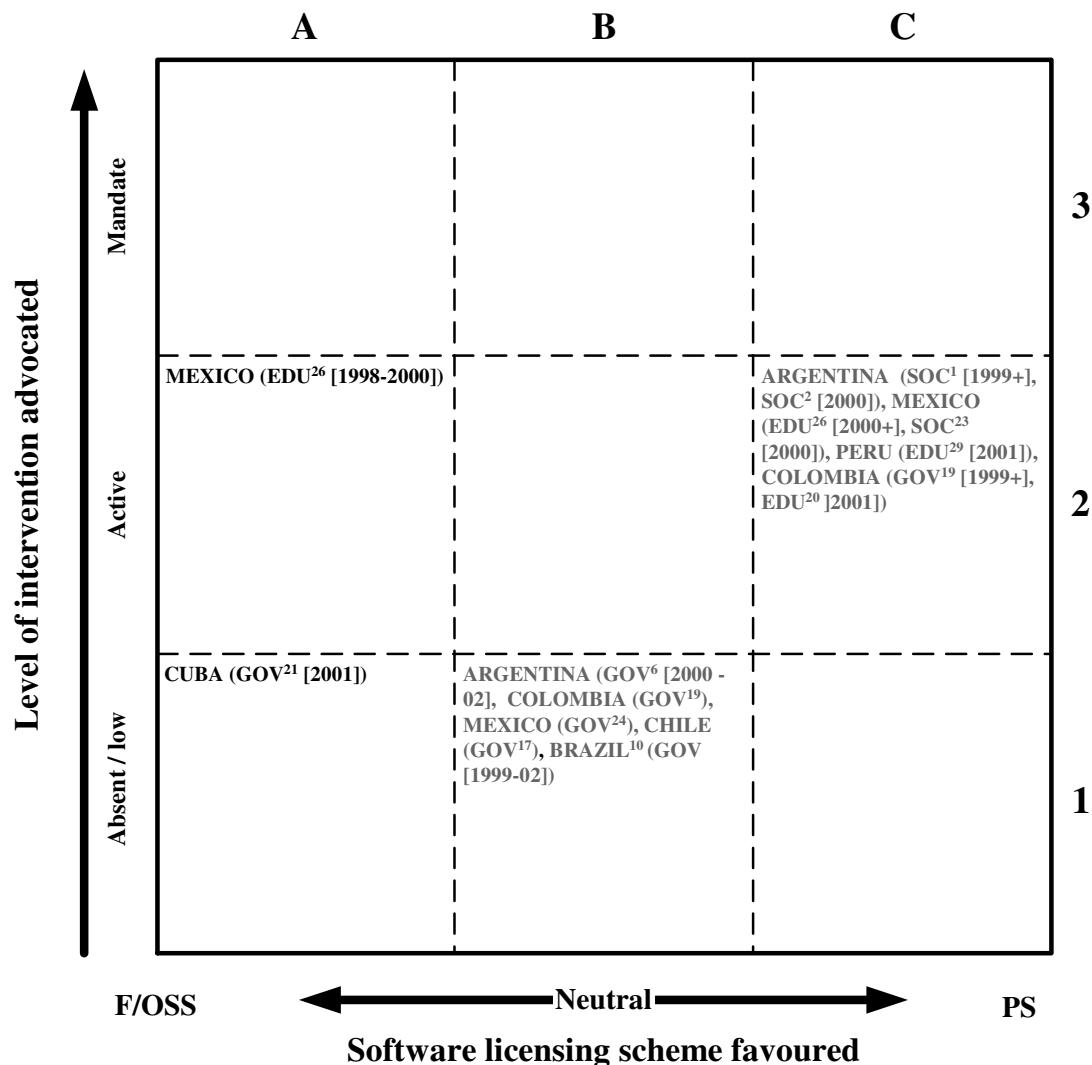
Figure 1-2 presents policy outcomes in T1.⁵ It can be seen that with the exception of Cuba and Mexico, policies were implicit and tended to favour PS. Figure 1-2 presents only those policies for which documentary evidence has been found but it is probable that in terms of government use of software, the policies of all South American countries would appear in B1. In the T1 period, F/OSS was still only beginning to enter the realm of national politics in Latin America and it is unsurprising that bar the exceptions of Cuba and Mexico, there is an absence of policies in A2 and A3. During T1, legislative projects relating to F/OSS promotion were submitted at a national level in Peru (Villanueva Nuñez, 2001; Villanueva Nuñez and Rodrich Ackerman, 2002) as well as in Argentina (Dragan, 2000) and Brazil (Bittencourt, 2001; Miranda, 2002; Pinheiro, 1999; Wanderer, 2000) but none were approved.

Figure 1-3 shows software licensing policies in the T2 period. The range of policy variation in T2 presents a sharp contrast to that in T1. After 2002, it can be seen that there are broadly two, separate groups of countries based on policy outcome – a group with policies favourable to F/OSS that fall in A2 and A3, and another with policies favourable to PS that fall in B1 and C2. The pattern of policy variation lends credence to the notion that software licensing policies are associated with political bias, with governments further to the left more likely to favour F/OSS and governments further to the right more likely to favour PS. Where governments were leftist, they tended to adopt policies favourable to F/OSS. With the exception of Alan García's 2006-2011 government in Peru, which reflected a more market orientated bias (Tanaka, 2008), the governments of Luiz Inácio Lula da Silva in Brazil (2003-2010), Cuba, Rafael Correa in Ecuador (2007 onwards), Tabaré Vázquez in Uruguay (2005-2010), Hugo Chávez in Venezuela (1999-2013) and Fernando Lugo in Paraguay (2008-2012) were all left of centre (Corrales, 2008; Lambert, 2011; Lievesley, 2009). Moreover, it appears that the more leftwing a government is – or characteristic of Castañeda's notion of the 'wrong

⁵ Numbers in superscript refer to Table 1 in Appendix 1 which presents further detail for each policy, including secondary sources.

left’ – the more emphatic its support for F/OSS. Within the group of F/OSS friendly governments, it was those more radical governments – those of Hugo Chávez and Rafael Correa – which mandated use of F/OSS. With the exception of Cuba, amongst the governments that promoted F/OSS, those that stopped short of forcing the issue were less radical. That of García was centre-right, those of Vázquez and Lula reflected a liberal inclination, representing exponents of the ‘right left’ (Castañeda, 2006) and that of Lugo whilst viewed as progressive, was a coalition, the mainstay of which was a rightist political party (Lambert, 2008). By contrast, governments that were further to the right tended to adopt policies favourable to PS. The centre-left governments of Ricardo Lagos (2000-2006) and Michelle Bachelet (2006-2010)(Silva, 2011) were considered closely aligned with market orientated policies (Tussie and Heidrich, 2008) and the ‘right left’ (Castañeda, 2006) whilst those of Álvaro Uribe (2002-2010) in Colombia and Vicente Fox (2000-2006) and Felipe Calderón (2006-2010) in Mexico were right of centre (Burton, 2011; Dawson, 2011; Raby, 2011). The two countries that stand out in the comparison, challenging the putative association between political bias and software licensing policy are Argentina and Brazil.

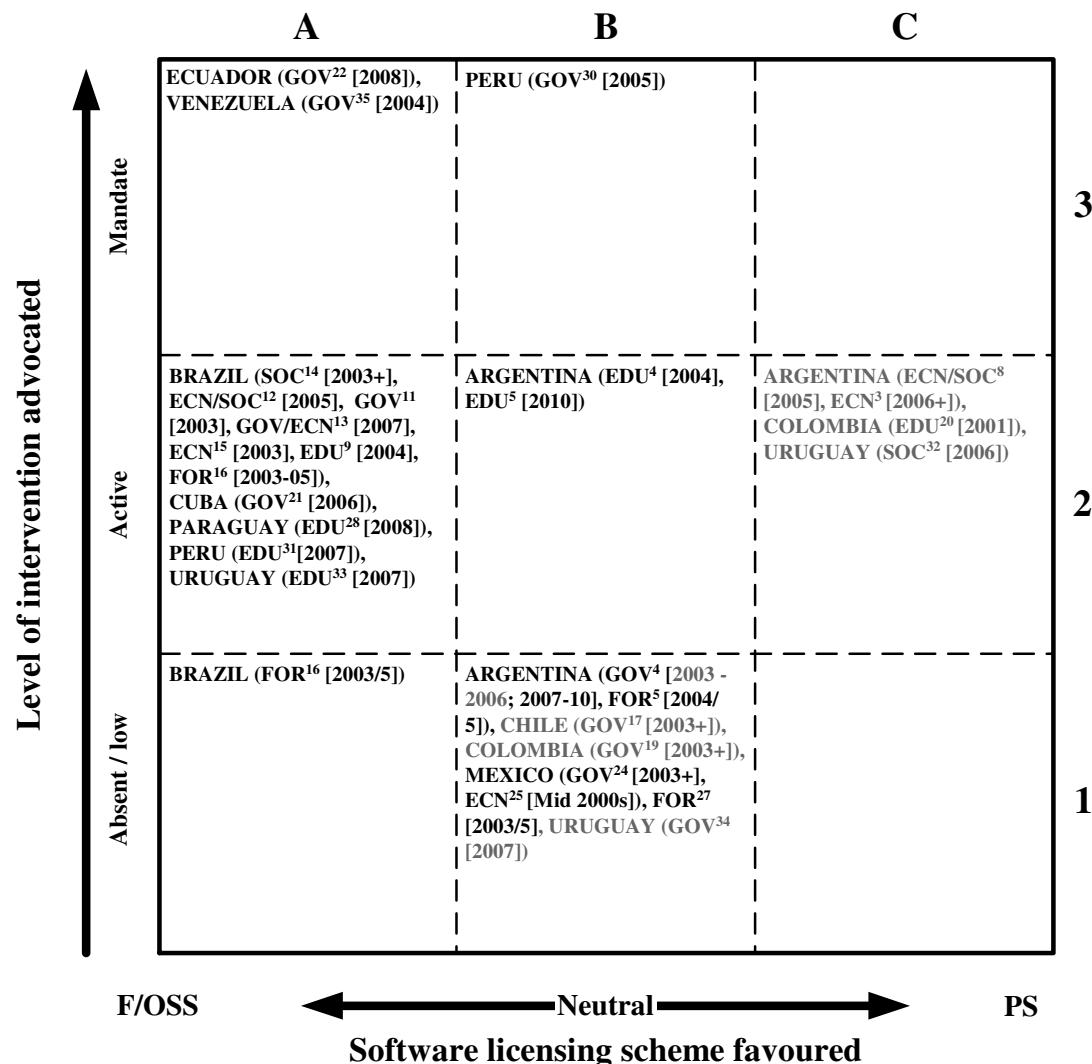
Figure 1-2 – National Software Licensing Policies in T1 (1999 – 2002)



Policy area	Code
Government software use	GOV
Economic (industrial / employment policy)	ECN
Education	EDU
Social access to ICTs	SOC
Foreign policy	FOR

Note: Greyed out text denotes ‘implicit’ policies. Numbers in superscript correspond to ID column in Appendix 1.

Figure 1-3 – National Software Licensing Policies in T2 (2003 – 2010)



Policy area	Code
Government software use	GOV
Economic (industrial / employment policy)	ECN
Education	EDU
Social access to ICTs	SOC
Foreign policy	FOR

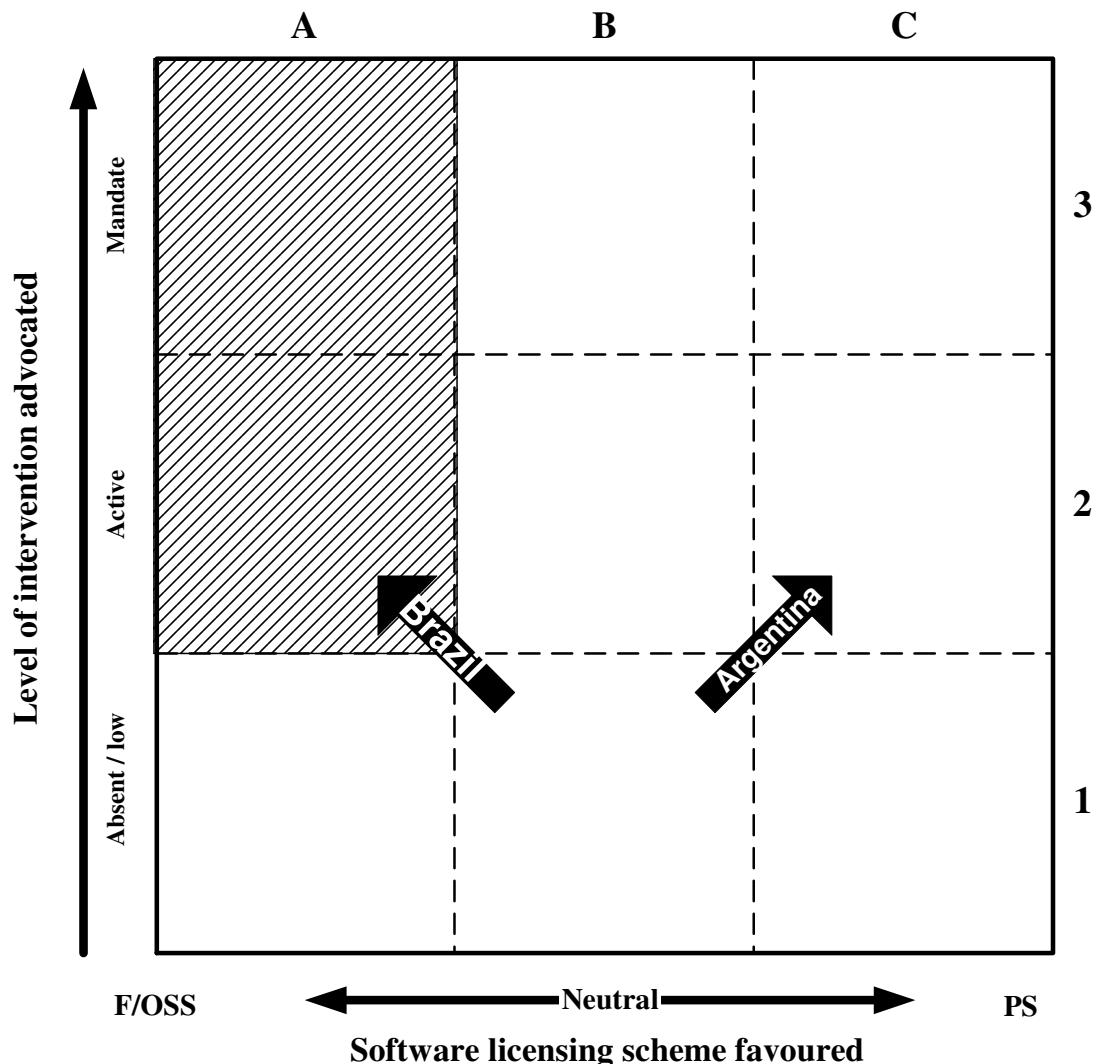
Note: Greyed out text denotes 'implicit' policies. Numbers in superscript correspond to ID column in Appendix 1.

If the policies of centre-right governments such as García's or other 'right left' governments like Vázquez's appear in A2 alongside those of the Lula governments, the Lula governments stand out for the *number* and *range* of F/OSS initiatives adopted. Whilst F/OSS initiatives were adopted in Peru and Uruguay – in each case, educational initiatives involving the One Laptop Per Child programme – in both these countries government procurement policies were favourable to the use of PS. Whilst the number and range of F/OSS friendly policies adopted in Brazil suggest F/OSS promotion was a priority there, the same cannot be said of Peru and Uruguay where only one, comparatively narrow F/OSS initiative involving partnership with a third party, appeared alongside policies favourable to PS. Furthermore, although the mandates adopted in Venezuela and Ecuador reflect willingness to go further in terms of intervention on behalf of promoting F/OSS, the range of initiatives adopted in Brazil reflect greater effort toward this goal. In short, despite their more liberal leanings, the Lula governments stand out as the leading proponents of F/OSS amongst other governments with policies appearing in A2 and A3.

The policies of the Kirchner governments stand out, because despite these governments' characterisation as populist and radical, they apparently favoured PS across a range of policy areas. Whilst the initiative featured in B2 – one which involved the provision of computers for schools, with both F/OSS and PS being loaded on to these computers – the initiative was arguably more favourable to PS as the government signed an agreement with Microsoft which included training (MECyT, 2004) whilst the free and open source software was reportedly unusable (FVL A, 2010a). If the Lula governments reflect a government-wide policy of promoting F/OSS, the Kirchner governments reflect a general policy favourable to PS.

Each favouring a distinct way of licensing software across a range of policy areas, the Kirchner and Lula governments are emblematic of contrasting policy positions on software licensing. Depicting the divergence in software licensing policy in Argentina and Brazil in T2, Figure 1-4 illustrates the change in policies between T1 and T2.

Figure 1-4 – Change in Software Licensing Policy in Argentina and Brazil between T1 and T2



Explaining Variation in Software Licensing Policy

This thesis argues that the variation in software licensing policy across Argentina and Brazil stems principally from two factors: the degree to which F/OSS advocates were embedded within institutions such as political parties and the state and the level of concentration that existed in the organisation of the software sector.

Whilst ideas and motivations for promoting F/OSS may exist, they have to be acted upon if they are to be translated into policy. However, the incentive structures that limit the aggregation of interests around FOSS suggest agency towards promoting F/OSS is

likely to be low. Not only is mobilisation around F/OSS promotion likely to be low, but where interests are diffuse and heterogeneous, as those surrounding F/OSS ordinarily are, capacity for political action is likely to be inhibited by reduced opportunities for cooperation and organisation (Olson, 1965). In contrast, mobilisation around PS is likely to be strong and highly capable of coordinating political action as interests are concentrated and homogenous, facilitating coordination and organisation. By interacting with incentives, the economics of information goods are only likely to intensify the asymmetries in collective action surrounding software licensing.

Because PS advocates are likely to be strong and oppose F/OSS promotion, it would appear that F/OSS promotion has to win backing from the highest levels of government if it is to be adopted. Yet precisely because mobilisation and public awareness surrounding software licensing are imbalanced in the way that they are likely be, political leaders' incentives suggest they are more likely to adopt policies that favour PS. With pressure from PS advocates likely to be high and public awareness of F/OSS low, the political tradeoffs are balanced in favour of PS.

If the incentives surrounding software licensing appear to diminish the likelihood of F/OSS promotion arising, why would governments promote F/OSS and how would they come to do so? I argue that institutional configurations and patterns in the organisation of interests hold the key to this puzzle by affecting how actors with distinct interests might influence policy.

In the literature on comparative political economy, the organisation of interests and institutions comprise two key types of variable which affect policy choice (Gourevitch, 1986; Haggard, 1990; Hall, 1989: 10–12; 1997). Patterns in the organisation of interests have a bearing on policy choice by conditioning actors' capacity to mobilise resources and support and, as a consequence, their ability to lobby political decision-makers. By mediating the aggregation of interests, institutions may similarly affect policy choice by affecting actors' capacities to mobilise resources and support.

Institutions may also affect policy choice by providing ties to those areas of the state that hold authority over policymaking, offering opportunities to influence policy through these ties. The ways in which these two types of variable affect opportunities for collective action and actors' capacities offer insights into how weak actors such as

F/OSS advocates might become stronger and how the power of strong actors such as PS advocates might be attenuated, precipitating conditions in which F/OSS promotion may take hold. If institutions can facilitate collective action, then they might offer F/OSS advocates opportunities to mobilise support and increase their influence over policy. F/OSS advocates are more likely to garner the benefits of institutions where they are ‘embedded’ within them, i.e. affiliated to or located within institutions. Such embeddedness may thus indicate the extent to which F/OSS advocates will be able to influence policy. Although incentives for collective action tend to strengthen interests around PS, fragmentation in the organisation of the software sector might attenuate PS advocates’ influence over policy. The level of cohesiveness within the organisation of the software sector may consequently indicate PS advocates’ capacity to influence policy. It is argued that different configurations in F/OSS advocates’ institutional embeddedness and software sector cohesion across Argentina and Brazil yielded the variation that occurred in software licensing policy across these countries between 2003 and 2010. Chapter 2 explains in greater detail the mechanisms by which institutions and interests might affect policy outcomes.

1.1 *Research Design*

In view of the research aims of explaining *how* as well as *why* software licensing policies came to be adopted, the research has been designed to illuminate the mechanisms by which the two explanatory factors – F/OSS advocates’ institutional embeddedness and software sector cohesiveness – yielded policy outcomes as well as identify associations between these factors and policy outcomes. A small-N study, encompassing comparison across two case studies is ideal for addressing these aims.

Case studies allow phenomena to be investigated in detail and in depth, facilitating identification of the mechanisms that connect causes with effects and understanding of how mechanisms operate (George and Bennett, 2005; Mahoney, 2007; Mahoney and Goertz, 2006). Case studies also enable a high degree of “conceptual validity” (George and Bennett, 2005: 19). By offering advantages in the conceptualisation of policies and political phenomena which are difficult to measure, they allow “contextualized

comparison[s]” (ibid: 19) that are “analytically equivalent” (Locke and Thelan, 1998, quoted in George and Bennett, 2005: 19).

Such conceptualisation enables the operationalisation of the two causal factors upon which the research is focused, both of which are based upon observable phenomena and coded dichotomously (weak versus strong). Where F/OSS advocates’ participation within or affiliation to institutions is used as an indicator of their ‘institutional embeddedness’, the institutional organisation of the software sector is used as an indicator of ‘sectoral cohesion’.

One of the trade-offs of using a small-N methodology is that findings are contingent upon the conditions that exist in the cases under investigation. This means case studies are only able to inform ‘contingent’ or ‘partial’ as opposed to universal generalisations (George and Bennett, 2005; Lijphart, 1971). In view of the research focus on explaining policy outcomes in the cases under study, this limitation is not an issue here.

1.1.1 Research Methods

A small-N study permits a mix of comparative, within-case and counterfactual methods, all of which are employed here.

The method of “structured, focused comparison” (George and Bennett, 2005: 67–72), is utilised to identify factors that drove policy outcomes across the two cases studies. By holding other factors relatively constant, the role played by F/OSS advocates’ institutional embeddedness and software sector cohesiveness in driving policy outcomes may be inferred from covariation between policy outcomes and these putative causal factors. By dividing both cases into two time periods, 1999 to 2002 and 2003 to 2010, the research analyses how different configurations of the two explanatory factors of theoretical interest covaried with policy outcomes across cases (or spatially) and longitudinally.

Although associations between independent and dependent variables are used to identify the relative importance of independent variables in driving outcomes on the dependent variable, it is not possible, through this method alone, to verify whether observed covariation between variables reflects causal relationships. Furthermore, in

this study, where the research is concerned with assessing the causal importance of two independent variables together, it is not possible through comparison to verify whether an outcome is driven by one of these variables alone or both at the same time. These issues may be addressed through within case analysis (George and Bennett, 2005: 153, 159).

Within case process tracing (Bennett, 2008; 2010; Fairfield, 2013; George and Bennett, 2005; Mahoney, 2000) – a method equivalent to that described by Brady et al. (2006: 355) in their discussion of “causal process observations (CPOs)” – entails gathering “insight[s] or piece[s] of data that provide … information about context, process or mechanism”, which are used to elucidate the “intervening causal process – the causal chain and causal mechanism – between an independent variable (or variables) and the outcome of the dependent variable” (*ibid*: 206). By enabling causation to be inferred *through* the sequence of events or steps that link cause(s) and effect(s), process tracing embodies a way of inferring causation that is distinct to that entailed in comparative methods – including large-N cross-case statistical studies – where causation is instead inferred through correlation (Bennett, 2010; George and Bennett, 2005). The way in which causation is inferred through use of process tracing enables explication of causal mechanisms, the identification of causal direction, specification of how multiple causes may lead to an outcome and avoidance of misattribution of causation on the basis of spurious association (George and Bennett, 2005; Bennett, 2008; 2010).

Process tracing also offers analytic leverage in addressing the issue of endogeneity, where “the values of the explanatory variables are caused by dependent variables” (Munck, 2004: 111). By offering opportunities to observe the operation of mechanisms through sequences of discrete steps over time, process tracing allows inference as to whether causal relationships are characterised by circularity or not. It enables inferences into “whether change in the independent [variable(s)] in fact preceded change in the dependent variable and, more significantly, by what process change in the independent [variable(s)] produced the outcome” (Munck, 2004: 113). Process tracing not only permits inference as to whether endogeneity actually exists. By extension, it also makes it possible to identify where an outcome was driven by circular relationships, factors independent of the outcome or a mixture of both.

The research complements comparative and within case methods with counterfactual analysis (Brady, 2008; Fearon, 1991) to bolster causal inference. Van Evera (1997: 25) describes counterfactual analysis as “examining history, trying to ‘predict’ how events would have unfolded had a few elements of the story been changed”. Counterfactual analyses rely upon theories (Van Evera, 1997: 25–26) as well as contextual knowledge (Collier, 2011: 825; Fearon, 1991: 175–176) – in effect, observations – that enable predictions to be made regarding the effect of a factor on an event. Counterfactual analysis may be used to test hypotheses regarding the role of a factor in driving an event. As Fearon (1991: 189) explains, “a cause of a particular historical event may be established by imagining the effect of its (counterfactual) absence”. In this research, counterfactuals are utilised to adjudicate between potential explanations where multiple hypotheses are consonant with a given outcome.

Employing cross-case comparison, process tracing and counterfactual analysis together, the research strengthens the overall causal analysis by deriving causal inference from multiple, independent sources.

1.1.2 Case Selection

The benefits of examining the relationships between the explanatory factors of theoretical interest and policy through a comparison of Argentina and Brazil are that other factors expected to matter to policy are either similar or vary in ways that negate their significance in shaping policy outcomes. As Gerring (2006: 133) notes, “[s]ome flexibility is admissible on the vector of controls … that are ‘held constant’ across … cases. Nonidentity [being] tolerable if the deviation runs counter to the predicted hypothesis”.

As already noted, political bias varied across the two cases in a way that ran counter to the policy outcomes observed. Both prior to as well as after 2003, government attributes appeared to favour F/OSS promotion in Argentina whilst militate against it in Brazil. If in Argentina, the 2002-3 Duhalde administration was not identified as leftist like the subsequent Kirchner governments, its rejection of the prescriptions of the IMF, move away from neoliberalism towards more interventionist policies and accommodation of social demands (Godio, 2004; Panizza, 2009: 244; 2014; Riggiozzi,

2009) appeared congruent with F/OSS promotion. By contrast, the pro-market and US friendly orientation of the Cardoso government in Brazil (Vigevani and Oliveira, 2007) looked coherent with policies beneficial to PS. From 2003 onwards, the distinctions between governments in the two countries only appeared to widen, as the Kirchners moved increasingly toward the left whilst Lula maintained the liberal orientation of his predecessor. Consequently, whilst conditions in Argentina looked increasingly favourable for F/OSS promotion, they continued to appear unfavourable in Brazil.

A country's power vis-à-vis the US is likely to matter to software licensing policy because as the principle benefactor of trade in PS and the most powerful state in the international system, the US possesses strong interests in PS and the capacity to pressure other states into complying with its preferences. US concern over F/OSS promotion in developing countries, as well as its attentiveness to the interests of Microsoft, is signalled in the US government cables published by WikiLeaks (2011a; 2011b; 2011c; 2011d; 2011e) and the intervention of the US ambassador to Peru over a Peruvian legislative proposal to promote F/OSS (Chan, 2004). In terms of stature on the international stage, whilst Brazil is the more powerful of the two, comprising the largest countries in South America and as members of MERCOSUR, Argentina and Brazil possess similar positions within the international system as well as power vis-à-vis the US (De Cruz et al., 1993; Klom, 2003; Tulchin, 1996). Both countries are capable of resisting powerful actors in the international system, as demonstrated by Brazil's successful stand against the US government over the cost of US produced AIDS drugs, a conflict in which the US backed down (Nunn et al., 2009) and Argentina's tough stance in renegotiating its international debt with the IMF, in which it won out (Benton, 2009; Levitsky, 2008). This capacity to resist external pressure suggests that both countries should be equally capable of promoting F/OSS in the face of opposition from US software firms and the US government.

In relation to institutional arrangements, both countries possess federal, presidential systems of government in which the presidency is in a comparatively strong position to influence legislative output (Alston et al., 2008; Jones, 1997; Mainwaring, 1997; Mustapic, 2002; Spiller and Tommasi, 2008). The ability of Argentinean and Brazilian presidents to determine legislative outcomes is bolstered by strong legislative powers, which allow the capability to legislate by decree (Jones, 1997: 285; Mustapic, 2002;

Santos and Vilarouca, 2008: 70; Shugart and Carey, 1992: 140–1) and the capacity to influence the legislative branch through the provision of resources (Calvo and Murillo, 2005; Samuels, 2006; Santos and Vilarouca, 2008). From 2003, presidents' leverage over the legislature was further enhanced by strong ruling party discipline (Jones, 2002; Samuels, 2004) in combination with majorities or generally strong coalitions in congress (Levitsky and Murillo, 2008; Samuels, 2008; Santos and Vilarouca, 2008). The relative strength of presidents vis-à-vis legislatures in Argentina and Brazil largely removes executive-legislative relations as a factor that might explain policy variation across these countries.

Although both countries witnessed a downsizing of the state in the 1990s (Amann, 2003; Manzetti, 2000; Oszlak, 2003), bureaucratic capacity is typically viewed as relatively low in Argentina (Bambaci, 2007; Spiller and Tommasi, 2008) whilst relatively high in Brazil (Alston et al., 2008; Montero, 2006). Whilst bureaucratic capacity may affect perceptions of the administrative viability of adopting F/OSS and as a consequence, choices in software licensing policy, as will be discussed in greater detail in Chapter 2, adoption of F/OSS has as much or more to do with the *way* in which IT administration is organised within the state as it has with capacity in so far as this concerns material resources.

Attributes of the Software Sector

The benefits of comparing Argentina and Brazil include the fact that the software sectors in both countries reflected broad similarities during the period under study. The characteristics of the software sector are likely to have an impact on policy outcomes for political as well as economic reasons. As well as affecting the economic tradeoffs associated with favouring different software licensing schemes through policy, these characteristics will influence sectoral interests, policy preferences, capacity for collective action and structural power.

The sector's size and participation in exports provide an indication of the sector's economic importance and structural power. Table 1 presents data reflecting the size of the software sector together with its participation in national exports in Argentina and Brazil through the 2000s. The Brazilian software sector is several times the size of its

Argentinean counterpart in absolute terms, corresponding to the much greater size of the Brazilian economy. However, in both countries the sector accounts for less than 1% of total production. The relatively small size of the sector in both Argentina and Brazil reflects its limited economic importance and correspondingly low structural power in these countries.

Table 1 – Software Sector as a Share of National Production and Exports

	2000	2001	2003	2004	2007	2008	2009
Argentina							
Software sector revenues as % of GDP	0.71 [§]		0.72 [§]	0.72 [§]	0.72 [§]	0.70	0.70
Software exports as % of total exports	0.11		0.52	0.57	0.60	0.63	0.83
Brazil							
Software sector revenues as % of GDP		0.71 [‡]		0.9	0.8	0.9	1.0
Software exports as % of total exports	0.06			0.12	0.17	0.15	0.2

Source: Data for GDP and total exports from World Bank. Unless indicated otherwise, sectoral data is elaborated from ABES (2005; 2008; 2009; 2010) for Brazil and from CESSI (2011a) for Argentina; [‡]Botelho, Stefanuto & Veloso (2002); [§]Lopez & Ramos (2008).

The balance of trade in an economic activity provides another indication of its economic significance and political leverage. Although data on Argentina is incomplete, it may be assumed that the balance of trade in software was broadly similar in both countries through the 2000s. The software sector in Brazil reflected a negative trade balance in the 2000s, imports exceeding exports by at least ten times throughout this period. There is scarce data on the value of software imports in Argentina in the 2000s, but even though Argentinean software exports grew on average by around 20% between 2003 and 2007 (López and Ramos, 2008) – there occurring a similar trend in Brazil (Softex, 2009) – it is likely the balance of sectoral trade was negative in Argentina too throughout the 2000s. For the two years where data exists, 2000 and 2002, the value of

imported software products was US\$627 million and US\$326 million respectively whilst software exports were just US\$35 million and US\$70 million (Chudnovsky et al., 2001; López, 2003). Notwithstanding the growth in Argentinean software exports after 2003, the value of these exports did not exceed the value of imports for the year 2000 until 2010 when they registered US\$629 million (CESSI, 2011a). As it may be assumed that the value of software imports also witnessed significant growth over this ten year period, if it took ten years for the value of exports to match that of imports in 2000, it seems likely the value of imports in 2010 still significantly surpassed the value of exports.

The composition of the sector will affect sectoral interests and preferences on software licensing policy. Whilst it is possible to deduce the software licensing interests of different segments of the sector, there is a scarcity of data breaking down activity within the sector in sufficient detail or in such a way as to observe the relative sizes of these segments. In the absence of such data, it is necessary to study indicators that might act as proxies for observing interests in software licensing.

Whilst crude indicators, the participation of products and services and imported and locally produced products within sectoral sales offer proxies to observe the relative weight of interests in PS and F/OSS. Without a breakdown of service activities it is not possible to say how far these activities connect to software licensing if at all. However, whilst services may be associated with PS, they are not dependent on appropriability and most of this activity is likely to be unrelated to PS. Firms based around services are unlikely to challenge F/OSS promotion and may even support it if the services they provide are connected to or may benefit from FOSS. Products are more likely to face a threat from F/OSS, yet the level of threat is likely to vary across imported and locally produced products. Imported products are likely to be dominated by package software easily substituted by F/OSS and reflect the interests of multinational PS vendors and their local distributors. As discussed above, local producers of software products are likely to face a lower threat from F/OSS.

Table 2 offers a view on the participation of services, imported and locally produced products in sectoral revenues across Argentina and Brazil, reflecting broadly similar

trends in both countries.⁶ The figures presented in Table 2 suggest that the relative importance of services within the sector was slightly higher in Brazil than in Argentina. However, from the mid 2000s, services grew in Argentina, suggesting the relative importance of services was the same if not greater in Argentina than in Brazil. With regard to software products, it can be seen that in both Argentina and Brazil, imports accounted for around two thirds of products sold, implying interests hostile to F/OSS promotion dominated the sector in these countries. In Brazil, around 70% of firms involved in the commercialisation of software products were dedicated to distribution (ABES, 2005; 2006; 2007), an activity generally associated with imports. As the share of imports in products was similar across both countries, it can be assumed that a similarly high percentage of firms were dedicated to resale of imported products in Argentina. Firms specialising in the local production of software products accounted for around 30% of sales and were concentrated in market segments where they possessed a competitive advantage in knowledge of local accounting and tax regimes (Chudnovsky et al., 2001; Botelho et al., 2005).

⁶ Due to a scarcity of published data, it is not possible to compare the two countries in the same years. The years for which data exists for Argentina is unfortunate as these years coincide with recession, economic crisis and a 2002 devaluation and the figures are consequently likely to be distorted by contraction of domestic demand and changes in exchange rates. Due to the devaluation, vendors of imported products witnessed the local currency value of their revenues increase whilst firms developing software locally saw their revenues drop (López, 2003: 83).

Table 2 – Revenue & Structure of Software Sector in Brazil and Argentina

	Argentina		Brazil	
	2000	2002	2004	2006
Activity	%	%	%	%
Sale of software products	49	52	39.5	35.9
- Developed locally	17 (35 [†])	9 (17 [†])	10.7 (27 [†])	11.7 (32 [†])
- Imported	32 (65 [†])	43 (83 [†])	28.8 (73 [†])	24.2 (67 [†])
Sale of services	51	48	60.5	64.1
Total Sales	100	100	100	100
Exports	1.75	9.22	2.11	7.87

Source: Argentine figures from Lopéz (2003)(exports elaborated). Brazilian figures elaborated from ABES (2005; 2007). [†]As percentage of total products sold.

The composition of trade is another factor that might influence the relative political weight of different segments of the sector. Whilst in both countries through the 2000s the balance of trade in software was likely negative and software exports grew (Softex, 2009: 38), this growth was more pronounced in Argentina. Exports accounted for 20% of sectoral revenues in Argentina in 2003 (López and Ramos, 2008: 7) whilst just over 5% in Brazil in 2006 (Softex, 2009: 38). In Argentina, the growth in exports was related mainly to services including activities such as Business Process Operations (BPO) and call centres (López and Ramos, 2008) that had little if anything to do with software *per se*. It would appear that in Brazil too, the increases in exports were associated with services (Softex, 2009: 38). As increases in exports were generally associated with services, it can be assumed these increases bore limited significance in terms of influencing the power of firms with interests in pushing or resisting the promotion of F/OSS.

Concentration in the software sector may affect sectoral preferences toward software licensing policy by influencing the capacity of multinationals to mobilise and coordinate the sector. Although multinationals' interests in software licensing vary, amongst the most important possess strong interests in PS, Microsoft being the prime example. As

the principle opponent of F/OSS promotion, Microsoft's market power is likely to affect the preferences of the sector overall as it allows the firm to mobilise support amongst local resellers through downstream linkages. Table 3 shows that software sectors in both Argentina and Brazil reflected high levels of concentration around multinational firms at the beginning of the 2000s. The fact that the years featured coincide with the crisis in Argentina likely accentuates the participation of foreign firms in sectoral revenues in Argentina. However, if concentration around the interests of foreign firms remained higher in Argentina through the 2000s, it is uncertain whether concentration necessarily favoured interests opposed to F/OSS. In 2005, in both Argentina and Brazil, IBM – a firm with interests in F/OSS as well as PS – led the sector in terms of overall revenues. However, in terms of revenue derived exclusively from software, Microsoft was by far the principle firm in Brazil, these revenues being more than double those of the next largest firm, which was also IBM (Marques, 2009: 75). Figures for revenue derived exclusively from software are unavailable for Argentina, but in terms of overall revenues, Microsoft was only the eleventh highest selling firm in the Argentinean sector (López and Ramos, 2008: 36).

Table 3 – Comparison of the Composition of Revenues and Employment in the Software Sector in Argentina and Brazil, 2000 & 2002

	Revenues			Employment		
	Argentina		Brazil	Argentina		Brazil
By origin	2000	2002	2002	2000	2002	2002
Foreign firms	66%	81%	53%	42%	36%	11%
Local firms	34%	19%	47%	58%	64%	89%
TOTAL	100%	100%	100%	100%	100%	100%

Sources: López (2003) and data elaborated from Roselino (2006).

Regarding how wider economic circumstances might have affected the costs and benefits of different software licensing models in the 2000s, mention should be made of the economic crisis and subsequent devaluation in Argentina at the beginning of the decade. Whilst Brazil suffered its own financial crisis in 1998 and subsequent

devaluations, these events lacked the severity of those in Argentina. A severe economic crisis and devaluation might be expected to affect the tradeoffs associated with different software licensing schemes and the relative absence of such events in Brazil might be viewed as problematic in terms of control. However, as with political bias, it is argued that the pattern of variation in wider economic circumstances made the policy outcomes that occurred less rather than more likely. In terms of the tradeoffs associated with different licensing schemes, it is argued that all else equal, the Argentinean crisis increased rather than reduced the likelihood of F/OSS promotion by increasing the financial incentives for adopting F/OSS.

1.1.3 Data Collection and Analysis

Interviews formed a principle source of primary data. In order to provide scope for cross examination and attain greater objectivity, in each country, around sixty interviews were conducted with key informants from government, industry, the F/OSS community and wider society, representing a range of contrasting positions on software licensing. Whilst inadequate as a source of reliable data in itself, print and Internet journalism were used to corroborate information gained from other sources. The observations gathered through data collection were triangulated with one another for substantiation. Process tracing was utilised to establish connections between variables.

Observation of legislative activity relating to software licensing was facilitated by the fact that the legislative process generates a paper trail. Information on legislative proposals as well as laws was accessed via the Internet although additional information was obtained by visiting and speaking to actors in various areas of legislatures as well as the executive branch. In addition to interviews, activity in committees was observed by gathering meeting minutes and committee reports. Policy implementation was observed through interviews and documentary sources such as government literature, implementation guides and reports, public expenditure figures and media commentary.

Government statistics bureaus and business associations were contacted to obtain data on production and trade, allowing assessment of the economics surrounding software in each country. The costs of using and switching software within the public sector were

informed through interviews with those responsible for administering IT infrastructure within the state, along with figures on public expenditure.

Understanding of actors' material interests, resources and the general dynamics of collective action were informed by speaking with actors from the private and third sectors. Private sector actors included firms operating in different segments of the software and wider technology sectors and also business associations. Actors in wider society included NGOs and activists connected with F/OSS and consumer interests. Interviews with technical and legal experts were used to decipher technological and legal issues affecting actors' interests, capacities and strategies. Interviews were supplemented with economic data, journalism and documents such as reports published by private and third sector actors.

The affect of ideological disposition upon software politics may be investigated through interviews and triangulated with press reporting and academic literature.

Understanding of the state, its institutions and the policymaking process was informed through interviews with current or former high level officials who play, or have played, a key role in shaping policy in the areas of industry and trade, science and technology, intellectual property, education and social policy. Senior public sector IT administrators were interviewed to gain insight into their role in shaping software policy. A range of documents including org-charts, process documents, reports and other publications was gathered to corroborate interview sources.

1.2 Thesis Summary

The thesis is laid out as follows. Chapter 2 defines in greater detail the explanatory factors, sets out the mechanisms by which they might affect software licensing policy, discusses how factors might be observed and finishes up by considering alternative explanations.

After summarizing explanatory factors and the mechanisms by which they might operate, I explain the incentive structures surrounding collective action around software

licensing and how these interact with economics. Understanding of these incentives is important because they condition the capacities of F/OSS advocates and PS advocates to organise and mobilise resources and thus the ability of these actors to translate their preferences into policy. I argue that in combination with economic factors, the structure of incentives surrounding software licensing mean that ordinarily, the capacity of F/OSS advocates to influence policy will be low whilst that of PS advocates will be high.

I continue by explaining how the power of F/OSS advocates might be enhanced through institutions whilst that of PS advocates might be attenuated by the organisation of interests in the software sector, thus affecting the capacities of these two sets of actor to influence policy. Institutions might enhance the capacity of F/OSS advocates to translate their preferences into policy by providing resources and ties to government actors. The organisation of interests in the software sector might attenuate the capacity of PS advocates to translate their preferences into policy by reducing the ability of these actors to mobilise and coordinate sectoral interests.

The empirical chapters examine the politics of software licensing in the two country case studies through the theoretical framework developed in Chapter 2. Chapter 3 conducts an analysis of mobilisation around F/OSS and the organisation of the software sector in both countries in the T1 period. Chapter 4 pursues a similar analysis of mobilisation in favour of as well as in opposition to F/OSS promotion in T2 Argentina. Chapter 5 replicates the analysis carried out in the previous chapter in T2 Brazil.

Chapter 3 explains the absence of F/OSS promotion in Argentina and Brazil between 1999 and the end of 2002, arguing that this outcome resulted mainly from F/OSS advocates' inability to persuade executives to adopt F/OSS promotion rather than the efforts of opponents seeking to prevent it. In this period, there was little to suggest F/OSS promotion would imminently emerge and mobilisation against such a policy was subsequently low. At the same time, PS advocates' capacity to mobilise the interests of the software sector against F/OSS would have been attenuated by weak sectoral cohesion. Although cohesion was weak in both countries, it appeared stronger in Brazil than in Argentina, making F/OSS promotion seem less likely in Brazil. F/OSS advocates' institutional embeddedness in this period was weak, limiting their capacity

to mobilise political support and forge ties with government actors. Remote from the government, F/OSS advocates lacked influence with political leaders and their demands either went unheard or were ignored by those with the power to promote F/OSS.

Chapter 4 explains why software licensing policy under the Kirchner governments favoured PS. It is argued that this outcome stemmed from a strengthening in the concentration of interests in the software sector whilst F/OSS advocates' institutional embeddedness remained weak. Stronger sectoral cohesion enhanced the capacity of the software sector to lobby the government by increasing organisational capacity, coordination and the legitimacy of sectoral demands. Moreover, stronger sectoral cohesion bolstered PS advocates' capacity to mobilise the software sector and present their narrow interests as coherent with those of the wider sector as a whole. At the same time, F/OSS advocates' remained remote from incumbent political forces and the government in general, reducing their ability to mobilise resources and forge relationships with political leaders. With the lobbying capacity of PS advocates enhanced whilst that of F/OSS advocates remained weak, the former were able to persuade the government to resist promoting F/OSS whilst politicians effectively ignored the demands of the latter.

Chapter 5 explains why software policy under the Lula governments favoured F/OSS. It is argued that this outcome stemmed from a strengthening in F/OSS advocates' institutional embeddedness whilst cohesion in the organisation of the software sector remained weak. Stronger institutional embeddedness offered F/OSS advocates access to political leaders through ties, facilitating these actors' capacity to persuade political leaders to promote F/OSS. Stronger institutional embeddedness also offered F/OSS advocates access to resources which enabled them to overcome the costs of collective action and mobilise wider political support. At the same time, weak cohesion in the software sector reduced the capacity of the sector to organise and pressure the government. Weak cohesion also attenuated the capacity of PS advocates to mobilise sectoral interests and present their narrow interests as coherent with the wider interests of the sector overall. As the lobbying capacity of F/OSS advocates increased whilst that of PS advocates was limited, the former were able to translate their preferences into F/OSS despite vehement opposition from the latter.

The conclusion discusses the research findings and contributions. The research makes two principle contributions to academic knowledge. The first is to show the importance of interests and institutions as drivers of software licensing policy where existing explanations have tended to emphasise agency and ideas. The second is to demonstrate how *both* interests and institutions may affect policy simultaneously by explicating the mechanisms by which these factors do so. By providing insights into the workings of causal mechanisms, the research also contributes to the comparative political economy literature. Within this literature, the characteristics of the state are recognised as playing an important role in shaping patterns of association and thereby affecting the capacity of collective actors to influence policy. However, discussion tends to focus upon how the state affects patterns of collective action outside of the state. I provide new perspective on this discussion by showing that the state also affects possibilities for actors situated inside it to instigate collective action and influence policy autonomously.

2 Explaining Variation in Software Licensing Policy

By affecting the appropriability of software source code, policy influences the interests of the actors arrayed around software by determining who benefits from software and how much. As a consequence, policy lies at the heart of a struggle amongst these actors. However, this struggle is about more than the financial interests of producers versus consumers. By affecting control over the rules that software embodies – rules that in turn regulate, govern and control social activity – it is also a struggle over rights, freedom and democracy. On the one side of this struggle are PS advocates, comprising business associations and firms including amongst the largest corporations in the world. On the other, are F/OSS advocates, typically technology enthusiasts who seek autonomy through the medium of software?

This chapter delineates the ways in which PS advocates' and F/OSS advocates' capacity to influence policy is shaped by institutions and the way in which interests are organised. The first section defines in greater detail the key independent variables – F/OSS advocates' institutional embeddedness and software sector cohesion – and the ways in which they may affect policy. In the second section, closer attention is paid to how economics and the structure of incentives surrounding software licensing interact to shape the dynamics in which software licensing politics are played out. The insights developed in the second section inform the third section, which sets out and explicates the mechanisms by which institutions and the organisation of interests might mediate PS and F/OSS advocates' capacities. The last section of the chapter considers alternative explanations, presenting arguments as to why these alternatives bear less relevance for explaining policy choices in the cases under study.

2.1 *Interests and Institutions*

I argue that two factors explain most of the variation in software licensing policy across Argentina and Brazil between 2003 and 2010: the degree to which F/OSS advocates were embedded within institutions and the level of concentration in the organisation of the software sector. F/OSS advocates' institutional embeddedness' relates to F/OSS

advocates' level of participation within or affiliation to institutions such as political parties, unions and social movements as well as the state. F/OSS advocates might participate in political parties, unions or social movements as members, affiliates or volunteers. F/OSS advocates might participate in the running of the state as professional bureaucrats or political appointees. Software sector cohesion refers to the level of concentration in the organisation of the software sector. The way these two factors matter to policy outcomes has to do with the way interests and institutions affect actors' capacities.

Interests influence actors' capacities to translate their preferences into policy by affecting their ability to mobilise support and pressure government (Gourevitch, 1986; Hall, 1997). Theorisation of political mobilisation, from resource mobilisation theory (McAdam et al., 2001; McCarthy and Zald, 1977; Tarrow, 2011) to the organisation of business interests (Durand and Silva, 1997; Schneider, 2004), draw heavily upon Olson's (1965) theory of collective action. Collective action theory suggests that political mobilisation will be easier where interests are concentrated and homogenous (McAdam et al., 2001; McCarthy and Zald, 1977; Tarrow, 2011). Concentration and homogeneity foster coherence which facilitates organisation and coordination, and thus the capacity of corporate actors to direct and engage in political action.

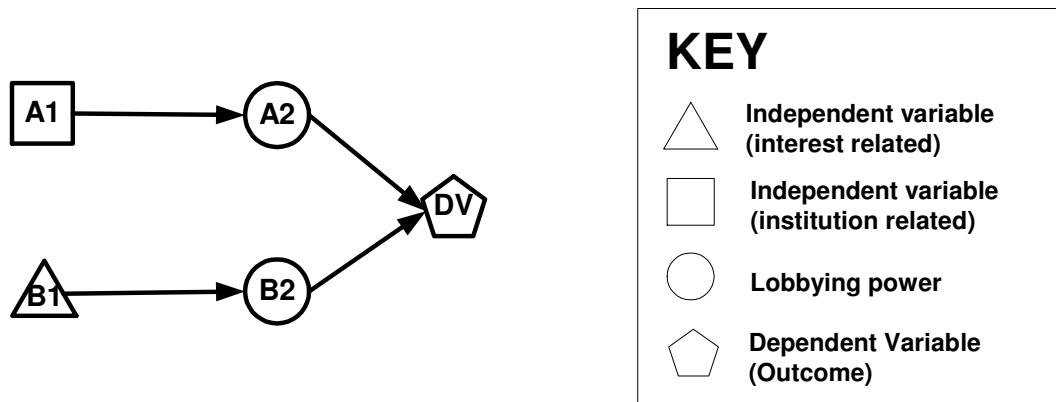
Institutions affect actors' capacities to translate their preferences into policy by mediating the aggregation of interests (Gourevitch, 1986; Hall, 1997; Skocpol, 1985). Institutions may facilitate collective action by aggregating interests where such aggregation would not occur in their absence (Peters, 1999). As a source of resources, institutions offer opportunities to overcome the free-rider costs of collective action. Resources enable actors to foster coherence amongst heterogeneous interests and thus boost actors' capacity to organise and coordinate interests. Institutions may also bolster actors' capacities to influence policy by providing ties to actors or areas within the state that hold authority over policymaking (Fairfield, 2011).⁷

Figure 2-1 below, outlines a model to illustrate the relationship between the two explanatory factors, F/OSS advocates' institutional embeddedness and sectoral

⁷ Here, the meaning of the word 'tie' is understood to encompass direct occupation of a position within the state that offers influence over the levers of policy as well as links to the holders of such positions.

cohesion, with the outcome, software licensing policy. Causal chain A reflects the pathway between F/OSS advocates' institutional embeddedness (A1) and software licensing policy (DV) and causal chain B reflects the pathway between sectoral cohesion (B1) and policy. Below, the hypotheses as to how the two explanatory factors matter to policy outcomes are stated, together with a summary of the mechanisms by which they might do so.

Figure 2-1 – Explanation of Software Licensing Policy



- A1. Social conditions – F/OSS advocates' institutional embeddedness
- A2. F/OSS advocates' lobbying power
- B1. Social conditions – software sector cohesion
- B2. PS advocates' lobbying power
- DV. Outcome of policy

F/OSS Advocates' Institutional Embeddedness

Hypothesis 1: *F/OSS advocates that are embedded within institutional structures such as political parties and the state are likely to possess greater lobbying power and are consequently more likely to be able to translate their preferences into software licensing policy (adoption of F/OSS promotion). F/OSS advocates that are weakly embedded within or aloof from these institutional structures are likely to possess weak lobbying power and are consequently less likely to be able to translate their preferences into policy.*

Causal chain A shows the pathway between F/OSS advocates' institutional embeddedness (A1) and software licensing policy (DV). A1 pertains to F/OSS advocates' institutional embeddedness, understood as their affiliation to or participation within institutions such as political parties and the state. The stronger F/OSS advocates' institutional embeddedness, the stronger will be their capacity to overcome the costs of collective action through the aggregation of interests and access to resources. Access to resources will facilitate F/OSS advocates' capacity to mobilise support in the F/OSS community and wider society, forge unity amongst these heterogeneous interests and coordinate them. Stronger institutional embeddedness is *also* expected to provide F/OSS advocates' with ties to actors or areas within the state holding authority over policymaking, offering opportunities to influence policy through these ties. The greater the resources and ties to political-decision makers that F/OSS advocates are able to procure, the stronger will be their lobbying power (A2). The stronger F/OSS advocates' lobbying power, the greater their capacity to influence policy (DV).

Software Sector Cohesion

Hypothesis 2: Where the organisation of the software sector is concentrated, PS advocates are likely to possess greater lobbying power and are consequently more likely to be able to translate their preferences into software licensing policy (proscription of F/OSS promotion). Where the organisation of the software sector is fragmented, PS advocates are likely to possess weaker lobbying power and are consequently less likely to be able to translate their preferences into policy.

Whilst institutions might facilitate F/OSS advocates' capacity to influence policy by strengthening these actors, the organisation of interests might also affect policy by mediating PS advocates' lobbying power. Whilst PS advocates are likely to be strong actors, their strength is mediated by the organisation of the software sector of which they form a part. Causal chain B shows the pathway between the organisation of the software sector (B1) and software licensing policy (DV). B1 pertains to the level of concentration in the organisation of the software sector. The stronger the concentration in the organisation of the software sector, the greater the sector's capacity to mobilise and coordinate sectoral interests is likely to be, enhancing its capacity to pressure government. Stronger concentration in sectoral interests is *also* likely to facilitate the

ability of PS advocates to mobilise and coordinate sectoral interests because the most powerful PS advocates – multinational corporations – will dominate those sectoral associations in which they participate. Stronger concentration will thus strengthen PS advocates' lobbying power (B2) by strengthening the lobbying power of the sector overall, but also, by facilitating PS advocates' ability to present their narrow interests as coherent with those of the wider sector as a whole. The stronger PS advocates' lobbying power, the greater their capacity to influence policy is likely to be.

As mentioned in Chapter 1, to observe F/OSS advocates' institutional embeddedness, I focus upon whether or not F/OSS advocates participate within or are affiliated within institutions (including 'institutions' often more readily understood as organisations or movements). As well as the forms of participation already discussed above, I am also concerned with F/OSS advocates' positions and locations within institutions. To observe sectoral cohesion, I focus on how the software sector is organised, i.e. whether it is represented by a small number of organisations or by many.

The relationship between F/OSS advocates' institutional embeddedness and software sector cohesiveness and policy choice is not deterministic. Rather, stronger embeddedness of F/OSS advocates within institutions and higher levels of software sector cohesion increase the likelihood that F/OSS advocates – in the case of the former – and PS advocates – in the case of the latter, will be able to exert influence over policy.

2.2 Incentives Surrounding Collective Action and Policy

Choice in Relation to Software Licensing

The following section lays out in more detail how the incentives surrounding different software licensing models together with the economics of information goods influence politicians' policy preferences by affecting the capacity of PS advocates and F/OSS advocates to mobilise support. As noted above, incentives for collective action tend to strengthen interests in PS whilst weakening those in F/OSS, shaping the dynamics in which software licensing politics are played out. Understanding how incentives and economics shape actors' capacities is important because F/OSS advocates' institutional embeddedness and software sector cohesion interact with these factors, mediating their

effects such that the strength of PS advocates may be attenuated whilst that of F/OSS advocates may be enhanced.

Collective Action around PS: Incentives and Characteristics

The acute and exclusive benefits from PS offer incentives for business interests surrounding PS to organise. Business interests possess advantages over non-business interests as they often have access to resources over and above those involved in business activity (Hart, 2004; Smith, 2000). In the case of those business interests associated with PS, resources are likely to be great as these interests encompass amongst the largest corporations in the world. Such corporations encompass an interest group that is unrivalled by others in terms of resources (Sell, 2003).

Apart from representing powerful actors in their own right, corporations are likely to be able to mobilise strong coalitions. Business coalitions have long been assumed to be stronger than non-business coalitions because they represent relatively homogenous, mutual commercial interests (Hart, 2004: 49). Firms also share ideological standpoints that align preferences (Sell & Prakash, 2002). Firms with interests in PS are also likely to be able to mobilise support from other knowledge based sectors where firms support strong IP protection (Sell & Prakash, 2002; Sum, 2003).

Mobilisation around PS in developing countries is likely to be facilitated by the balance of interests in local software sectors. As developing countries are generally net importers of software products (Correa, 1996), interests in the distribution and resale of imported PS are likely to dominate the local software sector.

Collective action around PS is also likely to be assisted by the tendency for high levels of concentration in markets for informational goods. The importance of economies of scale, network effects and first-mover advantages in markets for informational goods only serves to strengthen the multinational PS firms most likely to oppose F/OSS promotion. Sectoral concentration is likely to be even more pronounced in software sectors in developing countries, enhancing multinational firms' abilities to organise and play a leading role in the representation of the software sector.

Organisation is likely to be easier amongst smaller groups because the costs of collective action will be lower (Olson, 1982; Schneider, 2004). Where the distribution of resources is unequal, organisation is likely to be easier because some actors will likely receive sufficient benefit from public goods that they will assume the costs of collective action despite the free-riding of others (Geddes, 1995: 95; Schmitter and Streeck, 1999: 25). Because larger firms tend to shoulder collective action costs whilst smaller firms tend to free-ride, large firms will possess greater influence in shaping group preferences (Atkinson and Coleman, 1985; Hart, 2004; Schmitter and Streeck, 1999; Shadlen, 2002: 46; 2004: 13). The small number of corporations that lead the software sector, together with the highly unequal distribution of sectoral resources, suggest US PS corporations will dominate sectoral organisation.

Figure 2-2 – The Ten Largest Software Firms in the World in 2011

Ranking	Firm	Software revenues (Million US\$)	Total revenues (Million US\$)	Software revenue share
1	Microsoft	54,270	67,383	80.5%
2	IBM	22,485	99,870	22.5%
3	Oracle	20,958	30,180	69.4%
4	SAP	12,558	16,654	75.4%
5	Ericsson	7,274	30,307	24.0%
6	HP	6,669	126,562	5.3%
7	Symantec	5,636	6,013	93.7%
8	Nintendo	5,456	13,766	39.6%
9	Activision Blizzard	4,447	4,447	100%
10	EMC	4,356	17,015	25.6%

Source: Software Top 100 (2011).

The predominance of Microsoft amongst these firms – the firm representing the world leader in software sales, selling more than double the next highest selling firm and the

same as the next three put together (Software Top 100, 2011) – suggest sectoral interests will tend to oppose F/OSS promotion. Whilst the threat that F/OSS posed to software corporations through the 2000s varied, it was a major threat to Microsoft. Deriving its core revenue from systems software and packages in horizontal market segments, Microsoft’s products were particularly threatened by F/OSS as they lay in areas of the market characterised by low specificity and high appropriability. As well as likely dominating sectoral business associations, Microsoft was also able to mobilise support through its market position and the market segments in which it operated.

IT embodies systems and because these systems often comprise the products of more than one firm, it is important that different firms’ products interact effectively with those of other firms within a system (Shapiro and Varian, 1999). In this context, firms’ products complement one-another such that increased demand for a product raises demand for another product it complements (*ibid*). Because Microsoft dominates the market in systems software – the firm accounted for over ninety percent of the PC systems software market at the end of the 2000s (NetMarketShare, 2010) – on which both hardware and applications software depend, hardware and other software firms face strong incentives to collaborate with Microsoft with a view to increasing the market share of their own products. With its own interests in collaboration, Microsoft fosters relationships with other firms through its Independent Software Vendor (ISV) and Original Equipment Manufacturer (OEM) schemes (Shapiro and Varian, 1999). The importance of complementary goods in IT and Microsoft’s dominance of a strategic market segment places the firm in a strong position to mobilise support through partnership agreements.

Microsoft’s position as a supplier also facilitates its capacity to mobilise support through linkages. Linkages relate to where one firm’s or industry’s output forms an input for another firm or industry (Hirschman, 1958) and may allow suppliers to exert influence over client firms that distribute or utilise a supplier’s products as inputs (Shadlen, 2014). Together with its market dominance, linkages offer Microsoft a means of mobilising local SMEs that develop their own software using Microsoft technologies as well as firms involved in resale and distribution.

Interacting with partnerships and linkages to maintain and strengthen the relationships between Microsoft and smaller firms are the factors of lock-in and switching costs. Lock-in occurs when investments are made in “durable complementary assets” whose compatibility is limited to particular systems (brands, machines, software, etc.)(Shapiro and Varian, 1999: 11). Because these assets are incompatible with alternative systems, consumers face switching costs if they wish to move to another system. Proprietary standards bolster lock-in and such standards may be used to retain partners as well as consumers because of the costs associated with switching (*ibid.*). With Microsoft’s products based on its own proprietary formats, lock-in helps cement relationships between local firms and Microsoft that facilitates’ the corporation’s capacity to mobilise support.

Public Awareness

For actors seeking to influence software licensing policy, it is not only important to be able to mobilise interests but also public opinion. Apart from directly affecting the prevalence of software licensing models, public awareness also affects the knowledge on which policy decisions are based by affecting policymakers’ awareness of these models and politicians’ incentives for intervening in software licensing by shaping the political tradeoffs of favouring one model over another.

Whilst supply-side economies of scale may be important to competition in information goods, the ability for a single firm to capture markets in information goods is also based on the importance of network effects on the demand-side (Shapiro and Varian, 1999: 179). Demand for Microsoft’s products is high precisely because they are popular. This facet of the economics of information goods makes marketing especially important in software and helps to explain why vendors of package software invest more in marketing than in R&D and production (Correa, 1996). In 2005, Microsoft spent 21.8% of revenues on sales and marketing to 15.5% on R&D (Microsoft, 2005). Microsoft’s interest in influencing public awareness is important not just because it possesses strong incentives to do so, but also because this interest concerns the public at large by virtue of the fact that its core revenue stems from mass and horizontal market segments. Due to network effects, the fact that Microsoft already dominates these market segments means its market presence alone facilitates public awareness of its products.

With the resources at its disposal, Microsoft is in an unrivalled position to shape public opinion through media coverage as well as advertising. Fuchs (2007: 151) observes that “the dependence of the private media on the sale of advertising … means that news and reports to some extent are framed by commercial needs.” Microsoft is well placed to gain media coverage that is not only widespread but also favourable due to its significance as a source of advertising revenue for media firms.

Microsoft is also able to influence public awareness by giving its products away. Another facet of information goods is that they are “experience goods”, which means consumers only attach value to them after they have used them (Shapiro and Varian, 1999: 5). This characteristic of information goods means the public are unlikely to recognise interests in software until they have used it, such that strategies that allow consumers to use software products are important for marketing. An additional benefit from such strategies in the case of software is that use of the product raises the likelihood of lock-in. Because use of software often requires learning, costs are associated with switching software (*ibid.*). The benefits of giving products away explain Microsoft’s behaviour in offering its products as well as training at reduced rates or through donations in education and charitable initiatives (see Waters, 2008).

Because of the importance of public awareness to Microsoft’s maintenance of its market share, the firm even stands to gain benefits from piracy of its products as its co-founder, Bill Gates has admitted (CNN, 2000; see also Sum, 2003; Vance, 2010). Apart from acting to increase visibility of Microsoft’s products and lock-in users due to the switching costs associated with learning how to use software, the network externalities of pirated use of software only serve to increase its value.

Microsoft’s ability to give away or discount its products hinges upon its profit margins. The economies of scale that Microsoft enjoys together with low marginal costs of reproduction mean its profit margins are large – in the 1990s, the firm’s gross profit margins were 92% (Shapiro and Varian, 1999). These profit margins allow the firm to influence policy and public procurement decisions where governments are considering migrating to F/OSS by eliminating cost advantages associated with migrating to F/OSS. Because network effects and switching costs are important to

maintaining demand-side economies of scale and the marginal costs of reproduction are low, it is in Microsoft's interests to win or retain big customers even if these customers pay little or nothing in return. An example of Microsoft offering discounts to influence policy concerns its offer to donate US\$550,000 in software and material support towards a Peruvian government education project, following a 2001 Peruvian legislative project to promote F/OSS (Chan, 2004; D'Empaire, 2002; Lettice, 2002).

Collective Action around F/OSS Promotion: Incentives and Characteristics

Although the seeming popular appeal of F/OSS' benefits might lead to the expectation that interests in F/OSS would be strong, such interests are relatively weak by virtue of F/OSS' intrinsic character. If incentives and economic factors act to strengthen interests in PS – interests likely to oppose F/OSS promotion – they serve to weaken actors with interests in promoting F/OSS. As observed above, F/OSS' non-excludable and non-rivalrous characteristics mean the incentives for collective action are low. Even where firms form around F/OSS, as monetisation strategies tend to relate to services or software as a complementary product, these firms are unlikely to carry either the economic clout or intensity of interest in software *per se* that characterises PS firms because profits from F/OSS itself will be lower (Söderberg, 2008).⁸ Mobilisation of the interests surrounding F/OSS in pursuit of F/OSS promotion is likely to be weak not least because of the heterogeneity these interests reflect. Differences in ideology as well as material interests differentiate interests surrounding F/OSS. Just one example of these ideological differences are those that distinguish the Free Software Foundation (FSF) – which views sharing software as an ethical concern – and the Open Source Initiative (OSI) – which is more concerned with sharing for practical reasons (GNU.org, 2014). The F/OSS community also embodies differences in political views, ranging from anarchist and anti-capitalist perspectives through to libertarian standpoints (Coleman, 2004; Coleman and Golub, 2008; McInerney, 2009; Söderberg, 2008).

The salience within the F/OSS community of political standpoints antithetical to business interests tends to alienate firms with interests in F/OSS (Perkins, 1999).

⁸ IBM (and Sun Microsystems before it was acquired by Oracle in 2010) derives revenue from F/OSS but indirectly as a complementary good to increase the value of its hardware. The intensity of IBM's interest in F/OSS is thus low as it does not depend on F/OSS for revenue.

Notwithstanding this antagonism, the pragmatic interests of firms suggest that unless they are to benefit directly from such a policy, they are likely to be indifferent if not opposed to the idea of promoting F/OSS. As many firms with interests in F/OSS also possess interests in PS (Lerner and Schankerman, 2010), government intervention in software licensing is likely to be unwanted. Firms may also oppose F/OSS promotion on the basis that state intervention is inappropriate; such a policy may be viewed as political meddling in an issue best left to the market (Bessen, 2002). As firms, with their resources, represent valuable allies, the indifference not to mention alienation of business interests by ideologically driven groups within the F/OSS community limits prospects for strong mobilisation around F/OSS promotion.

A factor which is likely to further weaken mobilisation around F/OSS promotion is indifference towards mainstream politics and the state as well as the notion of promoting F/OSS through policy. The interests of those more technically focused areas of the F/OSS community lie away from promoting F/OSS through political means and the idea may be viewed as undesirable for politicising what is deemed a technical issue (Chan, 2004). Indeed, sections of the F/OSS community have even argued against state promotion of F/OSS on the basis that F/OSS should compete on its own merits in the free market, an argument that paralleled that of PS advocates (*ibid*: 534). Such an argument is likely to be shared by those sections of the F/OSS community closer to business interests – sections likely to overlap with those more focussed on the technical dimensions of F/OSS. As a group, software developers generally express indifference to politics (Coleman, 2004; 2013) reducing the likelihood that they will engage with mobilisation around promoting F/OSS. F/OSS promotion might also be rejected by politicised sections of the community that are hostile towards the state on both the left – anarchists and communists – and the right – libertarians.

Together with the challenges that F/OSS advocates are likely to face in mobilising actors with interests in F/OSS, the economics surrounding information goods look to make it difficult for these actors to mobilise support amongst the wider public. F/OSS' diffuse benefits mean incentives and investment in publicising F/OSS are low and as a consequence, public awareness of F/OSS is also likely to be low. As discussed with regard to Microsoft, as an experience good, software first needs to be used for users to recognise interests in it. Low public awareness of F/OSS – together with the fact that

the public are unlikely to recognise an interest in F/OSS unless they have experienced it – suggest F/OSS advocates' ability to mobilise wider public support will be limited.

Another aspect of the economics of information goods that will weaken F/OSS advocates are network effects. Whilst positive feedback may increase the popularity of popular goods and in the case of PS, strengthen firms that produce them, it may reduce the popularity of unpopular goods and in the case of F/OSS, weaken the actors associated with these goods. Linux, the most popular F/OSS systems software accounted for just over 1% of the market for PC systems software in 2009 (NetMarketShare.com, 2014). Precisely because usage of F/OSS is comparatively low, users are likely to be deterred from using F/OSS, checking greater uptake of this type of software. Whilst low usage of F/OSS does not directly affect the resources available to F/OSS advocates, it reinforces the scarcity of public awareness of F/OSS, reducing opportunities to mobilise public support.

These dynamics are reinforced by software piracy. By lowering the cost of PS and thereby increasing social access to this good, piracy drives its widespread use (Sum, 2003: 385; Weerawarana and Weeratunga, 2004: 35), maintaining incentive structures that disadvantage F/OSS.⁹ Piracy is likely to undermine the popularity of F/OSS in developing countries in particular. By effectively democratising PS, piracy represents a form of social inclusion. In developing countries, where large sections of the population are excluded from obtaining certain goods through prices and ownership of such goods is associated with social status, pirated PS becomes desirable to poorer constituencies on the basis of its inclusionary character as well as considerations stemming from network externalities and switching costs. The inclusionary benefits offered by pirated PS only act to accentuate incentive structures that disadvantage F/OSS within poorer sections of the population. As poorer sections of society represent an important constituency in developing countries, where they are likely to constitute the majority of the population, the effect of piracy on poorer users' incentives presents challenges for F/OSS advocates seeking to mobilise support in developing countries.

⁹ Whilst PS vendors rail against software piracy in public, they appreciate that piracy ultimately serves their interests. As Bill Gates himself acknowledged during a 1998 conference at the University of Washington, “[a]lthough about three million computers get sold every year in China, people don't pay for the software ...[s]omeday they will, though. And as long as they're going to steal it, we want them to steal ours. They'll get sort of addicted, and then we'll somehow figure out how to collect sometime in the next decade.” (CNN.com, 2000).

Finally, the importance of complementary goods in markets for IT goods weakens interests in F/OSS. As a result of Microsoft's dominance of the strategic systems software market, Microsoft's PS is generally bundled with new computers and other software, hardware and peripherals are often optimised to run or interoperate with Microsoft's software, sometimes exclusively. Bundling software with hardware, interoperability and compatibility further reinforce the market dominance of PS, by imposing costs or effectively preventing switching to F/OSS. Microsoft's well documented attempts at restricting or preventing interoperability and compatibility with F/OSS and open standards (BBC News, 2007; Ghosh, 2011; Jackson, 2010; Peritz, 2010; Rens, 2011) only compound the dynamics that disadvantage F/OSS and its advocates.

Incentives Surrounding Policy Choice in Software Licensing

The incentive structures and economic factors that help strengthen PS advocates whilst weakening F/OSS advocates suggest that the state may have to act on its own initiative for F/OSS promotion to come about. Moreover, due to the power of those actors likely to oppose F/OSS promotion, it appears this initiative has to come from the highest levels of government if such a policy is to withstand the opposition it will presumably encounter. However, the very conditions that lead to a disproportionate balance of power between PS advocates and F/OSS advocates suggest the likelihood of political decision makers independently pursuing F/OSS promotion appears low.

Public choice theory suggests that politicians' will choose policies that favour PS precisely because of the configuration of interests that surround software licensing. Grossman and Helpman (1994: 833) argue, that "politicians respond to the incentives they face, trading off the financial and other support that comes from heeding ... interest groups' demands against the alienation of voters that may result from the policy implementation of socially costly policies". If this is the case, the political incentives are highly skewed in favour of backing PS advocates' policy preferences. Because public awareness of F/OSS is low, public pressure for government to promote F/OSS is likely to be low and politicians will thus face few incentives to promote F/OSS. Moreover, the opportunity costs of choosing policies that favour PS are likely to be

minimal. By contrast, pressure for government to pursue policies that favour the interests of PS advocates will be strong. Sectors reflecting high concentration often enjoy government protection due to the relative ease with which they will be capable of organising (Geddes, 1995; Olson, 1982). The software industry represents a prime example of this trend with the state providing protection by upholding IP rights. Because PS advocates' are likely to be capable of mobilising strong coalitions, politicians will face strong incentives to follow their policy preferences.

Over and above their ability to mobilise interests, the corporations likely to lead opposition to F/OSS promotion – principally Microsoft – are in a strong position to influence policy on the basis of structural power and through ties with the state. High-tech industries represent amongst the highest added value economic activities and a source of power in themselves due to their focus on knowledge (Strange, 1994). With their market leadership of such an industry, PS corporations possess structural power in terms of their command of knowledge as well as expertise in a valuable productive activity. Politicians may court software corporations with a view to garnering the benefits of knowledge transfer or investment that these firms provide. Such corporations may also be called upon by political decision-makers as a source of authority when formulating policy (Sell, 2003).

Use of unlicensed software within governments in developing countries offers PS vendors opportunities to exert influence over these governments. The threat of legal action may be used to extract concessions, enabling PS vendors to persuade governments to sign-up to licensing agreements. As observed above, Microsoft also has the capacity to influence policy decisions through inducements that eliminate the up-front financial costs of using its products or reduce the costs associated with implementing policy.

The informational asymmetries that surround software licensing add an additional dimension to actors' capacities to shape politicians' policy preferences. Such informational imperfections produce power asymmetries, placing the knowledgeable in a strong position to shape the preferences of the unaware (Hay, 2002: 178). The high levels of public awareness and appreciation of PS versus low levels of public awareness and appreciation of F/OSS not only suggest politicians will face political incentives to

favour PS advocates' policy preferences. Because of the high visibility of PS, politicians are also more likely to call upon PS firms which, because of knowledge asymmetries, will be in a strong position to shape policy preferences to serve their interests. Within the state, knowledge of F/OSS is likely to be limited to IT administrators. Yet as a group, IT administrators make unlikely proponents of F/OSS promotion. Where such personnel are professional bureaucrats, they will not necessarily possess the political influence to persuade politicians to promote F/OSS. Moreover, IT administrators' face incentives to favour PS as vendors of PS provide support for their products and thus allow IT administrators to delegate to vendors responsibility for the operation of these products. Whilst the incentives of firms based around the sale of PS mean these firms have an interest in offering customer support, where F/OSS is developed independently of commercial interests, these incentives are absent and support is often dependent upon the F/OSS community. IT administrators may be wary of adopting F/OSS if it means they have to take on greater responsibility. If those actors within the government with the technical awareness to recognise the potential benefits of F/OSS are isolated from politicians or face incentives to use PS, PS advocates will be in a strong position to shape the policy preferences of politicians that are ordinarily unlikely to be savvy of IT or software licensing models.

2.2.1 Institutions and F/OSS Advocates' Embeddedness within Them

It has long been recognised that the power of ordinarily weak actors might be bolstered through institutions (Piven and Cloward, 1978). Institutions may offer actors opportunities to influence policy by affecting the aggregation of interests and access to political decision-makers (Gourevitch, 1986; Hall, 1997; March and Olsen, 1984; Peters, 1999). Whilst the state looms large amongst the institutions that might affect actors' abilities to influence policy by virtue of the fact that actors have to work through the state to realise policy goals (Gourevitch, 1986; Weir and Skocpol, 1985), other organisations that might be conceived as institutions and which might assist actors advance their interests encompass political parties, unions and social movements (Hall, 1997: 180; McAdam et al., 2001; Peters, 1999: 112; Tarrow, 2011; Wilson, 1990). The actors that institutions affect may include those actors that operate within them (Foweraker, 1995).

Resources

Institutions offer F/OSS advocates opportunities to overcome the low incentives for collective action that surround F/OSS and attract allies by aggregating interests and providing resources. Institutions may also enable F/OSS advocates to organise and coordinate mobilisation by allowing these actors to reconcile differences within the F/OSS community itself and a broader coalition encompassing business actors and wider society.

Within the literature on comparative political economy, the state is recognised as playing an important role in shaping patterns of association within society (Collier, 1995; Gourevitch, 1986; Haggard, 1990; Hall, 1997; Offe, 1995; Schmitter, 1974; 1992; 1995a; 1995b; Schmitter and Streeck, 1999; Streeck and Schmitter, 1985). Olson (1965: Chapter 6), in laying out his “logic of collective action”, suggested that where interests were heterogeneous and diffuse, high associational costs might be overcome through selective incentives provided by the state. Such incentives might attract support and foster unity where interests coalesce. The literature on corporatism informs discussion in comparative political economy of how the state might affect patterns of societal association through incentives (see Collier, 1995; Schneider, 2004).¹⁰ The state may reduce associational costs for certain actors, factions or sectors by offering exclusive or privileged rights of representation vis-à-vis the state through rules – instituted through statutory codes but also less formal norms and practices (Collier and Collier, 1977; Schmitter, 1982: 269; 1995a: 290, 296; Streeck, 1982; Streeck and Schmitter, 1985: 25). Such rules might be construed as providing organisational resources by incentivising participation in officially recognised associations. Another way the state might reduce associational costs is by offering subsidies which actors (Collier and Collier, 1977; Schmitter and Streeck, 1999), groups or sectors may subsequently dispense.

Since the publication of Olson’s original theory, it has been recognised that the incentives around which collective action revolves do not necessarily have to be

¹⁰ Corporatism may be defined as “a system of interest … representation … for linking the associational interests of civil society with the decisional structures of the state” (Schmitter, 1974: 86).

selective (Medina, 2013) and may also be “solidary” or “purposive” (Foweraker, 1995: 16). Selective incentives may nonetheless be important to sustain mobilisation (McCarthy and Zald, 1977; Lichbach, 1995) and allow its professionalization (Foweraker, 1995).

Although the literature on comparative political economy recognises the state as important as an influence upon patterns of association, it tends to overlook how actors situated within the state might utilise the institutional structures that surround them to initiate collective action. Within this literature it is accepted that societal actors may capture or colonise the state (Atkinson and Coleman, 1985; Collier, 1995; O’Donnell, 1977; Schmitter and Streeck, 1999: 33), implying that the state will act on these actors’ behalf. It is also acknowledged that those actors located inside the state have the capacity to mobilise interests themselves (Schmitter and Streeck, 1999: 31). Yet there is little discussion of state actors initiating collective action autonomously, independent of wider societal interests.

As Weir and Skocpol (1985: 118) observe, “states may be sites of autonomous official action, not reducible to any social-group pressures or preferences”. The literature on social movements elaborates how the state might facilitate the ability of actors within it to mobilise wider support. Actors operating within the state have access to a range of resources over and above those of a financial or organisational nature. Media access is important for mobilisation and the state may afford privileged access to this resource (Gamson, 2004). Institutions also offer knowledge and skills, for example with regard to leadership and political organisation, that may facilitate mobilisation (Tarrow, 2011). Edwards and McCarthy (2004) recognise that technical knowledge of IT may be useful for mobilisation over the Internet.

Institutions may also provide “ideological” resources that might facilitate collective action (Tarrow, 1988). Ideas may play an important role in mobilisation through framing possesses (McAdam et al., 2001; Snow, 2004; Tarrow, 2011) and the ideas embedded within institutions may be utilised in these processes (Tarrow, 2011: 31). Existing ideas embedded within the state may influence actors’ ability to mobilise support for new policies by determining which policy ideas appear attractive (Hall, 1993; Rueschemeyer and Evans, 1985; Sikkink, 1991; Weir and Skocpol, 1985).

The resources at the disposal of state actors allow the dispensation of benefits that may attract support and foster group cohesion. Benefits that might attract support in the case of F/OSS include a lowering of the costs involved in attaining information about F/OSS, i.e. learning how to use it, solve problems or adapt it to individual needs and the contribution of resources in the form of code, where the state develops F/OSS that others might utilise. Although F/OSS' openness means information is freely available and the F/OSS community may offer support, the opportunity costs of searching for information and learning may lower incentives to use F/OSS. State investment might lower these costs through activities which facilitate cooperation and knowledge sharing between users and actors that develop F/OSS.

Capacity to mobilise support in wider society is likely to improve F/OSS advocates' ability to garner political backing from politicians. Politicians' policy decisions take into account the tradeoffs between the support they receive from narrow interests and wider electoral support (Grossman and Helpman, 1994; Landes and Posner, 2004). The greater wider public support for F/OSS promotion, the more likely are politicians to back F/OSS promotion as the interests of the population at large counter the narrow interests of PS advocates.

Ties

As well as facilitating organisation, institutions also represent a source of ties to those areas of the state holding authority for over policy. Employment within the state may offer opportunities to influence policy through direct participation in policymaking or through proximity and ties to political decision-makers (Sikkink, 1991; Weir and Skocpol, 1985). Where bureaucrats possess specialist knowledge, for example in IT, such knowledge may strengthen these actors' capacity to influence politicians' ideas. Bureaucrats possess influence over policy choice because, as the actors responsible for implementing policy, they may determine whether policy is successful or not (Weir, 1989). The ideas and opinions of bureaucrats are important in influencing policymakers' decisions as to whether a policy is administratively viable (Hall, 1997; Weir and Skocpol, 1985). However, notwithstanding the fact that employment within

the state may offer opportunities to influence those actors that decide policy, it does not guarantee these actors will listen.

Where it comes to influencing political leaders, participation in political parties may offer advantages over professional state employment where political parties enter power. As the “main agents of political representation [political parties] provide access to government” (Hagopian, 1998: 101; also Mainwaring and Scully, 1995). Partisan ties may allow F/OSS advocates to influence policy through government appointments or lobbying of political decision-makers from outside government. Partisan ties may not only offer access to political decision-makers but also increase the likelihood that these actors listen due to political trust.

Another source of ties to political decision-makers may be organisations with which incumbent political parties are closely affiliated. Left parties, like those that held power in Argentina and Brazil between 2003 and 2010, often possess links with organisations such as unions and social movements. In Argentina, the Kirchner governments possessed ties with movements related to human rights (Wagner and Sánchez, 2009), the *Piqueteros* (Escudé, 2007) and the labour movement (Zelaznik, 2011). In Brazil, the *PT* traditionally enjoyed links with social movements and unions (Baiocchi, 2003; 2005; Branford et al., 2005; Foweraker, 1995; Hochstetler, 2008; Keck, 1995).

F/OSS advocates’ location within the state may facilitate their capacity to access political decision-makers. Because actors have to work through the state in order to obtain policy goals, the structure of the state conditions actors’ opportunities to influence policy (Gourevitch, 1986; Hall, 1997; Weir and Skocpol, 1985). For those actors with ties to the state or working within it, the areas of the state to which actors are connected or located inside it affects opportunities to influence policy (Foweraker, 1995; Weir, 1989; Weir and Skocpol, 1985). For F/OSS advocates with an interest in precipitating change in IT use, influence in areas of the state related to IT as well as those housing political leaders is likely to be key to their ability to advance their policy objectives.

Where F/OSS advocates possess direct control or indirect influence over those areas of the state with faculties pertaining to IT, they are more likely to be able to persuade

politicians that F/OSS promotion is administratively viable. The significance of the public sector as a principle user of software in developing countries means control or influence over the state's IT infrastructure will hold strategic importance to patterns of IT use in the wider population as well as within the state (Weerawarana and Weeratunga, 2004). Holding responsibility for policy implementation, those actors with responsibility for administering IT and setting IT standards within the state as well as those charged with formulating policy towards IT outside it determine whether F/OSS promotion is administratively viable.

Together with the support of bureaucrats and policymakers connected with IT, the backing of political leaders is likely to prove crucial to F/OSS advocates' capacity to translate F/OSS promotion into policy due to the power of PS advocates that are likely to oppose it. Backing from the political leadership of the executive increases the likelihood that F/OSS promotion might take on government-wide dimensions and resist opponents' attempts to stymie such a policy. Where presidential systems of government are strong, as in Argentina and Brazil, the presidential style of government means the president plays an important role in policymaking (Scartascini, 2008; Sikkink, 1991). The cabinet is also an important actor in policymaking as it is responsible for policy implementation (see Scartascini, 2008).

In Argentina, between 2003 and 2010, the executive was in a strong position to control legislative output. In this period, strong ruling party discipline (Jones, 2002) together with the ability of the ruling party to dominate the legislature through majorities or alliances with other parties strengthened the ability of the executive to determine the legislative agenda and outcome of proposed legislation (Jones and Hwang, 2005: 127; Jones and Micozzi, 2011). The executive is in turn able to exert strong discipline over the ruling party through both institutional and party-based mechanisms (Jones, 1997). The executive may exert influence over legislative party forces in general by offering benefits conferred through the state (*ibid.*)

The executive was also in a strong position to push through legislation in Brazil as well in the 2003 to 2010 period. In Brazil, the president is in a strong position to push through legislation due to their ability to effectively legislate by decree (Alston et al., 2008; Santos and Vilarouca, 2008; Neto, 2002; Shugart and Carey, 1992; Shugart and

Haggard, 2001). As in Argentina, there existed a number of mechanisms by which the chief executive could gain legislators' acquiescence to have legislation approved in congress (Santos and Vilarouca, 2008). The rules of the congress meant party leaders played a key role in determining committee appointments and this, combined with the ability of the presidency to offer resources (Alston et al., 2008: 127), allowed the chief executive to trade inducements for legislative support. Although the *PT* possessed a congressional minority between 2003 and 2010, the party was able to build a governing majority by offering cabinet positions and benefits (Samuels, 2008).

In addition to the capacity to push through legislation, executives also possess "negative agenda setting power" (Calvo, 2007). This means pursuing F/OSS promotion through the legislative branch is likely to be fruitless without executive backing. The president has the capacity to veto laws (Cox and Morgenstern, 2001; Jones, 1997), and through influence over parties in the legislative arena, may stymie legislation before it reaches a vote (Calvo, 2007).

The support of the political leadership of the executive may offer F/OSS advocates greater autonomy vis-à-vis opponents *within* as well as outside the state. Where actors receive backing from the political leadership of the executive, they are likely to enjoy a level of autonomy that may allow them to exceed their official remit whilst tempering the capacity of opponents to dislodge them or disrupt their plans.

2.2.2 The Organisation of Interests and PS Advocates

Although PS advocates, encompassing multinational PS firms, are likely to include actors that are powerful in their own right and which dominate the software sector both economically and politically, the power of these actors is mediated by the level of concentration in the organisation of software sector. Where business organisation is concentrated it enhances business' capacity to exert pressure upon and negotiate with government (Fairfield, 2011: 428). The greater the level of concentration in the organisation of the software sector, the larger sectoral representatives' ability to influence policy is likely to be.

As members of the sector, PS advocates will benefit along with other sectoral actors. However, greater concentration in sectoral interests is also likely to bestow disproportionate benefits upon the largest firms in the sector which encompass multinational PS firms. As multinational PS firms will tend to dominate the business associations in which they participate because of their size (Hart, 2004), where sectoral interests are concentrated within fewer associations, these firms' domination of sectoral interests will be greater.

Concentration in business' organisation also increases business' coordination. Fairfield (2011: 428) observes that "encompassing organisation ... enhances business' ability to forge common positions and coordinate political actions" (Fairfield, 2011: 428; also Durand and Silva, 1997; Smith, 2000). In the case of the software sector, greater concentration thus also allows multinational PS firms greater capacity to coordinate sectoral interests.

Greater influence over the coordination of sectoral interests will allow multinational PS advocates greater capacity to present their narrow interests in PS as reflecting those of the wider sector. Where sectoral interests are presented in this way, PS advocates will be in a stronger position to persuade policymakers to adopt policies that favour their interests as PS is more likely to be identified with the interests of the sector as a whole.

Concentration of sectoral interests will also increase PS advocates' capacity to benefit politically from the economic performance of the sector as a whole. The economic performance of the sector is likely to affect its political influence as a source of revenue for the government, stronger economic performance leading to a concomitant increase in political influence. The ability of PS firms to present their interests as those of the wider sector through concentration in sectoral organisation will enhance the capacity of PS firms to benefit politically from economic activity in which they do not directly participate.

Factors Affecting the Level of Concentration in Sectoral Organisation

The level of concentration in sectoral organisation may be affected by a variety of factors. As already noted above, the state may play a key role in shaping patterns of

association by influencing incentives for collective action. Firms' participation in business associations is motivated by access to selective benefits, yet the state may represent the source of these benefits (Schneider, 2004). The state might enable business associations to provide selective benefits by offering political access, government appointments or participation in policymaking (ibid.).

If the state affects levels of business associativism through the benefits that it offers, the dispensation of such benefits is conditioned by the state's demeanour toward business sectors. This demeanour may be conditioned by various factors. Perhaps the most salient is the state's ideological disposition. Offe (1995: 127) notes that the extent to which collective actors emerge is likely to hinge upon the “‘interventionist’ vs. ‘liberal’ nature of the state.” He observes that, where there is “lots to win from the state through associative activity, there will be a correspondingly stronger incentive to undertake the efforts of group formation and pressure politics … [i]nversely, governments that follow extreme market-liberal doctrines … will not only be unresponsive to such groups, but beyond that will actively try and disorganize intermediate groups” (ibid: 127).

Political support and policymaking may also affect the state's demeanour toward business sectors. Politicians might engage business sectors with a view to garnering their political support (Schneider, 2004: 27–28). Policymakers might engage business sectors to send them a signal with a view to influencing their behaviour, i.e. to alleviate business' uncertainty (Haggard et al., 1997: 41; Schneider, 1997), or to garner information that might facilitate policymaking (Schneider and Maxfield, 1997: 7–9). Policymakers' engagement with business sectors might also stem from interests concerning policy implementation, where policy aims and the limited resources at the disposal of the state mean cooperation from such sectors raises the likelihood of policy success (Cawson, 1985; Fuchs, 2005; 2007; Maxfield and Schneider, 1997; Schneider, 2004).

The state's influence upon business association includes the legacies of its historical policies (Schneider, 2004: 51). Up until the 1980s, many Latin American countries pursued state-led economic strategies where local firms or sectors may have enjoyed protection. Where protection has historically favoured local firms in the software sector, development of local production may mean sectoral representation has grown up

around this activity. Such representation is historically likely to have expressed a nationalist bias (Domínguez, 1982), with interests antagonistic to foreign firms. Moves to neoliberal economic models and the removal of protection – a phenomenon that occurred in both Argentina and Brazil in the 1990s – mean local software firms' interests would likely have become more dependent upon imported PS by the turn of the 2000s. Yet it is possible that sectoral representatives that emerged during the protectionist period survived subsequent market opening and if so, their continued presence may increase the likelihood of fragmented sectoral representation. Business associations founded under protection may cling to nationalist interests, prompting the emergence of additional associations to cater for new interests arising from the opening of the market. Under such circumstances, sectoral cooperation may be reduced, attenuating the capacity of the sector as a whole to coordinate political action and the ability of actors within it to bargain with the government. Moreover, fragmented sectoral organisation is likely to inhibit PS advocates' capacity to mobilise and coordinate sectoral interests.

The neoliberal policies of the 1990s may also have affected patterns of business association by reducing levels of associativism. In addition to diminishing the availability of state derived benefits that might encourage association, neoliberal policies are likely to have reduced associativism by increasing private sector competition, attenuating incentives for inter-firm cooperation and resources for collective action (Schneider, 2004).

Business organisation and cooperation is likely to increase when common business interests come under threat (Durand, 1997; Durand and Silva, 1997; Plotke, 1992; Schneider, 2004). Such threats include economic crises which increase incentives for associativism and business unity. A factor which may in combination with common threats to business interests encourage business associativism concerns exclusion from policymaking (Durand and Silva, 1997), which increases business' uncertainty over the actions government might take (Durand, 1997).

Plotke (1992: 190) claims that business cooperation may be affected by changes in the relations between firms. Where social ties between firms are extensive and strong, they are likely to facilitate inter-firm discussion. In combination with changes in the wider

socio-economic environment that threaten common business interests, such ties may facilitate inter-firm cooperation and organisation.

Geography may affect the concentration of sectoral interests, the size of a country and the distribution of industry within it conditioning patterns of association (Schneider, 2004).

Overview of Theoretical Framework: Interests, Institutions and Lobbying Power

To summarize, the theoretical framework laid out in the preceding sections of this chapter is based upon the configurations of interests and institutions that surround F/OSS and PS advocates, configurations which influence outcomes in software licensing policy by mediating the lobbying power of these actors. This framework explains variation in software licensing policy across Argentina and Brazil between 2003 and 2010. In Argentina, strong cohesion in the software sector strengthened PS advocates' lobbying power by enabling these actors to mobilise and coordinate sectoral interests. At the same time, weak institutional embeddedness weakened F/OSS advocates' lobbying power by limiting resources which might lower the costs of collective action and coordination and ties with political decision-makers that might provide high level political access. In Brazil, the situation was reversed. There, weak cohesion in the software sector weakened PS advocates' lobbying power by attenuating their capacity to mobilise and coordinate sectoral interests. By comparison, F/OSS advocates' lobbying power was strengthened by these actors' strong institutional embeddedness which furnished resources which lowered the costs of collective action and coordination and provided ties with political decision-makers that offered high level political access.

2.3 Alternative Explanations

This section considers alternative factors that might explain software licensing policy, advancing arguments as to why these alternatives offer less leverage in explaining policy outcomes in Argentina and Brazil.

2.3.1 Economics

Broad similarities between the software sectors in Argentina and Brazil mean the costs and benefits associated with different software licensing models are generally similar across these two countries. In terms of software products, both countries are net importers of PS and face incentives to reduce expenditure on these imports. With locally produced software products less likely to be dependent upon appropriation, increased use of F/OSS offers a plausible means of reducing imports of PS. If anything, as argued in the previous chapter, the Argentine crisis suggests that on balance, F/OSS promotion was more likely in Argentina in the 2000s than in Brazil if only because of the acute resource shortages in the state and the effects that the devaluation would have made to the price of royalties for foreign produced PS. Despite economic causes of variation having been controlled for through case selection, it is important to point out that economics provide limited value in explaining variation in software licensing policy.

Whilst such policy choices might be expected to take into consideration the material costs and incentives associated with different software licensing models, because policies may be motivated by political concerns that go beyond economics – concerns for which policies may be adopted *in spite of* rather than because of financial costs – explanations of policy choice are not necessarily reducible to an economic calculus. The political reasons for promoting F/OSS may mean financial costs are secondary or of little concern in policy decisions. Indeed, there is reason to suggest that economics *per se* provide limited grounds for promoting F/OSS.

So far as *use* of software is concerned, unless politicians are concerned with enforcing IP, they are unlikely to recognise significant financial benefits in promoting F/OSS or switching to it from PS. By making PS financially accessible to all sections of the general population through the medium of pirate software, weak enforcement of IP offers an effective means of enabling social access to software. Even if politicians care about reducing piracy where software is used within the state, PS firms' capacity to lower their prices to win and maintain business may make it financially advantageous for government to adopt PS over F/OSS in the short term, cancelling any apparent

pecuniary benefit in switching to F/OSS. So far as *producing* software is concerned, it would appear politicians have to appreciate the wider implications that F/OSS raises in terms of facilitating knowledge transfer, learning and education as well as opportunities to capture the benefits of peer production if they are to recognise tangible economic benefits in promoting F/OSS.

The way in which different interpretations of F/OSS affect the value associated with its promotion speaks to the significance of cognitive factors in influencing choice in software licensing policy. If the value of promoting F/OSS hinges largely upon interpretations of F/OSS' significance, variation in policy outcomes cannot be attributed solely to straight forward pecuniary costs and benefits.

2.3.2 Ideas

Ideas have long been identified as an important factor in explaining policy choice (Adler, 1987; Gourevitch, 1986; Hall, 1989; 1997; Hart, 2004; Sell and Prakash, 2002; Sikkink, 1991). Ideas are likely to be particularly important to choice in software licensing policy because they determine the potential for value to be recognised in promoting F/OSS by conditioning cognisance of the political dimensions and ramifications of software licensing. Although where software is used, the financial incentives for switching to F/OSS may appear limited, if politicians care about the implications software licensing raises for autonomy and democracy, the benefits of using F/OSS may be viewed as substantial. Because interpretation of the meaning of software affects the goals and interests that policy serves, gaining consensus over this meaning lies at the heart of the politics of software licensing.

The importance of interpretation to choices in policy over software licensing mean politics are played out within ideas themselves as actors seek to persuade policymakers to accept interpretations coherent with actors' interests. Discursive power and framing are two concepts that help explain how ideas might shape policy outcomes.

Fuchs (2007: 139) describes discursive power as the capacity to wield influence by "shaping norms and ideas". Discursive power evokes Lukes' (2005) "third dimension"

of power, where actors might shape the preferences of others and consequently lead them to act in ways in which they otherwise would not.

Framing may be understood as an interpretive process through which identities and interests are defined and understood (McAdam et al., 2001: 48; Snow, 2004; Tarrow, 2011). Through framing, actors construct collective identities, legitimate objectives and demands and connect their interests to those of potential allies that might offer support.

Schoonmaker (2002: 7) notes that within discourse, “certain relations of power and domination are represented as normal through language, while others are subjugated by not being acknowledged”. Through discourse, norms and values become reified within social structures, coming to be interpreted as objective reality whilst their character as norms and values is obscured (*ibid.*). This insight echoes the Gramscian notion of “cultural hegemony” (Harvey, 2007) where the beliefs held within society comprise a socially constructed reality which is taken to represent the natural order of things. Through the modern period, rationality and neoclassical interpretations of economics have come to represent the dominant worldview (Schoonmaker, 2002) and may be regarded as culturally hegemonic. The cultural hegemony of rationality and economics privileges actors that employ arguments based upon these values by facilitating such actors’ ability to present themselves as representatives of objectivity, allowing them to frame arguments based upon alternative values as irrational or inefficient and thus counter to common sense. Furthermore, it enables them to undermine arguments based on alternative values by drawing attention to their foundation within ideas. Whilst the arguments of those aligned with hegemonic values benefit from the notion that these arguments reflect objectivity – a notion that obscures their ideological underpinnings – the labelling of alternative arguments as ideological contributes to their framing as counter to objectivity.

As noted above, the informational asymmetries that surround software licensing place PS advocates in a strong position to shape the preferences of politicians who are ordinarily unlikely to be savvy of IT or software licensing. The cultural hegemony of rationality and economics affords PS advocates an additional advantage in their ability to shape politicians’ preferences.

The struggle to gain consensus over software licensing evokes free software proponent Richard Stallman's oft quoted dictum about the 'free' in free software meaning "free" as in 'free speech,' not as in 'free beer'" (Stallman, 2002: 43). PS advocates tend to concentrate on the financial costs associated with using software when engaging with the debate on software licensing (see Katopis and Galan, 2009; Bradford L. Smith, 2002), leaving unmentioned political concerns, hence framing F/OSS in 'free beer' terms. Rooted in hegemonic values of rationality and economics, this frame is socially intuitive and unless bystanders are otherwise aware, suggests software licensing is principally a financial issue. Whilst F/OSS is understood in 'free beer' terms, it presents little threat to the interests of PS advocates because PS firms may undercut prices for F/OSS solutions and F/OSS presents little if any value over PS. Furthermore, the very rationale for promoting F/OSS on the basis of putative financial or technical benefits may be called into question by PS advocates (and even sections of the F/OSS community, as noted above) on the strength of free market arguments: if F/OSS is indeed cheaper or technically superior to PS, then it may compete with PS without the need for state intervention. F/OSS advocates make explicit the political dimensions of software when engaging in the debate over software licensing, framing F/OSS in 'free speech' terms. Where, F/OSS is understood as 'free speech' and politicians care about autonomy and democracy, F/OSS represents the only option if autonomy and democracy are to be guaranteed.

If there is an association between political bias and software licensing policy, it perhaps relates to whether politicians care about the political dimensions of software licensing. If more conservative political forces view democracy through a narrow, institutional lens or see limited threat to the sovereignty of the state, perhaps because of close alignment with the US, then the attractiveness of F/OSS' political dimensions are likely to be limited.

Ideas as Roadmaps

Ideas may matter to policy as "road maps", where ideas related to principles and values guide choices in policy by "providing compelling ethical or moral motivations for action" (Goldstein and Keohane, 1993: 16). Under this mechanism, policy choices will be influenced by the ideas that already exist in surrounding social structures and

institutions. Hall (1989: 10) observes that “[t]he persuasiveness of a new set of … ideas is always relational, that is to say, it depends not simply on the ideas themselves but on the way in which they fit with other existing ideas” (see also Sikkink, 1991: 26). The attractiveness of licensing models will be a function of the degree to which frames and philosophies surrounding these models connect to and cohere with existing goals or ideas.

Ideas may matter to policy by shaping opportunities for mobilisation and hence actors' political influence vis-à-vis political decision makers. Ideas may allow possibilities for collective action in the absence of clear interests by acting as “focal points and glue” (Goldstein and Keohane, 1993: 17). In this way, ideas are likely to be especially important for F/OSS advocates' ability to mobilise support. Over and above the issues that F/OSS' non-excludable character poses to collective action, low public awareness of F/OSS and F/OSS' character as an experience good (such that value only arises with use), mean F/OSS advocates face a lack of understanding and appreciation of F/OSS in the wider population upon which interests might be activated. In the absence of interests in F/OSS in the wider population, ideas offer F/OSS advocates' opportunities for mobilising support through framing.

The degree to which actors will be successful in mobilising wider support through ideas depends on their ability to frame their interests and objectives in ways that resonate with the norms and values of constituencies from which they seek support (Kapczynski, 2008: 814; Tarrow, 2011).

In poorer countries, constituencies at the base of society offer important opportunities for mobilising support for F/OSS because they likely represent the better half of the population and their use of F/OSS may thus serve to harness the benefits of network effects in generating wider popularity of F/OSS. Because the abundance of pirate PS and switching costs effectively make F/OSS more expensive than PS for ordinary users, attracting the support of poorer sections of the population is likely to rest on framing F/OSS in ways that transcend its potential financial benefits. Drawing attention to the ways in which F/OSS might foster democracy and self-reliance might offer opportunities to mobilise support for F/OSS amongst marginalised sections of the population by connecting F/OSS to issues of social inclusion and empowerment.

Ideas may matter to policy choice by becoming embedded within institutions (Goldstein and Keohane, 1993; Sikkink, 1991). The very fact that the ideas that exist within institutions such as the state and political parties shape policy choices through awareness of the options that are available and by informing which options are appropriate means that where ideas gain purchase within institutions, they tend to influence future policy decisions.

Whilst ideas matter to policy choice, focus on ideas in themselves does not necessarily explain how or why one set of ideas comes to motivate policy over another. Ideas have to be “available” to those actors that formulate policy if they are to influence policy (Goldstein and Keohane, 1993: 13; Weir, 1989) and availability is contingent upon the interests and institutions that surround ideas. As Weir (1989: 54–55) observes, if ideas are “only advocated by those without access to centres of national power, there is little chance that [such ideas] can emerge as the basis for redesigning policy”.

The configuration of interests that surround ideas may affect opportunities for ideas to be taken up in policy (Weir, 1989). Political incentives to act on ideas through policy may hinge around the strength of coalitions that support and oppose ideas.

The institutional structure of the state affects the propensity of ideas to influence policy by influencing the transmission of ideas between sources in wider society and other areas of the state and political decision-makers (Hall, 1989). As already observed above, actors’ location within the state affects their ability to influence policy by conditioning access to the levers of policymaking and location thus also conditions the possibility for actors’ ideas to shape policy choice. As social structures within which ideas are embedded, institutions also condition opportunities for the actors located within them to mobilise support (Rueschemeyer and Evans, 1985; Sikkink, 1991; Tarrow, 2011: 31; Weir and Skocpol, 1985).

The availability of ideas and their capacity to be assimilated and appreciated is also conditioned by the availability of knowledge (Rueschemeyer and Evans, 1985: 50). Because politicians are unlikely to possess strong knowledge of IT and software licensing, if politicians are to recognise the political dimensions of software licensing on

which the value in promoting F/OSS is principally based, actors that might explain these dimensions need to be proximate to politicians. Within the state, those most likely to possess knowledge relevant to recognising the benefits of F/OSS are IT administrators. However, as noted above, these actors possess principally financial and technical interests and face incentives to use PS, making it unlikely they will ordinarily push for F/OSS to be promoted. The significance of knowledge to the recognition of value in promoting F/OSS and the issues that are typically likely to militate against this knowledge being imparted, again points to the importance of F/OSS advocates' embeddedness within the state or incumbent political forces if F/OSS promotion is to stand a chance of emerging. Only where knowledge of the political benefits of F/OSS is coupled with the desire to realise these benefits is this knowledge likely to be imparted.

Whilst ideas matter to choice in software licensing policy, their influence on policy varies across time and national boundaries in relation to conditions shaped by the character of interests and institutions. It is argued that whilst ideas may play an important role in shaping policy decisions and mobilisation, the influence that ideas have rests upon the location, resources and ties of the actors that espouse them such that they may be regarded as secondary to interests and institutions in explaining policy choice.

2.3.3 Other Institutional Factors

A number of other institutional variables might affect software licensing policy.

State Capacity

The capacity of the state affects policy choice by determining which policy options are administratively viable (Hall, 1989; Weir and Skocpol, 1985; Evans, 1995). Although the organisation and resources at the disposal of IT administrators will affect the capacity of these actors to adopt F/OSS *independently* – i.e. without buying in knowledge, personnel or solutions from the private sector – outside the issues raised by switching costs, the ability of the state to purchase PS solutions suggests that it might equally purchase F/OSS solutions if they are competitively priced. In-house knowledge

will be important if public sector IT administrators are to deploy F/OSS themselves. Manpower with the relevant skills will be crucial if the state wishes to develop F/OSS independently. However, notwithstanding these issues, the adoption of F/OSS is arguably more about responsibility and *organisation* than resources. Where F/OSS is adopted, if the state adopts F/OSS independently, IT administrators take on more responsibility for the systems they manage than when they buy-in solutions and support from the private sector. In terms of organisation, greater pooling and sharing of knowledge across the state as well as engagement with the wider F/OSS community offers IT administrators opportunities to overcome the search and learning costs associated with adopting F/OSS and harness the benefits of peer production. In view of the amount the state may spend on licensing PS, it is reasonable to assume that governments generally posses the financial resources to manage their IT needs relatively independently through F/OSS.

State-Sector Relations

As implicit in the discussion above as to how state demeanour toward the private sector might affect business organisation, the relations between the state and the private sector affect business actors' influence over policy (Durand and Silva, 1997; Maxfield and Schneider, 1997; Schneider, 2004).

As for any actor, the structure of the state will affect the influence that business is able to wield over policy (Gourevitch, 1986; Hall, 1997). The way in which policymaking towards software is organised within the state is likely to be key to sectoral actors' ability to influence policy. The very fact that software is ever more integral to daily life means policy in virtually any policy area might involve software. As a consequence, all areas of the state may connect to software and unless these areas are coordinated, the software sector will find it costly to influence policies that affect its interests. The more centralised policymaking toward software, the easier it is likely to be for sectoral actors to influence policy. Awareness and understanding of IT within the government is likely to affect the degree to which the interests of the software sector are catered for as formal liaison with the sector rests upon recognition of software as a policy issue. The character of formal state-sector relations and the areas of the state with which the sector formally liaises will affect sectoral influence over policy.

As well as the wider institutional structure of government, business actors' ties with those in the state more generally will affect influence over policy (Fairfield, 2011; Plotke, 1992). Apart from more formalised consultation of business, business actors might garner ties with government through appointments, informal or partisan links (Fairfield, 2011). Although business did not represent a core constituency of government in either Argentina (Corrales, 2008) or Brazil between 2003 and 2010, governments in both countries counted on support from business. Business support is necessary for governments to effectively govern (Lindblom, 1980). The Lula government's dependence upon business was signalled by the appointment of pro-business figures to ministries related to business interests (Branford, 2005: 98–99). The Kirchner governments counted on sections of the business community for support, especially those with an orientation toward local production (see Lewis, 2009: 163; Wylde, 2012: 126).

Although state-sector relations will affect PS advocates' ability to access political decision-makers and participate in policymaking, it is argued that this factor is secondary to the organisation of sectoral interests in explaining software licensing policy choice. Although strong ties with policymakers and politicians are likely to increase PS advocates' lobbying capacity, the organisation of the sector will affect government actors' responses. Where cohesion in sectoral interests is lower, PS advocates' reduced capacity to mobilise the sector and present their interests as those of the sector overall will reduce these actors' ability to persuade policymakers to choose policies that favour PS.

3 The Politics of Software Licensing Policy in Argentina and Brazil at the Turn of the 21st Century (1999 – 2002)

Around the turn of the millennium, calls for policy promotion of F/OSS emerged in both Argentina and Brazil in the guise of activism and legislative initiatives.

Notwithstanding the appearance of these efforts, the prospects of F/OSS promotion taking hold looked to vary widely across the two countries, appearing high in Argentina whilst low in Brazil. There were a number of reasons why prospects appeared to vary this way. First were the underlying financial incentives for using F/OSS. In Argentina in the wake of the 2001 economic crisis, the pecuniary incentives for government to turn to F/OSS were arguably greater than anywhere else in the region. As the state faced fiscal collapse and the cost of imported PS skyrocketed with the 2002 devaluation of the peso, F/OSS effectively represented the only feasible means of using software legally. Although financial drivers for the Brazilian government to turn to F/OSS may seemingly have been elevated in Brazil too following its own crisis in 1998, subsequent increases in fiscal revenues and public sector spending (Amann, 2003; Giambiagi and Ronci, 2004) suggest that – in spite of the fact that the Brazilian government sought to reign in public sector spending in a political climate of austerity (*ibid.*) – such drivers were unlikely to have been significantly more compelling than elsewhere in Latin America.

Second were trends in wider IP regimes. In the 1990s, as it acceded to the TRIPS agreement and sought preferential access to US markets, Brazil increased patent protection to levels higher than those called for either under the TRIPS agreement or by the US (Guise et al., 2008; Shadlen, 2012; 2014). This hike in protection, showing a bias in favour of knowledge owners in Brazil's wider IP regime, made F/OSS promotion appear less likely. Argentina also increased levels of patent protection in this period, yet it sought to minimise these increases, utilising flexibilities under the TRIPS agreement and failing to meet the levels of protection called for by the US (Shadlen, 2014). These attempts to minimise increases in protection, showing an inclination to

favour knowledge users in Argentina's wider IP regime, suggested F/OSS promotion was more likely.

Third was the character of foreign policy. Brazil's foreign policy was characterised by cooperation as it sought a global order based on collaboration and multilateralism, and it generally conformed with international norms as a result (Vigevani and Oliveira, 2007). The liberal character of the international environment and US' backing of US PS firms meant promotion of F/OSS – a phenomenon its US detractors described as 'un-American' (Festa, 2001) – appeared incongruent with Brazil's behaviour in the international arena. Although Argentina had pursued strong alignment with the US in the 1990s, its image on the international stage had historically been characterised by recalcitrance. As Argentina defaulted on its international debt at the end of 2001, reinforcing its reputation for indifference to international norms, US disapproval appeared unlikely to present a serious obstacle to F/OSS promotion.

Fourth was the likely strength of would-be opponents of F/OSS promotion, the legacy of previous industrial policies suggesting such actors would be stronger in Brazil than in Argentina. Protection of informatics was stronger in Brazil than in Argentina during the 1980s (see Evans, 1995; Nochteff, 1995). By 1990, where the Brazilian software sector represented a notable political player, such an actor barely existed in Argentina. Although Brazil's informatics protection was rolled back in the 1990s, reducing the significance of the software sector as an actor, there remained a legacy of institutional structures which represented the sector and connected it with government which were virtually absent in Argentina.

Last and perhaps most important was the character of governments in Brazil and Argentina around the millennium. The Cardoso government looked unlikely to promote FOSS not only because it sought strong ties with the US but also because its liberal bent was apparently at odds with 'picking winners', especially in relation to a software licensing scheme popularly viewed as antithetical to capitalism and the spirit of IP. Although the Argentinean governments of the period were hardly radical, the Duhalde administration's break with neoliberalism as it adopted interventionist measures suggested it would be open to promoting F/OSS.

Despite prospects of F/OSS promotion appearing to vary in this way across Argentina and Brazil in T1, both countries maintained policies that favoured PS. The absence of policy variation in T1 is noteworthy in view of cross-national patterns in underlying conditions. Yet it is all the more so at the end of this period, when conditions appeared to become increasingly propitious to F/OSS promotion in Argentina following the crisis, whilst seeming to remain as unfavourable as ever to such a policy in Brazil. Considering the increasingly leftist orientation of the subsequent Kirchner administrations, at the end of 2002, F/OSS promotion looked imminent in Argentina. By contrast, Lula's pledge to maintain the market orientated stance of the Cardoso administration suggested policy would continue to favour PS in Brazil.

This chapter explains the absence of F/OSS promotion in Brazil and Argentina between 1999 and 2002, arguing that this outcome resulted mainly from F/OSS advocates' inability to persuade executives to adopt F/OSS promotion rather than the efforts of opponents seeking to prevent it. With little to suggest F/OSS promotion would imminently emerge in T1, mobilisation against such a policy was low.

F/OSS advocates were unable to translate their preferences into policy because they possessed weak institutional embeddedness, attenuating their lobbying power by reducing their capacity to mobilise resources and forge ties with political decision-makers. Without ties to political leaders, F/OSS advocates lacked influence within the leadership of the executive and as a consequence, their demands either went unheard or were ignored by those with the power to promote F/OSS. In Argentina, F/OSS advocates were remote from the state in general and could mobilise only limited support and possessed little if any influence within the executive. Brazilian F/OSS advocates presented a contrast to their Argentinean counterparts in that they possessed strong embeddedness within both an incumbent political party and the state albeit at the subnational level. By offering access to resources, embeddedness within a state government facilitated these actors' capacity to mobilise and organise a national movement around F/OSS. However, affiliated to a party that at the national level sat in opposition, Brazilian F/OSS advocates lacked ties with the leadership of the national executive. Notwithstanding the support Brazilian F/OSS advocates were able to mobilise in wider society, in the absence of influence amongst national political leaders, these actors were unable to persuade these leaders to promote F/OSS.

The cases of Brazil and Argentina at the turn of the millennium demonstrate the limits of agency where actors are relatively weak and act outside institutional structures such as the state and political parties. Whilst F/OSS advocacy emerged in both these countries during this period, F/OSS advocates worked from outside the national government and political forces holding power at the national level. With embeddedness within the government and incumbent political forces weak or absent, F/OSS advocates lacked the capacity to translate their preferences into policy.

This chapter first examines the characteristics of the software sector and mobilisation around F/OSS promotion in Argentina before carrying out an equivalent analysis for Brazil. In both countries, greater space is given to analysing mobilisation around F/OSS promotion in accordance with the argument that between 1999 and 2002, mobilisation of opposition to F/OSS promotion was low. Greater space is devoted to analysing F/OSS mobilisation in Brazil than in Argentina on account of the fact that in the former country, F/OSS advocates were able to achieve their goals at a subnational level and mobilise greater support than their counterparts in Argentina, even if they were ultimately unsuccessful in succeeding in precipitating F/OSS promotion at the national level.

3.1 F/OSS Advocacy in T1 Argentina

At the turn of the 2000s, Argentina possessed what was likely the most well developed F/OSS community in Spanish speaking Latin America, with probably the most Linux users (Busaniche, 2006) and numerous F/OSS related groups, the largest of which attracted around 1,000 active participants. However, if the existence of a developed local F/OSS community made the existence of social pressure for government to promote F/OSS seem likely, where it existed, such pressure was ineffectual. Differences between groups calling for F/OSS to be promoted prevented these groups from working together effectively and no one group was strong enough in itself to persuade the government to adopt such a policy.

Although F/OSS related groups were numerous, most were narrowly focused on the technical dimensions of F/OSS and generally disinterested in F/OSS as a political issue or an object of government promotion. Those groups that were interested in F/OSS promotion were significantly smaller than their technically focused counterparts, attracting relatively few participants and able to mobilise limited resources, reflecting the collective action issues surrounding mobilisation around F/OSS promotion. The main groups were *Hipatia*, the Free Path Foundation (*FVL*) which both emerged at the end of the 1990s and Free Software Argentina (*SoLAr*) which emerged in 2003 (*SoLAr A*, 2011; *SoLAr B*, 2011; *SoLAr C*, 2010). *SoLAr* was estimated to involve around two-hundred active participants and *FVL* around only ten (Saravia, 2011). Outside the voluntary labour of their participants, *FVL*'s resources were generated through partnering with international donor organisations whilst *SoLAr*'s were effectively limited to membership dues.

Capable of mobilising limited resources, groups advocating F/OSS also experienced difficulties in working effectively together on account of differences that characterised the F/OSS community more widely together with competition for leadership and political space. Based upon ideological positions in terms of political bias and democratic principle, differences were reflected both within as well as across groups. In terms of political bias, *Hipatia* was associated with the far-left whilst *SoLAr* reflected views across the political spectrum albeit with a leftwing bias. Whilst *FVL* professed neutrality with regard to political bias and partisan affiliation, the organisation was viewed elsewhere in the F/OSS community as rightwing, in part because it worked with Marcelo Dragan, a legislator affiliated with the centre-right party, Action for the Republic (*APR*)(see Torre, 2005: 175), to improve the text of a F/OSS mandate bill (*FVL A*, 2010b; *Proposicion.org.ar*, 2001). With regards democracy – a theme of import within the F/OSS community where openness and deliberation were prized – differences existed between *FVL*, which was incorporated as a foundation, organised hierarchically and conducted decision-making behind closed doors and *SoLAr*, which was incorporated as a civil society and where emphasis was placed upon observing democratic norms, participation and transparency in decision making. Where *FVL* was criticised on ethical grounds, on the basis that its operation flouted the very values it purported to uphold (interviews, 2011), *SoLAr* was criticised for being ineffective, its

emphasis on democracy reducing the organisation's capacity to define objectives and strategies to achieve them (interviews, 2010; 2011).

If groups advocating F/OSS faced limitations in mobilising support amongst themselves, they also passed up opportunities to attract allies in wider society. The general profile and demeanour of F/OSS advocates served to reduce possibilities for mobilising support from wider society. In Argentina, the F/OSS community represented a relatively privileged section of society, embodying a mainly middle class, university educated, twenty-something following (FVL A, 2010; Journalist A, 2012; see Zúñiga, 2006: 26). With their origins in this community, where an anti-politics stance was also prevalent, F/OSS advocates generally remained disengaged and aloof from social mobilisation (Journalist A, 2012), missing opportunities to generate wider social awareness of F/OSS and associate it with a broader constituency. Around the turn of the century, the costs of this aloofness were high, as mobilisation in response to the conditions wrought by the crisis was widespread amongst sections of the middle classes and sectors at the base of society (Di Marco, 2003; Grugel and Riggiorozzi, 2007: 94; Levitsky, 2008: 107; Panizza, 2014). In some cases, F/OSS advocates' demeanour or actions served to alienate potential allies. Leftist sections of the F/OSS community reduced possibilities to mobilise resources by alienating business actors, as much through the disdain their political bias generated within the business community as through their own rejection of capitalism (interviews, 2011). *FVL*'s involvement with *APR* looked to negatively affect chances of mobilising support by associating F/OSS with conservative political forces at a time when such forces were particularly unpopular.

APR was headed by the principle architect of Argentina's economic policies through the 1990s, Domingo Cavallo (Grugel, 2009), a man many Argentineans regarded as the primary culprit for the crisis (see Lewis, 2009; Panizza, 2014; Smith, 2002: 4).

Engaging with Cavallo's party at the height of the crisis in 2001 – a moment at which its leader could not have been more unpopular – *FVL*, and by extension F/OSS, not only came to be associated with political forces facing the groundswell of public opinion but also, effectively framed F/OSS in a way likely to deter rather than garner support from important constituencies. Framing represents a mechanism for mobilising support (McAdam et al., 2001; Tarrow, 2011) and in Argentina, where sectors at the base of

society represent the majority of the population, framing F/OSS in ways that connect to the interests of these sectors may offer valuable opportunities to mobilise support. With the availability of low cost, unlicensed PS representing a form of social inclusion, if such sectors were to come to support F/OSS, it was important to frame F/OSS in ways that drew attention to its political dimensions, such as social inclusion. Dragan's project – the motivations of which were couched primarily in economic and technical arguments relating to reducing fiscal expenditure, stimulating local commercial enterprise and improving the efficacy of the state (Dragan, 2000) – presented F/OSS in a way that overlooked its political benefits. Moreover, being presented by political forces viewed by many as responsible for increased social exclusion, the project was likely to do little to endear F/OSS to poorer sections of the population (Carlini, 2012; Journalist A, 2012).

Aloof from actors in wider society, F/OSS advocates were also isolated from state and political institutions, passing up further possibilities to mobilise resources as well as opportunities to garner influence within the government. With their anti-politics stance and at a time marked by acute wider public dissatisfaction with Argentina's political class as a result of the crisis (Grugel and Riggio, 2007: 94; Riggio, 2009: 109; Torre, 2005), F/OSS advocates were generally averse to working with the state and mainstream political parties. Isolated from incumbent political forces, F/OSS advocates' reduced possibilities to participate in policymaking and transmit their ideas to politicians, not least political leaders, the support of which was crucial for F/OSS promotion to be adopted as a government wide policy. Unless ideas are pushed by actors with access to the bases of power within the state, the likelihood of ideas influencing policy is slim (Weir, 1989: 54–55).

Generally avoiding incumbent political forces and professional bureaucrats, F/OSS advocates' contact with government was effectively limited to their engagement with Dragan's legislative project. As a strategy to precipitate policy promotion of F/OSS, legislative proposals possessed a number of drawbacks. In the case of Dragan's project in particular, a principle issue concerned the fact that *APR* was a minority party holding just 4.3% of the seats in the chamber of deputies in the legislature (Calvo and Murillo, 2013: 141), reducing the likelihood of approval. Dragan's assistant believed there had existed support sufficient for the bill to be approved within the chamber of deputies in

2001 (Ares, 2011) yet the crisis eclipsed the bill's discussion and before a vote could be taken, *APR*'s presence within congress was practically wiped out in the 2001 election (Calvo and Murillo, 2013: 141; Torre, 2005). Another issue with Dragan's project was that it reflected neither a societal demand nor garnered significant public support that might have added to the political incentives for approval. Dragan had submitted his project on individual initiative after hearing about F/OSS from a mutual friend (Ares, 2011), his first contact with the F/OSS community only arising *after* his bill's submission when *FVL* approached him (FVL A, 2010b).

More generally, as a strategy to prompt policy adoption of F/OSS promotion, legislative projects were susceptible to being blocked in the absence of support from the executive or majority party in the legislature. Ruling party control of committees allows the executive or ruling party to stymie proposed legislation it opposes at the committee stage, preventing it from ever reaching the floor to be voted on (Calvo, 2007; Scartascini, 2008). In Latin America, much of the activity that takes place in the legislature takes place behind the scenes (Morgenstern and Nacif, 2002) and lobbying of legislators or parties that control committees offers one way in which legislative activity may be stymied (Guides, 2011; HCDN A, 2011; Legislative assistant B, 2011). Following the crisis which eclipsed discussion of Dragan's bill, the Justicialist Party (*PJ*) was the ruling party, such that the bill required the support of the *PJ* if it was to stand a hope of being revived. Even if projects enjoy political support and are not blocked, to stand a chance of being implemented successfully they also require the support of bureaucrats (Weir and Skocpol, 1985).

Bureaucrats may play a key role in determining policy adoption as participants in the policymaking process, thereby possessing capacity to influence politicians, and by affecting the administrative viability of policy proposals due to their role in policy implementation (Weir, 1989: 373; Weir and Skocpol, 1985). Within the Argentinean government, the *Oficina Nacional de Tecnologías de Información (ONTI)* was responsible for determining standards for technology adoption (Fontdevila et al., 2008). It was crucial that *ONTI* bought-in to the idea of promoting F/OSS if such a policy was to be viable because the entity was not only in a position to influence policymakers but also exerted influence over policy implementation throughout the state. However, F/OSS advocates failed to engage with *ONTI*. In the case of Dragan's project, *ONTI*

was not invited to committee meetings to discuss the project despite its importance to the viability of this proposal (Carllinni, 2010).

In the absence of engagement from the wider F/OSS community, government IT administrators pursued their own, autonomous F/OSS related initiative through a workgroup within the *Foro de Responsables Informáticos (FRI)*(Kaufman, 2003: 16; 2005; Poggiese et al., 2005). The *FRI* was part of a wider initiative involving cooperation and knowledge sharing between bureaucrats through forums across a range of areas in public administration, conceived with a view to enabling the state to continue functioning through the resource shortages of the crisis (Kaufman, 2003; Poggiese et al., 2005: 4). The F/OSS workgroup within the *FRI* was motivated by pragmatic as opposed to political or ideological concerns and focused upon tackling technical issues in the adoption of F/OSS rather than promoting F/OSS as an end in itself (Carllinni, 2010). Coordinated by professional bureaucrats from within the *ONTI* beneath the political tiers of government, the *FRI* operated independently of political intervention (*ibid.*).

The separation of F/OSS advocates, the political leadership of the executive and government IT administrators in Argentina around the millennium reduced the likelihood of F/OSS promotion emerging because the motivation to adopt such a policy, political authority necessary to avoid stymie and technical capacity for viability were all separated from one another. Awareness and comprehension of IT was generally limited in political circles in Argentina (see Kaufman, 2005) and without interchange between politicians and actors holding both technical knowledge and an appreciation for the political dimensions of technology, politicians generally lacked the awareness to lead them to consider adopting F/OSS by themselves.

If F/OSS advocates were unsuccessful in getting the government to promote F/OSS in the first years of the century, the prospects of these actors achieving their objectives appeared to improve in 2003, shortly before Kirchner came to power. From within the offices of the presidency, it was announced that the F/OSS community was to be invited to participate in an initiative to promote the use of F/OSS within the state – the *Ámbito de Software Libre en el Estado (ASLE)*(ASLE, 2003). Suggesting an opportunity for F/OSS advocates to strengthen their government ties, it appeared likely that F/OSS

advocates would begin to increase their influence within the government and that F/OSS promotion would be incorporated into the government's agenda.

3.2 Opposition to F/OSS Promotion in T1 Argentina

Mobilisation in opposition to F/OSS promotion was low in Argentina at the end of the 1990s and first years of the millennium, not least because there appeared relatively little sign the executive would adopt such a policy. However, likely opponents of F/OSS would have been in a relatively weak position to prevent the uptake of F/OSS promotion, had the executive decided to do so. At the end of the 1990s and early 2000s, whilst local firms with interests in PS existed and large US software firms were active in Argentina, software was not readily identified as a discrete economic activity yet alone a sector of political weight with notable representation. Where business associations existed, they tended to aggregate the interests of only the largest, multinational firms, raising consequences for their organisational strength. Identified primarily with the interests of multinationals rather than local SMEs, local business associations that nominally represented the interests of the software sector as a whole attracted little participation from local firms. Reducing the resources available to these associations and their legitimacy as sectoral representatives, low levels of associativism also inhibited the ability of the most powerful would-be opponents of F/OSS promotion to coordinate the sector. Would-be opponents of F/OSS promotion were also in a relatively weak position to lobby government due to the institutional structure of the state, which was not geared to facilitating liaison between the sector and the government, there being an absence of relevant government interlocutors and institutionalised channels of communication. Overshadowing the period around the millennium, the crisis drew the attention of the government, reducing the likelihood of significant change in government-sectoral relations in this period.

Sectoral Association

In both economic and political terms, the Argentinean software sector was relatively insignificant at the end of the 1990s. Whilst the government had shown some interest in developing local production of informatics in the 1980s, policy was weak and ineffective (Babini, 2003; Chudnovsky and López, 1996: 17; Fontdevila et al., 2008;

Nochteff, 1995). Generally left to the vagaries of the free market from this period onwards, the local software sector was small and dominated by foreign, mainly US interests (Chudnovsky et al., 2001; Correa, 1996). In the mid 1980s, conservative estimates put the number of firms involved in software related activities in Argentina at around 300 (Chudnovsky et al., 2001: 76). It appears that this number remained relatively static for the next decade, the same figure being reported in a study from the mid 1990s (Correa, 1996). Whilst institutional representation of software related activity existed in the 1980s and early 1990s, reportedly aggregating the interests of around 80 local SMEs at the beginning of the 1990s, the business associations concerned possessed limited political influence (CESSI A, 2011).

Under the neoliberal policies of the Menem governments in the 1990s, there existed no policy support for the software sector (Chudnovsky et al., 2001: 42). The software sector was not even able to obtain benefit from horizontal policies aimed at assisting industry in general as software was not recognised as a discrete economic activity (Chudnovsky et al., 2001). The Menem governments also generally took little notice of business organisations (Birle, 1997: 273–285; Schneider, 2004: 53). Schneider (2004) argues that the state may play a major role in patterns of business organisation, intervention and business consultation representing two factors which might stimulate associativism. The absence of sectoral policy toward the software sector and government indifference to business organisation through the 1990s reduced incentives for sectoral association.

The software firms that did develop in the 1990s grew up around the privatisation of state enterprises and informatisation of the state (Fontdevila et al., 2008: 111–112; Yogui et al., 2006). According to businessmen active in the 1990s, competition amongst local firms during the period was strong (CESSI B, 2010; CESSI C, 2012; CESSI D, 2012). Competition may inhibit business organisation by limiting available resources (Schneider, 2004: 52). Together with a lack of state intervention to offer incentives for organisation, market conditions in 1990s Argentina led firms to focus on individual interests rather than sectoral cooperation. A sector's capacity to support business organisation may also be associated with its size (Drope and Hansen, 2009: 309). With the local software sector in Argentina still at an incipient stage of

development in the 1990s, its relatively small size is likely to represent another factor that limited business organisation.

With the Argentinean market open to foreign software, Microsoft dominated the Argentinean software sector. Forward linkages, which allow suppliers to mobilise firms that use suppliers' products as inputs (Shadlen, 2014), meant Microsoft was able to influence local distributors and resellers. Whilst sectoral business associations were dominated by MNCs, allowing these firms a strong hand in steering associations' agendas, the low participation of national software firms in these associations meant MNCs' ability to coordinate the sector was limited.

At the end of the 1990s, the business associations chiefly associated with the software sector reflected primarily the interests of multinational firms. These organisations were the Argentine Chamber of IT and Communications (*CICOMRA*) and the Chamber of Software and IT Services Firms (*CESSI*). *CICOMRA* primarily represented the telecommunications sector (Capellán and Ballarino, 2011). Representing many of the largest IT and telecommunications firms in the world, *CICOMRA* possessed significant resources. However, whilst its members included software firms, it was primarily focused on telecommunications. Focussed exclusively upon activity relating to software and nominally representing firms across the sector, national as well as international, *CESSI* was nonetheless dominated by MNCs (CESSI D, 2012). Local firms, saw little benefit from participating in the *CESSI* (CESSI D, 2012) and the organisation faced difficulty in extracting contributions from its members around the time (CESSI E, 2011). Participation was so low that there were often insufficient numbers to support the various commissions within the association (CESSI B, 2012b; CESSI C, 2012). Under such conditions, *CESSI* welcomed the involvement of MNCs as much as a source of resources as a source of influence (CESSI A, 2011). MNCs' dominance within the association reinforced itself, as local firms viewed the association as representing the interests of MNCs rather than local firms (CESSI D, 2012). The influence of multinational PS firms within the *CESSI* at the end of the 1990s is reflected by the organisation's focus on combating use of unlicensed software (see Giglio, 2000).

Whilst the *CESSI* petitioned the government it was unsuccessful in gaining government support for the sector. It is unsurprising that the association remained weak through the period as it was able to offer few incentives to attract participation.

State-Sector Relations

The arrangement of the institutions with which societal actors interact with the state condition these actors' influence within it (Evans, 1995; 1997b; Weir and Skocpol, 1985). In T1 Argentina, institutional arrangements interacted with the weak cohesion of the software sector to limit the effects of its lobbying. With policy toward the software sector absent, there existed no particular institutional arrangements to cater to the sector. Due to the nature of software, the purview of many areas of government touching upon the issue, responsibility for matters of concern to the sector was distributed across a multitude of different government ministries and departments (CESSI A, 2011). As the sector had to coordinate with multiple areas of the government to pursue its interests, such conditions increased the costs of government liaison and reduced the sector's chances of lobbying success. The coordination problem facing the sector was compounded around the millennium because the government was controlled by a coalition, the entities with which the sector had to liaise being distributed amongst the different political forces from which the coalition was comprised (CESSI A, 2011). This coalition broke down in 2000 (Lewis, 2009) further complicating the sector's ability to liaise with the government as cooperation between the different areas responsible for matters of interest to the sector was obstructed by political differences.

3.3 F/OSS Advocacy in T1 Brazil

Unlike their counterparts in Argentina, Brazilian F/OSS advocates were from the outset embedded firmly within political and state institutions and these institutions enabled these actors to mobilise support for F/OSS promotion in multiple ways. In Brazil mobilisation around F/OSS promotion emerged within the state government of Brazil's southernmost state, Rio Grande do Sul (RS), during the leftist administration of *PT* governor, Olívio Dutra. Unlike the mobilisation around F/OSS promotion in Argentina, where heterogeneous interests limited F/OSS advocates' ability to mobilise support, Brazilian F/OSS advocates were able to overcome the costs of collective action and

harness the support of a broad coalition reflecting heterogeneous interests through the resources they were able to mobilise through the state. Controlling the resources on which this coalition was built, these F/OSS advocates were able to lead and coordinate this coalition.

Emergence of F/OSS Policy

In RS, mobilisation around F/OSS promotion emerged in tandem with the adoption of F/OSS as a policy by the state government and both were prompted by actors within the state. The state may allow actors within it to act autonomously, the structures that surround these actors conditioning opportunities for action (Weir and Skocpol, 1985: 118). The mix of state institutions and incumbent political forces that the Dutra administration embodied produced conditions in which politicians' receptiveness to the idea of adopting F/OSS promotion was more likely for reasons relating to the goals and capacity of the government.

Institutions affect policy choices through the ideas which are embedded within them (Rueschemeyer and Evans, 1985; Sikkink, 1991; Weir and Skocpol, 1985). The particular ideas of the *PT* conditioned the policy ideas that would be acceptable within the Dutra administration. The *PT*'s emergence coincided with the re-democratisation of Brazil (Keck, 1995) and one of the party's goals concerned increasing participation in democracy (Abers, 2000; Nylen, 2000; 2003). Reflecting this goal, the stated objectives of the Dutra administration were to offer citizens more control over the state, improve public accountability and public participation in the way the state was run and IT was viewed as strategic to advancing these objectives (C. Dutra, 2011; O. Dutra, 2012; Mazoni, 2011). The ideas embedded within the Dutra administration meant heed was likely to be paid toward policy proposals that might improve the state's capacity to offer public services through IT.

The institutional structure of the state affects the administrative viability of policies and thus conditions the policy options the state might realistically entertain (Rueschemeyer and Evans, 1985; Weir and Skocpol, 1985). The institutional structure of the state government of RS meant the government possessed the capacity to develop its own IT

solutions. In RS, the IT and telecommunications (ICT)¹¹ infrastructure upon which the state bureaucracy of RS depended was publicly owned and administered by a public company, the State Data Processing Company of RS (*PROCERGS*). Unlike *ONTI* in the Argentinean government – which was focused on formulating standards for IT adoption within the state – *PROCERGS* was responsible for executing as well as formulating government IT policy. Further to controlling government owned ICT infrastructure, *PROCERGS* possessed technical personnel that offered the potential to design, develop and deploy IT solutions in-house, including software.

Whilst the goals and capacity of the Dutra administration made receptiveness to F/OSS adoption more likely, these conditions in themselves were insufficient for the idea itself to gain recognition amongst politicians. The catalyst was a government actor which was itself an outcome of the political forces that comprised the Dutra administration.

Although the Dutra administration was a *PT* administration, it was dominated by more radical sections of the party. The prevalence of radical factions within the *PT* party organisation of RS was particularly pronounced (Machado, 2004; Sobota, 2011) and as a result of internal party struggles during the 1998 gubernatorial elections, these factions gained strong representation in the Dutra administration (Goldfrank and Schneider, 2003). Emerging out of revolutionary groups, these factions contained experienced activists who possessed “know-how” in political organising (Gret and Sintomer, 2005: 11; see also Abers, 2000: 57). Unionised public sector workers represented a core constituency of the *PT* (Nylen, 2000) and the Dutra administration also reflected participation from this constituency.

As a result of the attributes of the political forces that comprised the Dutra administration, *PROCERGS* came to be headed up by a group of professional public sector IT administrators, who were linked to labour unions and a radical *PT* faction with roots in Trotskyism, Socialist Democracy (*DS*)(see Goldfrank, 2003; Kucinski, 2005). Constituting a ‘bureaucracy-party-union nexus’, this group represented a confluence of

¹¹ The terms ‘ICT’ and ‘IT’ will be used interchangeably here. Due to technological convergence, both the transport of data over networks (encompassing communications/telecommunications) and the processing and storage of data (generally referred to as ‘IT’) rested on the same digital foundations by the turn of the millennium.

state and political institutions as well as a fusion of the cognitive attributes that these institutions embodied.

Through professional, partisan and union ties, members of this nexus were connected to colleagues and peers in local branches of federal institutions as well as the municipal government of the state capital of RS, Porto Alegre, which was also controlled by the *PT*. It was through these ties that *PROCERGS* managers were prompted to consider F/OSS adoption as a means to reduce government expenditure on PS (Parera et al., 2000) following a suggestion from a *DS* activist who worked in *SERPRO* – the federal equivalent of *PROCERGS* – where F/OSS adoption had been trialled (see Tema, 2002).

On coming to power, the Dutra government found state funds had been exhausted by the outgoing administration of Antônio Britto, leaving the state with massive shortfalls due to debts owed to the federal government (Goldfrank and Schneider, 2003: 161). The Dutra government's fiscal situation was not helped by conditions in the wider Brazilian economy as it took power during a period of falling economic growth and financial crisis (see Amann, 2003). In 1999, the state government's expenditure on PS licensing fees reportedly ran to around US\$10 million¹² (Parera et al., 2000) and facing acute financial difficulties, *PROCERGS* managers welcomed a suggestion that might reduce these fees.

Though F/OSS adoption was initially considered for economic reasons, it was also quickly identified as consistent with the Dutra administration's ideals. Together with ideas, the knowledge embedded within institutions affects policy choice through awareness of the policy options that are available (Rueschemeyer and Evans, 1985: 50). It was a result of a mix of the knowledge as well as ideas embedded within the nexus that F/OSS adoption was recognised as a policy idea and one which was attractive. Fusing technical expertise of ICTs, leftist ideas and the political goals of the wider Dutra administration, members of this nexus were not only aware of F/OSS but also quick to appreciate its political significance and view its adoption as desirable.

¹² Converted using 1999 exchange rate (World Development Indicators) from figure quoted in Brazilian reales in source.

As political appointees, *PROCERGS* managers were in a strong position to gain political leaders' backing for policy proposals in their area of competence and they readily received Dutra's approval to adopt F/OSS (O. Dutra, 2012; Mazoni, 2011).

The nexus' control of *PROCERGS* and the political emphasis placed on advancing the administration's goals meant that in contrast to the situation in the Argentinean government, where IT administrators and politicians were relatively isolated from one another, the two groups worked together closely in RS such that there was an interaction between technical knowledge and political objectives. With F/OSS being viewed as congruent with the government's goals, this close interaction facilitated the uptake of F/OSS adoption, such that the motivation for such a policy, political authority necessary for adoption and support of technical personnel for policy viability, all came together.

With Dutra's support, F/OSS was adopted in a range of initiatives across the state government of RS. *PROCERGS* developed a clone of Microsoft Outlook, *Direto*, featuring email, calendar and address book functionality which was deployed throughout the state government (Teza, 2003; 2004a). *Rede RS*, a corporate network connecting 60 entities of the state government of RS and attending 300,000 users was developed using F/OSS (Cruz, 2002). The state bank, *Banrisul*, migrated to the F/OSS office suite, *StarOffice* (Tema, 2002). In digital inclusion projects, which sought to increase social access to ICTs, F/OSS was adopted in the *Vía Pública, Escolas Técnicas de Informática* and *Telecentros* initiatives (Mori, 2011: 127; Teza, 2002; 2003). In the area of education, initiatives included Web portals (ICAWF, 2003), the *Rede escolar* initiative, which deployed free software in 42 schools (Teza, n.d.) and migrations such as that in the State University of RS (*UERGS*)(Teza, 2002). The uptake of F/OSS at the state level also prompted similar initiatives within the municipal government of Porto Alegre (Branco, 2004) which was also controlled by the *PT*.

Mobilisation around F/OSS

Although *PROCERGS* managers recognised benefits in adopting F/OSS, at the end of the 1990s, knowledge of F/OSS was scarce outside the F/OSS community. Within *PROCERGS* itself, there was a lack of technical knowledge of F/OSS technologies as well as understanding of the network mode of production by which F/OSS was

produced. To garner greater knowledge of F/OSS and thus facilitate F/OSS adoption, *PROCERGS* managers initiated the Free Software Project RS (*PSL-RS*)(ICAWF, 2003; Teza, 1999; 2000). Paralleling the aim of the *FRI* within the Argentinean government, the *PSL* aimed to harness the benefits of F/OSS and peer production by encouraging knowledge sharing and collaboration across the state. The potential utility of such an initiative being likely to increase in relation to its size and breadth, *PROCERGS* managers launched the *PSL* in conjunction with the data processing company of the municipal government of Porto Alegre, *PROCEMPA*, and the state bank, *Banrisul* (*ibid.*). The *PSL* differed to the *FRI* however in that it not only sought to encourage collaboration within the state but also across wider society. State actors may mobilise civil society to facilitate policy implementation (Rich, 2013) and in the case of the *PSL*, the inclusion of societal actors facilitated F/OSS adoption by offering a larger pool of knowledge and labour. For example, by involving the F/OSS community in state software development projects, the *PSL* harnessed the labour as well as the knowledge of the F/OSS community (Mazoni, 2011).

At its inception, the *PSL* involved over forty actors encompassing areas of the state government and municipal government of Porto Alegre, local branches of federal government institutions, universities, NGOs, private firms as well as individuals (Teza, 2004c). The *PSL* involved laboratories, courses, publications and events to study and share knowledge of F/OSS (Teza, 2000). Initially coordinated through a mailing list, the *PSL* soon found a home on the Internet in the guise of a website. The centre-piece of the initiative was a F/OSS event, the International Free Software Forum (*FISL*), which ran annually from 2000 (Knebel, 2010).

Whilst the *PSL* set out to facilitate the adoption of F/OSS within the state on economic and technical grounds, the coordinators of the *PSL* quickly recognised political grounds for promoting F/OSS as an end in itself.¹³ As the *PSL*'s coordinators came to learn more about the philosophy surrounding free software, free software came to be viewed as coherent with advancing the wider values and goals of Dutra administration. The

¹³ Those behind the *PSL* actually sought to promote ‘free’ as opposed to ‘open source’ software. In Portuguese (and Spanish), F/OSS is generally referred to as ‘software livre/libre’ which privileges free software over open source. The ‘libre’ label also avoids the ambiguity that exists in English regarding the meaning of ‘free’ in free software, i.e. whether it means “free as in beer” or “free as in speech”. In Portuguese and Spanish, ‘livre’/‘libre’ means free as in speech.

ideological motivations behind free software – protecting and advancing freedom through technology – bore a strong affinity to democracy as it was understood within the *PT* (Aquino, 2011; Murilo, 2011). Free software was conceived as a mechanism to advance the Dutra administration’s drive to deepen democratic participation. The ideas embedded within institutions may offer opportunities for mobilising support through framing (Tarrow, 2011: 31), and the currency that the idea of democracy held within the Dutra administration enabled the *PSL*’s coordinators to utilise this idea as another base for mobilising support for promoting F/OSS.

The framing of F/OSS in RS contrasted that in Argentina. By highlighting the political dimensions of software licensing, presenting F/OSS as a means to expand democracy and empowerment, *PROCERGS* managers not only connected F/OSS to the interests of wider society and thus raised opportunities to garner wider societal support. They also moved debate to territory on which PS, by its very nature, could not compete, by offering a rationale for promoting F/OSS that transcended technical or economic questions. Proponents of PS could plausibly argue that promotion of F/OSS on technological or economic grounds was unnecessary if not undesirable in a market economy. However, where such grounds concerned political questions such as autonomy, transparency and democracy, it was difficult to contest F/OSS promotion on the grounds themselves. The justification of promoting F/OSS on political grounds was important because such grounds were not only more difficult for opponents to challenge but also appealed to the interests of wider society, making wider societal support more likely.

Resources

PROCERGS managers’ situation within the state facilitated their capacity to mobilise support for F/OSS. Institutions may lower the costs of collective action by aggregating interests and offering resources (Olson, 1965; Tarrow, 2011: 136). The resources *PROCERGS* managers were able to mobilise as a result of their position within the state – with their control over *PROCERGS* and backing from political superiors – contrasted the limited resources that Argentinean F/OSS advocates were able to mobilise of their own accord. These resources encompassed financial, human, technological and cognitive dimensions, facilitating capacity to mobilise political support.

In terms of financial resources, *PROCERGS* managers had access to departmental and organisational budgets. Control over budgetary resources contributed to the *PSL*'s ability to stage an event to publicise F/OSS, the *FISL* (Branco, 2011). The personnel that worked for *PROCERGS* offered a pool of labour which could be deployed in pursuit of the *PSL*'s goals. Unlike Argentinean F/OSS advocates whose activist related activities were confined to free time, the *PSL*'s coordinators were able to devote time to such activities in their day job. The physical technological resources that *PROCERGS* managed – hardware, networks and software – offered opportunities to communicate, network, organise and disseminate knowledge. *PROCERGS*' managed the state Internet service provider, *Via-RS*, and coupled with control over government domain names, Web hosting software, storage space on servers and staff with the technical skills to develop and administer Web sites, it was possible for the *PSL* to stage a website at minimal cost (see Teza, 2004c). *PROCERGS* also represented a concentration of technical knowledge which facilitated the *PSL*'s ability to coordinate and execute its activities. As well as technical knowledge in IT which assisted the *PSL*'s ability to use technology in pursuit of its aims, the management and political organising expertise possessed by *PROCERGS*' directors helped in developing tactics and strategy for mobilisation.

Technology can facilitate organisation without the need for physical organisational structures (Castells, 2010b; Tarrow, 2011: 137). With their technical knowledge, *PROCERGS* managers were not only adept at using the Internet to organise but also quick to understand the modus operandi of the wider F/OSS movement. As a result, they were able to harness the network mode of production that F/OSS embodied for their political ends.

PROCERGS managers' were able to leverage the benefits of Internet based mobilisation by coupling it with the conventional, offline forms they were able to easily exploit by virtue of their position within the state. In online terms, the *PSL* represented what Castells (2010b: 147) describes as a “network movement”: a social movement organised online, where “Internet-based networking, is not just an instrument of organisation ... [but] a ... form of social interaction, mobilization and decision-making” (ibid: 156). In network movements, heterogeneous interests broaden a movement's base of support

without undermining capacity for organisation (Castells, 2010b: 147–148). However, due to the decentralised nature of the Internet, online, no node within a network is capable of controlling other nodes (Castells, 2010b; Galloway, 2004), holding ramifications for any one actors' ability to control network movements. The *PSL* was able to leverage the opportunities that the Internet allows for mobilising heterogeneous coalitions online whilst at the same time retain the capacity to steer this movement through its control over the resources around which the mobilisation was centred offline.

The *PSL* coordinators' position within the state offered privileged access to the media. Such access allowed the *PSL* to publicise F/OSS through two channels. Where mainstream media was used to reach the widest audience, raise awareness in areas where media coverage was absent or scant and to challenge criticism, the *PSL* website was used to disseminate news that did not appear in the mainstream media (Teza, 2004c). Such use of technology allows audiences to be engaged outside the mainstream media, thus avoiding mainstream editorial constraints (Castells, 2002: 141; 2010b: 157).

Ties

Besides providing access to the political leadership of the Dutra administration, *PROCERGS* managers' partisan ties also facilitated their ability to instigate legislative initiatives at the federal as well as state and municipal level of government.

The most important of these initiatives was *PL-2269*, submitted at the end of 1999 within the federal chamber of deputies by *PROCERGS* managers' *DS* and union colleague, *PT* federal deputy, Walter Pinheiro (Pinheiro, 1999). At the time *PL-2269* was submitted, the political context was hostile to the approval of the project as the *PT* was in a relatively weak position in the chamber of deputies, holding just over eleven per cent of seats in the chamber and leading a coalition which controlled around twenty per cent (Lamournier, 1999; Nylen, 2000: 130). This, together with the gate keeping function of committees (Scartascini, 2008), which made it easy for opponents of F/OSS promotion to block a project, meant that as with projects in Argentina, the project had limited hope of gaining approval. However, in Brazil, F/OSS advocates were aware of this, the principle objective of *PL-2269* being to raise the profile of F/OSS and provoke

a debate with a view to improving the climate for approval of similar projects at state and municipal levels.

PL-2269 achieved *PROCERGS* managers' main objectives. *PL-2269* was followed by the submission of projects by *PT* representatives in the legislatures of the state of RS and municipality of Porto Alegre (Bohn Gass, 2000; Bonumá, 2000) – also instigated by *PROCERGS* managers – which were subsequently approved (Governador do Estado do Rio Grande do Sul, 2002; see *Proposicion.org.ar*, 2004). The submission of Pinheiro's bill also raised the profile of F/OSS as an international as well as national level (Teza, 2011). Raising the political capital associated with F/OSS, *PL-2269* sparked the submission of a series of similar projects at the national level by legislators representing parties across the political spectrum (Alves, 2003; Bittencourt, 2001; Miranda, 2002; Wanderer, 2000) as well as in state and municipal governments across Brazil (see *Proposicion.org.ar*, 2004).

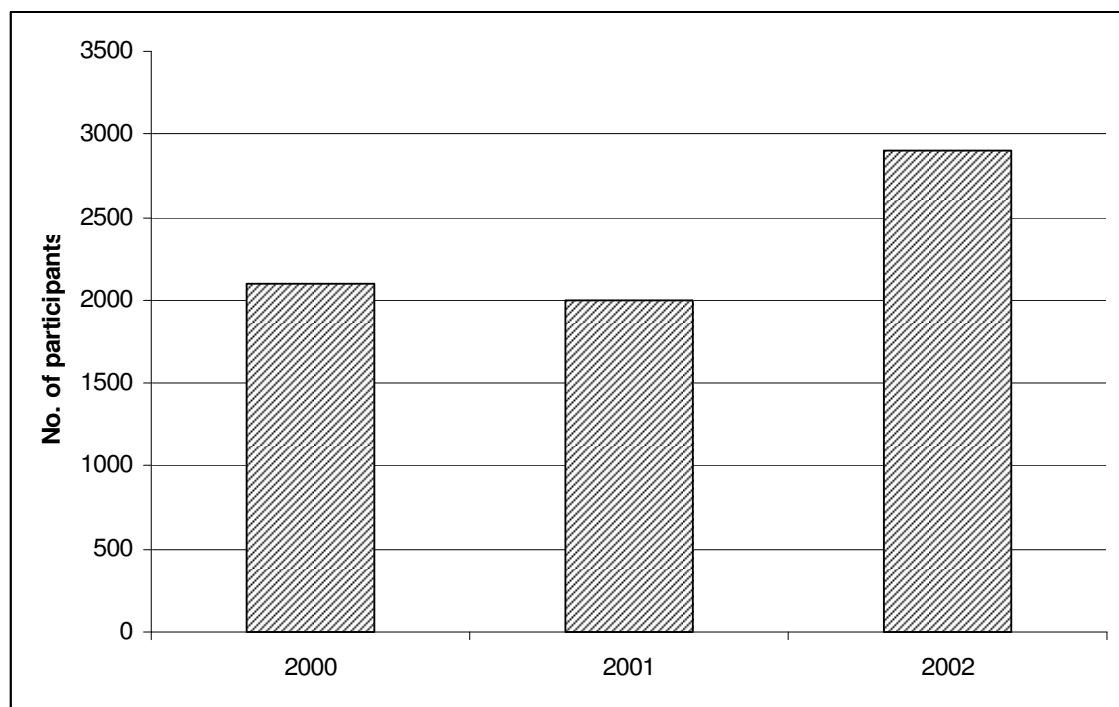
Mobilizing a Coalition

Contrasting Argentinean F/OSS advocates' isolation from actors in wider society, the *PSL* was able to attract and mobilise a range of actors encompassing all three levels of the Brazilian state, private firms, universities, business associations, third sector NGOs, the F/OSS community and wider society (Abreu, 2005a). Through its control over state resources, the *PSL*'s coordinators were able to attract participation by offering selective benefits – whilst access to knowledge surrounding F/OSS was notionally free, the costs of obtaining such knowledge were generally high and by investing in aggregating this knowledge, the *PSL* lowered these costs for participants.

The *PSL* thus attracted participation, support and resources for the same material reasons that motivated the initiation of the *PSL*: gaining knowledge to leverage the benefits of F/OSS and harnessing the productive forces of networks. Due to the importance of the health of developer communities as a source of quality, speed in software development cycles and support (see Weber, 2004), users as well as producers of F/OSS possessed interests in contributing to *PSL* initiatives such as the *FISL* with a view to motivating participation in F/OSS projects.

At the centre of the *PSL* was the *FISL*, the first edition of which attracted over 2,100 participants (Teza, 2000). Because the value of the *FISL* was related to its content which was in turn related to the level of diversity the event was able to attract in terms of participation – participants contributing to content through panels, seminars, workshops and general discussion – this value increased with the size and breadth of participation. By attracting more participants, the *FISL* had a propensity to generate positive feedback. Figure 3-1 reflects participant numbers in the *FISL* between 2000 and 2002. Whilst numbers appear to drop slightly in the event's second year, they climb by almost a third in 2002, reflecting a substantial increase in interest in attending the event.

Figure 3-1 – FISL Participant Numbers (2000-2002)



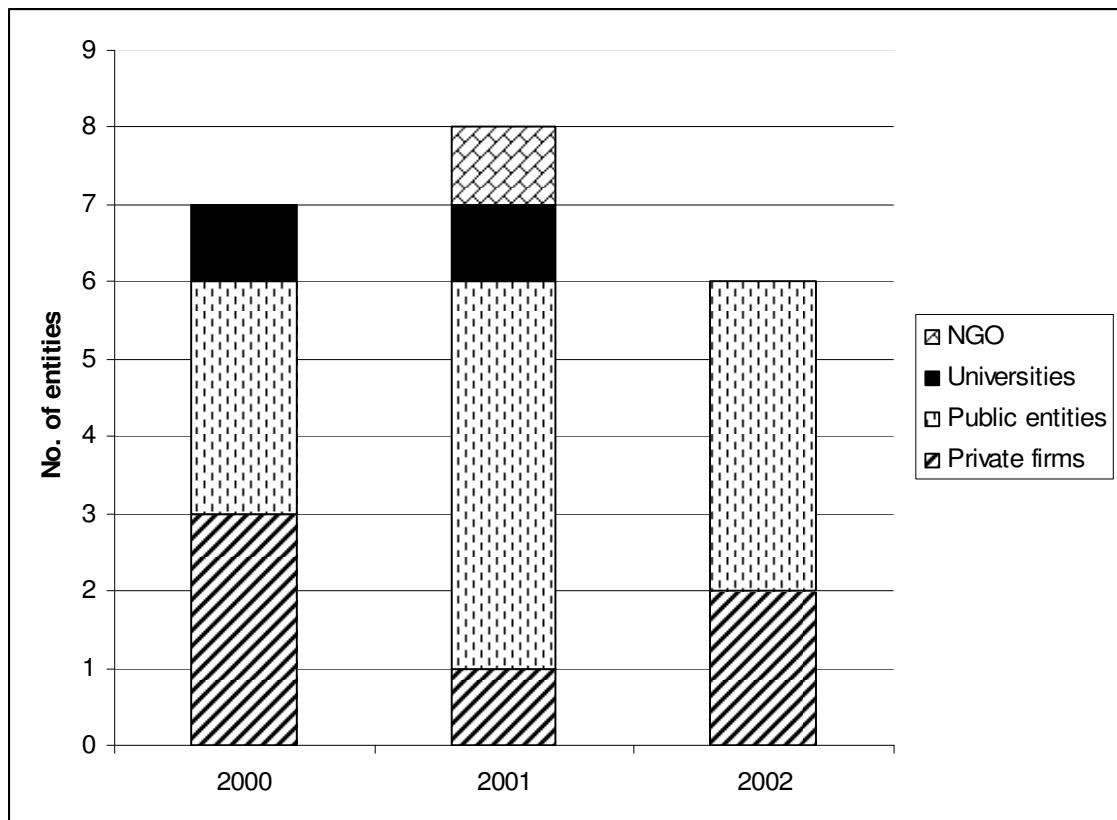
Source: Data elaborated from Abreu (2005).

With a view to maximising participation, the *PSL* sought to provide a greater and wider array of attractions than on offer elsewhere (Teza, 2000; 2011). Existing F/OSS events reflected a business or technical focus (Teza, 2000) and to differentiate the *FISL*, in terms of content, the event was to be no more than two thirds technically focused and embrace philosophical and cultural themes as well as business interests (Teza, 2000;

2004b). The *PSL*'s coordinators were able to attract participation in the *FISL* through a number of mechanisms.

Through resources the *PSL*'s coordinators were able to mobilise through *PROCERGS* and wider sponsorship, they were able to attract high profile speakers. For the very first *FISL*, the *PSL* paid for free software guru Richard Stallman to attend (Zúñiga and Couture, 2005). Mobilisation of resources through the state and wider sponsorship meant they were less dependent upon entrance fees to mobilise resources. To make the event as accessible to the widest possible audience the cost of entry was set at a nominal fee (Teza, 2000). Representing the largest event of its kind in Brazil, the *FISL*'s potential as a platform for disseminating information could be utilised to attract a range of participants. Advertising and marketing opportunities allowed the *PSL* to attract sponsors. The first *FISL* attracted sponsorship from private as well as public companies – including the US software firm, RealNetworks, the company behind the Brazilian Linux distribution, Conectiva and the telecommunications provider, Embratel (Abreu, 2005a). Figures for the value of sponsorship are not available although Figure 3-2 suggests the importance of state entities in funding the event.

Figure 3-2 – Sponsorship of the FISL (2000-2002)



Source: Data elaborated from Abreu (2005).

Further to offering financial resources, sponsors also supported the *FISL* in other ways. Access to the resources that *PROCERGS* and *PROCEMPA* managed allowed provision of Internet services through government ISPs and general computing resources (Branco, 2011; Teza, 2011). Opportunities to disseminate knowledge also attracted panellists, speakers and participation in workshops and seminars. The *PSL* coordinators' union ties enabled them to attract participation from unions. Within the first edition of the *FISL*, the National Gathering of Public Sector IT Personnel (*ENAPIP*) was staged, an event that was coordinated by the National Federation of Data Processing Workers' Syndicates (*FENADADOS*) (ibid.).

Sectors Attracted

Where in Argentina, leftist sections of the F/OSS community alienated business actors, the *PSL*'s coordinators recognised these actors as key to the success of the mobilisation around F/OSS and actively engaged them. Businessmen were incorporated into the

coordination of the *PSL* (Parera et al., 2000). Firms were attracted for the same reasons as other actors, although the wide range of interests that participants embodied also offered firms possibilities to network and forge contacts, learn about potential business opportunities, keep up with the latest market developments and develop relationships with the wider F/OSS community.

FISL attracted participation from organisations representing the software sector, such as *ASSESPRO* and *SOFTSUL* (Abreu, 2005a), a local state linked association involved in promoting the local software sector. *FISL* supported small software firms by offering them opportunities to showcase their solutions at a fraction of what it generally cost in more commercially orientated trade fairs (Teza, 2004b).

By gaining support from the business sector, F/OSS advocates ameliorated potential opposition from this sector and gained powerful allies. Having business on-side was important for the material support the business community was capable of furnishing. It also meant the endorsement of a constituency that embodied a powerful political as well as economic actor (Branco, 2011). Helping to dispel the anti-capitalist trappings associated with F/OSS, the backing of firms would also offset the disproportionately greater power of actors with interests' threatened by the increased prevalence of F/OSS vis-à-vis the *PSL*. The endorsement of business would also help to legitimate F/OSS as a serious technical solution.

Universities were important as a source of sponsorship and support. In the first *FISL*, universities submitted 28 proposals for workshops, 19 of which were approved for inclusion in the event (Teza, 2000). Another actor which supported the *FISL* was the Brazilian Computer Society (SBC).

F/OSS advocates' ties with unions and social movements facilitated their ability to attract participation from sectors in wider society. By offering opportunities to attain technical knowledge and skills, the *PSL* and *FISL* were able to appeal to the members of unions and social movements (see Teza, 2000). As observed above, the *FISL* attracted involvement from *FENADADOS*. Through the first World Social Forum (WSF), which was held in Porto Alegre in 2001, F/OSS activists established contact with the Landless Workers Movement (*MST*)(Teza, 2005b), a movement with a high profile. Leveraging

the synergies that existed between the philosophy of free software and wider themes such as digital inclusion, indigenous rights and democratization, the *PSL* was able to raise awareness amongst wider constituencies by associating free software with advancing these themes (Silveira, 2011). Engaging with and attracting support from high profile groups like the *MST* also helped to raise the profile of F/OSS in the general population.

The involvement of the state government of RS in the staging of the WSF in 2001 and 2002 offered *PROCERGS* managers opportunities to raise awareness of F/OSS through this event as well.

Sao Paulo

The nexus' activities in RS prompted the emergence of F/OSS promotion in other *PT* controlled sub-national governments, the most prominent example being the municipal government of Sao Paulo (SP). If RS was significant primarily for mobilisation around F/OSS, SP was significant for the implementation of F/OSS in an initiative which would prove F/OSS' viability.

Assuming control of the municipal government of SP in 2001, *PT* mayor Marta Suplicy appointed Sergio Amadeu, a party activist who had worked for her in the Florestan Fernandez Public Policy Institute to coordinate electronic governance, a position which included responsibility for digital inclusion (Costa, 2011: 164). Like *PROCERGS* managers, Amadeu was in a strong position to influence policy. He was proximate to political leaders, acting on their behalf and advising them, and he was responsible for formulating and executing policy. After attending the *FISL*, Amadeu chose to adopt F/OSS in a flagship digital inclusion project involving telecentres (see Bacoccina, 2003). Commencing in mid 2001, this project would attend around 550,000 people by 2006 (Reinhard and Macadar, 2006: 244).

Rolled out successfully, the huge scale of the project meant that it held symbolic importance in terms of proving F/OSS' viability (Silveira, 2011). Not only did the project prove that F/OSS could be deployed on a large scale. Attending to users with

little or no prior experience of computers, the project also dispelled the arguments of F/OSS' detractors that F/OSS was too complicated for the average user (Silveira, 2011).

F/OSS Advocates' Failure to Persuade Federal Government to Adopt F/OSS in Absence of Ties

Notwithstanding the capacity of F/OSS advocates to mobilise support for F/OSS promotion in Brazil, these actors were unable to precipitate F/OSS promotion in the federal government. The federal executive was controlled by the Brazilian Social Democracy Party (*PSDB*), a party to which the *PT* sat in opposition in the legislative branch, and the F/OSS advocates of RS subsequently lacked strong ties with incumbent political forces and thus political access that might have facilitated their ability to persuade national political leaders to promote F/OSS.

3.4 Opposition to F/OSS Promotion in T1 Brazil

As in Argentina, mobilisation in opposition to F/OSS promotion was low around the turn of the century as despite the emergence of activism surrounding F/OSS, there was little to suggest the executive was considering promoting F/OSS. However, PS advocates in Brazil looked to be in a stronger position than their Argentinean counterparts to block the uptake of F/OSS promotion had the government decided to adopt such a policy. Brazil protected IT in the 1970s and 1980s and as a result, whilst policy concentrated on protecting hardware, a relatively important local software sector developed. At the beginning of the 1990s, protection was removed, leading to the demise of local software production as cheaper, imported PS flooded the market. However, the institutional representation of the sector and sectoral ties to the government survived, leaving a sector with interests increasingly dominated by foreign PS that in comparison to Argentina was relatively well represented at the turn of the century. With the Brazilian software sector dominated by interests in PS, organised and connected to government, PS advocates looked to be in an advantageous position to mobilise the local sector and lobby the government to prevent the adoption of F/OSS promotion.

Sectoral Association

Brazil's IT policies of the 1970s and 1980s were important in shaping the characteristics of the local software sector. The Brazilian government began protecting the mini and microcomputer segments of the hardware sector in the 1970s to encourage the development of national hardware producers and advance economic development and technological autonomy (Bastos, 1992: 241; V. Dantas, 1988; M. Dantas, 1989; Evans et al., 1992; Evans, 1995; Tigre, 1983: 65; 1984; 1987; Schmitz and Hewitt, 1992).¹⁴ The protection of these segments stimulated software activity, spawning local software production in the 1980s (Botelho et al., 2005; Commander, 2005: 9; Evans, 1995; Schware, 1992b).

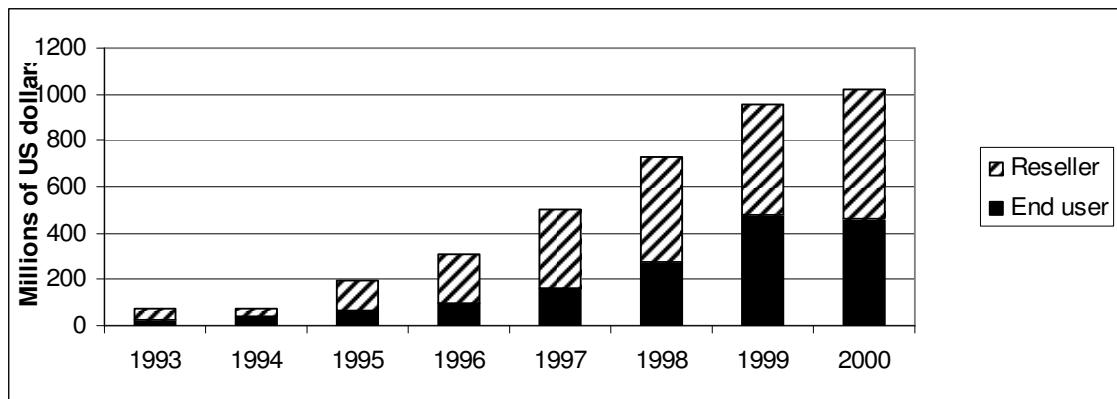
As a nascent software sector emerged, it developed into a significant player in national politics (Bastos, 1992) with a number of actors appearing to represent sectoral interests. The Association of Informatics Services Firms (*ASSESPRO*) was founded in 1976 to represent the interests of local data processing firms, its interests developing over the subsequent decade in response to changes in technology through the 1980s. Identified primarily with firms that developed software locally, *ASSESPRO*'s interests were primarily nationalist in orientation. In the mid 1980s, as the Brazilian government came under foreign pressure to allow the local sale of Microsoft's DOS (Bastos, 1994; Felder and Hurrell, 1988; Schoonmaker, 1992) a number of firms which sought to import Microsoft's software broke away from *ASSESPRO* to form a new association, the Brazilian Association of Software Firms (*ABES*) (ABES B, 2011; *ASSESPRO* A, 2011; Schoonmaker, 1995: 382). In 1990, there emerged a National Federation of Informatics Firms (*FENAINFO*) which aggregated the interests of state level, IT sector employers' syndicates and whose primary focus concerned employers' fiscal obligations (*FENAINFO* A, 2011).

¹⁴ Brazil's efforts in developing local production of informatics were linked to the Brazilian military's interests in developing nuclear and aeronautics technology (Hirst, 1996) as well as controlling foreign purchased military hardware (Adler, 1987). The Brazilian navy became interested in developing computer technology around the turn of the 1970s after purchasing frigates from the British (V. Dantas, 1988; M. Dantas, 1989; Evans, 1995: 118; Helena, 1984). These ships were controlled by computers produced by the British firm, Ferranti (Erber, 1995; Evans, 1995: 136; Soares, 2002: 3), which was averse to giving up knowledge as to how these computers worked. Taking the view that Brazil could not depend on foreign firms to guarantee its security, the Brazilian navy sought to develop their own computers. This experience led to a keen appreciation in Brazil of the significance of control over technology and the notion of technological autonomy (Adler, 1987).

In the early 1990s, as Brazil moved towards neoliberal policies under President Collor, protectionist IT policies were dismantled (Schoonmaker, 1995; 2002). The opening of the market led to the demise of national software producers in the face of a flood of cheaper software imports (Schoonmaker, 2002; see also Botelho et al., 2005; Marques, 2009). Figure 3-3 illustrates both the suddenness and degree to which software imports increased in the 1990s. With local producers of software either going out of business or moving to the resale and distribution of imported software, the interests of the sector came to be dominated by interests in foreign produced PS in the 1990s.

In 2004, 70% of companies operating within the industry were dedicated to distribution and marketing (ABES, 2005) – an activity generally associated with PS – and 73% of the \$5.98 billion spent on software was developed overseas (*ibid.*). As in Argentina, Microsoft came to dominate the software sector in Brazil. With Microsoft's products comprising a substantial share of these imports – the firm's revenues from Brazilian software sales in 2005 exceeding those of the two next highest selling firms, IBM and Oracle put together and exceeding by almost four times those of the largest Brazilian owned firm (Marques, 2009: 75) – the firm became the largest in the sector, dominating the sector both politically and economically. As in Argentina, forward linkages enabled Microsoft to exert influence over local resellers, distributors and firms which developed software using Microsoft's technologies.

Figure 3-3 – Brazilian Software Imports (Licensing Royalties) in the 1990s



Source: Central Bank of Brazil. Compiled by *SEPIN* (SEPIN, n.d.).

Whilst local software production diminished rapidly with the opening of the market and with it, the political influence of the sector (FENAINFO A, 2011), the protectionist IT policies of the 1980s left an institutional legacy. Although the interests of the sector changed, the institutional representation of the sector survived along with institutional ties to the government.

At the turn of the 2000s, *ASSESPRO*, *ABES* and *FENAINFO* remained active in representing sectoral interests. *ASSESPRO* remained both a principal representative of the sector and maintained an association with SMEs based around national capital. Organised in a federal structure, it possessed state level affiliates throughout Brazil and thus represented sectoral interests across the country as a whole. Based in São Paulo, *ABES* aggregated the interests of foreign software firms and their local partners and was synonymous with Microsoft (ASSESPRO A, 2011; BRASSCOM, 2011; FENAINFO A, 2011; Softex B, 2011). With the activity *ABES* represented generally rooted in foreign produced PS, its priorities centred around protecting the PS business model, including campaigning for strong IP protection and fighting software piracy. *FENAINFO* was funded through the state by IT firms' fiscal contributions and so represented all firms in the sector by default.

The sector's relations with the government not only reflected institutionalised channels of liaison but also suggested the government took an interest in software, implying the sector retained influence over policy. With regard to sectoral policy, the sector liaised

with secretariats within the Ministry for Industry (*MDIC*) and *MCT*. In the *MCT*, the sector participated in policymaking through the Committee for the Area of IT (*CATI*) within the Secretariat of Informatics Policy (*SEPIN*), on which four sectoral representatives sat alongside four representatives of wider civil society (Nunes, 2011). The *CATI* provided the software sector a formal, institutional forum by which it could liaise with the government, contrasting the absence of formal government-sector links in Argentina. With regard to the *MDIC*, the sector liaised with the Secretariat of Industrial Technology (*STI*).

The government's continued interest in the software sector was indicated by the *Softex* program which was initiated in the 1990s and affiliated with the *MCT* (Botelho et al., 2005; Commander, 2005; Marques, 2009; Softex, 2009). Involving support from a range of government institutions including banks, such as Brazilian Development Bank (*BNDES*), and entities concerned with fomenting R&D, such as the Funding Authority for Studies and Projects (*FINEP*), Softex offered support such as finance, training and subsidised certification schemes with a view to increasing the competitiveness of Brazilian software firms (Marques, 2009; Softex, 2000; 2009; Softex B, 2011).

3.5 Conclusion

This chapter has argued that weak institutional embeddedness limited F/OSS advocates' capacity to persuade national political leaders to promote F/OSS in both Argentina and Brazil.

In Argentina, the emergence of F/OSS advocates out of the fractious, generally politically indifferent F/OSS community resulted in these actors possessing little capacity to lobby the government. Reflecting the heterogeneous interests of the F/OSS community, the groups that emerged were limited in the resources they were able to mobilise and unable to work effectively together. Where anti-capitalist leanings alienated business actors that might have provided greater resources, F/OSS advocates' anti-politics stance meant they failed to garner the support of the social movements that emerged in the wake of the crisis. Crucially, as a result of the anti-state and anti-politics stance to be found in the wider F/OSS community, F/OSS advocates passed up

opportunities to forge ties with the state and mainstream political parties. Had these actors forged such ties, they would have raised their chances of both overcoming the costs of mobilising resources and gaining influence within the government. As it was, effectively cut-off from the executive, these actors lacked ties with both political leaders – the support of whom was necessary if F/OSS was to be promoted in the face of opposition from PS advocates – and IT administrators – whose support was crucial if F/OSS promotion was to be administratively viable.

The situation in Brazil contrasted that in Argentina. There, the emergence of F/OSS advocates was the result of a combination of state and political institutions which brought together the volition, political authority and administrative capacity necessary for F/OSS to be promoted. The combination of institutions that existed in the government of RS resulted in politicised state IT managers with the resources and connections to mobilise support for F/OSS both within the state and in wider society. The resources these managers were able to deploy allowed them to overcome the collective action issues faced by Argentinean F/OSS advocates and unify the F/OSS community, enabling them to build a movement that drew on the support of the F/OSS community as a whole. These resources also allowed them to attract business actors, ameliorating potential opposition from the software sector as well as further boosting resources. Through the ties that their involvement in a leftist party offered, these actors were able to attract allies outside the F/OSS community through social movements and unions and launch legislative proposals nationally and locally. The success of F/OSS advocates in RS in mobilising support reflected how embeddedness within the state and political institutions could strengthen these actors. Yet their failure to precipitate F/OSS promotion at the national level, in spite of the support they were able to mobilise, speaks to the importance of ties. Affiliated with a political party sitting in opposition to that holding power at the national level, the F/OSS advocates of RS lacked ties with – and as a consequence, influence within – the national executive, reducing their opportunities to garner the backing of national political leaders.

Another contrast between F/OSS advocates in Argentina and Brazil concerned the framing of F/OSS, holding implications for both garnering support in wider society and backing from political leaders. In Argentina, if inadvertently, F/OSS was effectively framed in such a way that it failed to offer discernable benefits over PS. F/OSS was

also associated with social exclusion and in a context where unlicensed use of PS effectively offered a form of social inclusion, such a frame made it less likely that use of F/OSS would increase in the wider population. In Brazil, by contrast, F/OSS was framed in ways that drew attention to its political dimensions such that it offered benefits that PS could not. Such a frame not only allowed F/OSS to compete with PS, making it more likely that F/OSS use would increase in the wider population, but also contributed to political leaders' support for F/OSS' promotion.

By detailing the causal pathways that linked software sector cohesion and F/OSS advocates' institutional embeddedness to policy choices in T1 Argentina and Brazil, this chapter has shown how both these factors contributed to the choices that were taken in these countries in this period. Figure 3-4 shows the associations between combinations of these factors and policy outcomes across both countries in T1. It can be seen that weakness on both factors was associated with policies favourable to PS in both Argentina and Brazil. This result is consistent with what the power asymmetries between F/OSS advocates and PS advocates would predict. Because PS advocates ordinarily enjoy significantly greater lobbying power than F/OSS advocates, where the power of both sets of actors is limited by surrounding associational and institutional conditions, PS advocates will be the stronger of the two sets of actor and policy is likely to favour PS as a result.

Figure 3-4 – Combinations of F/OSS Advocates' Institutional Embeddedness and Software Sector Cohesion in T1 Argentina and Brazil

	T1 Argentina	T1 Brazil
F/OSS advocates' institutional embeddedness	Weak	Weak
Software sector cohesion	Weak	Weak
Software licensing policy outcome	Favourable to use of PS	Favourable to use of PS

4 The Politics of Software Licensing Policy under the Kirchner Governments in Argentina (2003 – 2010)

Under the Kirchner governments, as Argentina began to recover from the crisis and politicians' horizons expanded beyond economic fire-fighting, F/OSS promotion looked more likely than ever. The Kirchners' public embrace of popular causes such as human rights (Panizza, 2014) and national self-determination (Riggiorzzi, 2009) suggested F/OSS promotion would become integral to these governments' wider political project: not only was use of F/OSS congruent with advancing the causes supported by the Kirchners – causes cited as motivation for promoting F/OSS by the Kirchners' allies in Venezuela and Ecuador – its promotion also offered an easy means of doing something likely to win the government popularity. F/OSS promotion was consistent with the Kirchners' defiant stance in the international arena. The intransigence these governments displayed vis-à-vis the IMF and international banks in negotiating Argentina's international debt obligations (Etchemendy and Garay, 2011; Riggiorzzi, 2009; Vernengo, 2005) suggested they were unlikely to be deterred from promoting F/OSS for fear of upsetting the US, a country inclined to take a dim view of such a policy. The Kirchners' willingness to intervene in the market and take-on private sector actors (Etchemendy and Garay, 2011; Panizza, 2014) – not least multinational firms which they often pilloried in their rhetoric – implied they were also unlikely to care about deviating from free market norms, including orthodox interpretations of IP, or riling international PS firms. As the government of Cristina Fernandez de Kirchner looked to move further to the left towards the end of the 2000s, the prospects of F/OSS promotion only appeared to increase.

Outwardly, the Kirchner governments manifested support for F/OSS promotion. As Kirchner assumed power in 2003, the president's media secretariat pronounced overtures to this effect, announcing a public sector F/OSS initiative. Around the same time in the legislature, F/OSS promotion bills enjoyed the support of legislators affiliated with incumbent political forces. F/OSS was considered in education policies, most notably in relation to proposals to participate in Nicolas Negroponte's One Laptop per Child Project (Lanacion.com, 2005). Perhaps the clearest gesture of support for

promoting F/OSS came in 2010, when the Cabinet Chief declared that free software was a state policy in a widely publicised speech.

However, if support for F/OSS promotion was expressed, practical efforts suggested a rather different policy. Actions under the Kirchner governments were more conducive to promoting PS than F/OSS. F/OSS promotion initiatives within the government were abandoned. In the provision of computers for schools, the OLPC project was dropped in favour of a Wintel solution (Calvo, 2009) and in a 2004 initiative where F/OSS *was* adopted, implementation was found wanting, making the software of limited value. Despite approval of a F/OSS promotion bill in the lower house of congress appearing likely in 2008, the project mysteriously disappeared from the legislative agenda before reaching a vote. Whilst F/OSS promotion floundered, *de facto* promotion of PS occurred in initiatives concerning the use of software in government, education, social access to ICTs, and employment and sectoral policy.

This chapter explains the Kirchner governments' unexpected resistance to promoting F/OSS, arguing that this outcome was mainly a result of a strengthening in the cohesion of the software sector in T2 while F/OSS advocates remained isolated from the government. In T2, cohesion in the organisation of the software sector strengthened as sectoral associativism increased in the wake of the crisis and the interests of the sector came to be aggregated largely beneath a single business association. The sectoral business association lobbied for government policy support and against the backdrop of a boom in IT service outsourcing to developing countries and a local currency devaluation which made Argentina attractive as a destination for these services, the government responded by inviting the sector to participate in policymaking. Sectoral participation in policymaking boosted the lobbying power of the sector by strengthening ties between the sectoral business association and the government, thereby facilitating access to political decision makers, and consolidating the concentration of sectoral interests within this association, thus boosting its capacity to mobilise resources. Stronger sectoral cohesion simultaneously strengthened the capacity of multinational PS firms such as Microsoft to coordinate the sector and the presentation of sectoral interests; with the sector largely represented by a single actor, which these firms dominated, sectoral representation reflected these firms' pro-PS interests. Even before policies to promote the sector specifically came into effect, the revenues of the sector

began to grow rapidly following the devaluation. The sector's economic growth augmented its lobbying power further and as this power became stronger, the sector presented an increasingly formidable obstacle to F/OSS promotion as it lobbied to forestall the emergence of such a policy. By the time of the second Kirchner administration, whilst a move to the left suggested adoption of F/OSS was more likely, the government instead resisted such a policy as PS actors enjoyed influence up to the level of the president herself. At the same time, F/OSS advocates remained isolated from incumbent political forces and the government in general as a result of their rejection of mainstream politics and the state, attenuating their capacity to mobilise resources and forge ties with political leaders. With their power remaining weak, they possessed little ability to counter the efforts of opponents of F/OSS promotion.

The case of Argentina illustrates the significance of path dependency and the limits to which policy choices may be determined by ideas and agency alone. Even if the Kirchner governments wished to adopt F/OSS promotion as evinced by the limited efforts that were made, the capacity of government actors supportive of such moves to shape policy was surpassed by that of opponents whose influence within the executive increased as they began to participate in policymaking and consolidate ties with political decision-makers. If, in the second half of the 2000s the government's capacity to translate support for F/OSS promotion into policy was increasingly constrained, such constraint stemmed from the previous actions of the government itself in engaging with a pro-PS actor. Effectively strengthening a pro-PS constituency, the government became locked into the maintenance and adoption of policies that favoured PS.

The chapter first analyses the characteristics of collective action around F/OSS promotion and PS in T2 before examining the fortunes of government initiatives related to software licensing to elucidate how lobbying power – mediated by institutional embeddedness in the case of F/OSS advocates and software sector cohesion in the case of opponents of F/OSS promotion – conditioned software licensing policy outcomes.

4.1 F/OSS Advocates' Institutional Embeddedness Remains

Weak

This subsection analyses collective action around F/OSS promotion in T2 Argentina, arguing that F/OSS advocates' institutional embeddedness remained weak and that this continued to limit F/OSS advocates' power by attenuating the capacity of these actors to mobilise resources and forge ties with state actors. In 2003 and 2004, as government began promoting F/OSS in neighbouring Brazil, conditions looked conducive for F/OSS advocates to strengthen their institutional embeddedness by forging ties with government IT administrators who expressed interest in adopting F/OSS. At the same time, there emerged a potentially important opportunity for F/OSS advocates to build alliances with politically important constituencies and forge ties with incumbent political forces. However, at just the moment when conditions looked conducive to F/OSS advocates mobilising greater support for F/OSS promotion and increasing their institutional embeddedness, the mobilisation around F/OSS promotion experienced deepening divisions such that these opportunities were missed.

F/OSS advocates' ties with government remain weak

The institutional embeddedness of F/OSS advocates in T2 Argentina remained weak, with F/OSS advocates continuing to generally avoid engagement with government IT administrators and incumbent political forces. F/OSS advocates' interests in cooperating with government IT administrators suffered following the launch of a new executive F/OSS initiative in mid 2003, the *Ámbito de Software Libre en el Estado* (ASLE). Instigated autonomously by IT administrators within the government, the ASLE was distinct from yet possessed similar goals to the *FRI*, its aims encompassing the sharing of knowledge through a forum (Presidencia de la República Argentina, 2003). Launched at a moment when IT budgets were still badly affected by the crisis, the ASLE also sought to draw upon the F/OSS community to supply and maintain the software needs of the state. *SoLAr* participated in the ASLE but quickly became disillusioned on the realisation that participation would not be recompensed (SoLAr B, 2011), making the group more wary of engaging with the state as a consequence. In the

case of engaging with incumbent political forces, F/OSS advocates were wary for fear of cooption (interviews, 2011) or F/OSS promotion becoming conflated with partisan bias (FVL A, 2010b).

In terms of strategies, F/OSS advocates continued to focus on legislative proposals as a means of instigating F/OSS promotion. *SoLAr* adopted an entryist strategy whereby members would seek to obtain bureaucratic positions which might offer opportunities to influence the uptake of F/OSS. However, strong links between *SoLAr* and incumbent political forces generally absent, the positions which *SoLAr*'s members were able to obtain were relatively low level. Observers within the state argued that the strategy overlooked the primacy of political power in determining bureaucratic outcomes (interviews, 2010).

In 2004, F/OSS advocates were presented with an opportunity to forge an alliance with the *Madres de Plaza de Mayo*, a group that emerged during Argentina's 1976 to 1982 military dictatorship in response to the disappearances of their children at the hands of this government and campaigned for human rights (Brysk, 1994; Wagner and Sánchez, 2009). The *Madres* offered opportunities for F/OSS advocates to garner support for F/OSS promotion in the wider population as they worked with social movements such as the *Piqueteros*, which represented poorer sections of the population (Di Marco, 2003) and make potential inroads into the government as the *Madres* became a base of support for the Kirchner government (see Lewis, 2009: 155; Zelaznik, 2011: 97), many figures proximate to the *Madres* in subsequent years coming to gain positions in the government with access to resources (see Escudé, 2007; Journalist A, 2012; SoLAr A, 2011).

In August 2004, Richard Stallman, head of the Free Software Foundation and international champion of free software visited Argentina (Kukso, 2004; Lavaca.org, 2009). With an itinerary organised by members of *Hipatia* and *SoLAr*, Stallman was scheduled to speak the *Universidad Popular Madres de Plaza de Mayo (UPMPM)* in Buenos Aires. At the time, *FVL* worked closely with Stallman and on the basis of the *Madres'* political affiliations, *FVL* recommended Stallman avoid speaking at the *UPMPM* to prevent F/OSS becoming associated with partisan politics, a recommendation on which Stallman acted (Lavaca.org, 2009). Distrustful of the US in

light of the US' role in supporting the Argentine military governments (Sheinin, 2006: 157–164) – governments anathema to the notion of freedom – the *Madres* were leery of receiving messages about freedom from Americans like Stallman and his cancellation only served to reinforce the *Madres* prejudices and alienate them (SoLAr A, 2011). The cancellation of the world's leading proponent of free software harmed the image of F/OSS and that of the wider F/OSS community, helping to alienate rather than garner political support for F/OSS promotion within the wider population. In a further example of negative framing, F/OSS was once again associated with connotations of social exclusion rather than inclusion, serving to undermine the construction of F/OSS as a progressive issue. Amongst F/OSS advocates themselves, *FVL*'s intervention acted to deepen divisions between actors, reducing possibilities for cooperation and coordinated action.

F/OSS Advocates' Lobbying Power Remains Weak

Remaining isolated from the government and incumbent political forces and experiencing a deepening of divisions between actors, F/OSS advocates in T2 Argentina continued to possess weak ties, if any, with actors within the government and were capable of mobilising relatively limited resources. As a consequence, mobilisation around F/OSS promotion in T2 Argentina remained modest, and F/OSS advocates' capacity to influence policy continued to be weak.

4.2 Software Sector Cohesion Strengthens

This subsection analyses collective action around PS in T2 Argentina, arguing that cohesion in the software sector strengthened in T2 and that this strengthening enabled PS advocates to block government promotion of F/OSS. The upswing in associativism behind the *CESSI* that followed the crisis strengthened the lobbying power of the sector as a whole by aggregating sectoral interests largely beneath a single business association. These conditions also allowed multinational PS firms to coordinate sectoral interests and present their interests as coherent with those of the sector as a whole due to these firms' ability to shoulder collective action costs and consequently dominate associations in which they participated. However, heightened sectoral cohesion might have dissipated had the government not responded to the sector's

petitions to promote the software industry. Inviting the *CESSI* to participate in the formulation of sectoral policy – a move which marked the beginning of increasing involvement of the association in policymaking across a range of areas – the government reinforced sectoral cohesion by establishing ties with the *CESSI*, thus strengthening incentives for associativism behind it. The government’s actions served to entrench PS advocates’ political domination of the sector as well as augment their lobbying power. Yet this lobbying power ballooned largely for another factor that contributed to the government’s decision to promote the sector in the first place. Independently of promotional policies which only came into effect in the second half of the 2000s, exports in IT related services began to grow rapidly following the devaluation, yielding substantial economic growth in activity nominally associated with software. As Argentina recovered from crisis, strong economic performance in activity symbolic of high added value and an advanced level of development boosted the political capital associated with this activity. Whilst IT services often had little to do with software – proprietary or otherwise – the highly concentrated organisation of the software sector allowed PS advocates to capture the political benefits of growth in this activity, which in turn boosted their lobbying power. If economic growth in IT services was a principle driver of PS advocates’ strong lobbying power, it was the consolidation of sectoral cohesion resulting from the government’s engagement of the sector which made this possible. Had the government not consolidated sectoral cohesion by engaging the sector, growth in IT services would have had limited impact if any upon PS advocates’ lobbying power because these actors’ association with this activity would have been tenuous. By intervening in the software sector, the government’s actions were thus decisive in enabling PS advocates to subsequently restrict policy choices to those favourable to PS.

Software Sector Cohesion Begins to Strengthen

Associativism began to increase within the software sector at the turn of the millennium as declining internal demand prompted national firms to call for policies to facilitate exports (CESSI B, 2012a; CESSI C, 2012). At the beginning of 2002, a devaluation provoked panic throughout the sector. Business associativism tends to increase when the private sector faces threats to its interests (Schneider, 2004; Durand and Silva, 1997), and in the wake of the devaluation, interest in cooperation and association within

the sector rose sharply (CESSI B, 2012a; CESSI C, 2012). Changes in the character of relations between firms, where the extensity and strength of inter-firm ties increase, may also facilitate business mobilization (Plotke, 1992: 190) and such a factor also played a role in the upswing in associativism within the Argentinean software sector at this time. Through a government organised trade mission to Miami in 2001 (Carrizo, 2001), businessmen from the software sector who had previously had little to do with one another met and forged ties which engendered cooperation (CESSI B, 2012a; CESSI C, 2012; CESSI D, 2012). Combined with the existing institutional structures which represented the sector, elevated interest in business cooperation resulted in the concentration of sectoral representation within one business association as the interests of firms across the sector came to be aggregated under the *CESSI*.

In the wake of the devaluation, more firms began to participate in the *CESSI* and as participation grew, the association came to represent the principal representative of the software sector. Both *CICOMRA* and *CESSI* representing activity associated with software and ICT more widely, relations between the two associations was characterised by a degree of rivalry (CESSI A, 2011), yet as participation in the *CESSI* increased, its leadership in the area of software became undisputed. With *CICOMRA* focused upon telecommunications and largely representing multinationals, the increasing profile of national firms within the *CESSI* meant it became more representative of not only software but also firms across the software sector.

The crisis also precipitated greater cooperation within the *CESSI* itself. Although multinational firms had joined the *CESSI* in the 1990s, those that represented these firms within the *CESSI* had often recognised limited interest in participating in discussions inside the association (CESSI B, 2012a). With national SMEs under threat and the domestic market generally in disarray, these managers began to participate within the *CESSI* as they came to fear for their jobs. Although the market for software in Argentina was relatively small, multinational employees had an interest in the health of national firms because these firms were their clients and supplied revenue upon which these employees' jobs depended.

Geography may affect patterns of business organisation (Schneider, 2004), and in Argentina, with the software sector located mainly in and around the capital, Buenos

Aires, the sector's spatial distribution facilitated concentration in its organisation as associativism rose in the wake of the crisis. The sector's concentration in Buenos Aires not only lowered the costs of organisation but also enhanced the sector's capacity to liaise with the national government which was also based there.

With the interests of the software sector unified within the *CESSI*, sectoral cohesion was strong and coordination of sectoral interests was enhanced. Fairfield (2011: 428) observes that “[u]nity and coordination [may] legitimate business demands and improve business' bargaining position”. With sectoral interests effectively represented by one actor, the sector was in a stronger position to project its demands.

Government Receptiveness to Sectoral Demands Increases

As the coherence of the software sector strengthened, other factors made it more likely that the government would respond to the sector's demands. The crisis also created economic and political conditions conducive to political receptiveness to sectoral demands. Against the backdrop of the devaluation and a global boom in IT outsourcing the software sector encountered backing of its policy demands within the legislature in 2002 (Briozzo, 2002a; 2002b). Interest in policy promotion of the sector gained traction in the executive in the second half of 2003, culminating in the Ministry of Economy inviting the sector to participate in the formulation of a policy (Briozzo, 2007: 15; SICPME, 2003). Four factors facilitated greater receptiveness the sector's demands within government.

The political context made politicians' receptiveness to the sector's demands more likely because of the considerable political uncertainty generated by the crisis. This context made it more likely that politicians would respond to demands from economic sectors with the potential to strengthen political support. In May 2003, Nestor Kirchner assumed power in a position that appeared weak (Levitsky, 2008: 111). Winning just 22% of the vote in the first round of presidential elections, Kirchner won these elections after Carlos Menem, the candidate Kirchner would have stood against in a runoff, pulled out before the second round went to a vote (Grugel and Riggiozzi, 2007: 97). At a time when public distrust of politicians remained high, Kirchner had an interest in

strengthening his mandate and with the economic situation still looming large economic recovery was crucial to this goal (Lewis, 2009: 154).

Within a month of Kirchner coming to power, the Minister of Economy, Roberto Lavagna, began to consider the feasibility of promoting the software sector (Dumont, 2012). Shortly after, the Ministry of Economy (*MEcon*) backed the legislative projects for the promotion of the sector which had been effectively stalled through the first half of 2003. The support of the executive meant these projects not only remained on the legislative agenda but that they began to advance.

The devaluation made politicians' receptiveness to the sector's demands more likely because the exports were viewed as crucial to addressing the economic crisis and the software sector was well placed to export. Argentina was cut-off from external credit markets after defaulting on its international debt obligations (Grugel and Riggiorozzi, 2007) and consequently, exports were considered crucial to kick start production, soak up high unemployment and provide fiscal resources to allow the government to fund welfare programmes (Riggiorozzi, 2009). The devaluation of the Argentine currency increased the competitiveness of Argentine exports (Grugel and Riggiorozzi, 2007). Labour is the primary factor of production for the software sector (Commander, 2005: 1) and by lowering the local cost of labour in relation to international prices, the devaluation increased the international competitiveness of Argentinean software firms (Chudnovsky and López, 2005). Whilst the devaluation made local software firms internationally competitive, it also raised the costs to these firms of exploring opportunities in external markets (CESSI B, 2012a; PJ deputy B, 2012).

The external context made politicians' receptiveness to the sector's demands more likely because of a boom in the out-sourcing of IT services to developing countries, India being an emblematic case (Ascutia, 2002; see Desai, 2005: 46–47; McGivering, 2002). The take-off in economic activity related to software in India and Ireland provided examples which raised political confidence in the viability of an export focused strategy for the software sector (PJ deputy B, 2012; PJ deputy C, 2012). Coupled with the devaluation, the global boom in IT out-sourcing increased the political incentives for adopting policies to attract software related investment (*ibid.*).

Politicians' were more likely to be receptive to the sector's demands because of a change in the direction of economic policy in the wake of the crisis. Through the 1990s, strict adherence to orthodox principles in economic policymaking meant that sectoral policies were deemed undesirable (Chudnovsky and López, 2007). Under Duhalde administration, economic policy turned away from the neoliberal prescriptions of the 1990s toward a more interventionist stance that emphasised reactivating industrial activity (Grugel and Riggiorozzi, 2007; Panizza, 2009). In response to the acute economic problems that beset Argentina, Duhalde's Minister of Economy, Roberto Lavagna, instigated an industrial support programme to kick start production (Godio, 2004; Grugel and Riggiorozzi, 2007). This change in economic policy goals, which continued under Kirchner (Levitsky, 2008: 113), meant politicians were suddenly open to policies to promote specific sectors such as software.

Incentives for State to Engage the Software Sector

Interests on the side of the executive also played a part in the decision to back policy support for the software sector. Minister of Economy, Roberto Lavagna was interested in developing sectors which capitalised on Argentina's comparative advantages (Lavagna, 2012). Argentina possessed a workforce which was relatively skilled in relation to those of other developing countries and Lavagna was interested in developing economic activity that might take advantage of this skilled workforce (*ibid.*). IT services fitted this aim and were thus looked upon favourably for promotion through sectoral policy.

Policymakers may engage the private sector to signal the government's commitment to private investment (Haggard et al., 1997: 41). Although the devaluation improved conditions for investment, investment was adversely affected by the backdrop of the crisis. In relation to IT specifically, Argentina lacked a reputation internationally as a base for IT related economic activity (Sametband, 2002). A key motivation for the adoption of a sectoral policy for software was to publicise the fact that investment opportunities existed and signal to the world that the Argentinean government was serious about supporting investment (Dumont, 2012; Lavagna, 2012).

Policymakers may involve the private sector in policymaking as a result of aims and resources, to facilitate policy implementation and/or to improve the likelihood of policy success (Cawson, 1985; Maxfield and Schneider, 1997; Schneider, 2004: 26).

Following the executive's decision to adopt a sectoral policy for software, it subsequently decided to involve the sector in the formulation of this policy (SICPME, 2003; 2004). For the *MEcon*, the participation of the sector lowered the costs of policy formulation and increased the probability of successful implementation (Lavagna, 2012).

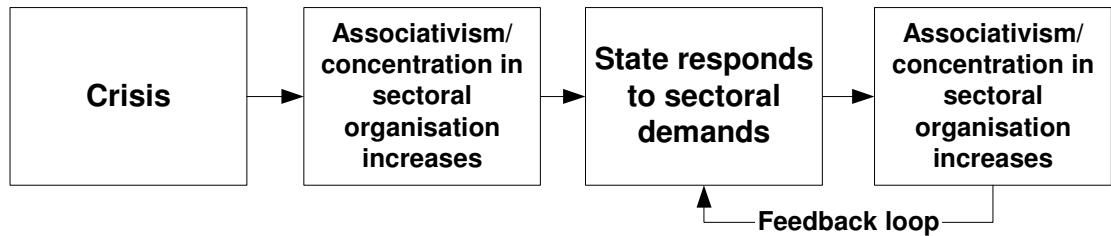
With wider political and economic factors increasing incentives for the government to promote the software sector, strong sectoral cohesion played a role in politicians' decision to act on adopting a sectoral policy for software. *CESSI*'s aggregation of the interests of firms across the sector increased the legitimacy of the association's demands because it was viewed as representing the interests of the sector as a whole. With the interests of the sector aggregated under the *CESSI*, the sector projected a strong, coherent voice which signalled that the private sector was interested and receptive towards the idea of sectoral policy (Lavagna, 2012). The coordination of the sector behind a single business association also meant there existed a clearly identifiable interlocutor with which the government could liaise, reducing the costs of negotiating with the sector (Dumont, 2012). The organisation of the sector also lowered the costs of putting a policy together by offering information.

The information possessed by the private sector may offer incentives for the state to engage with private sector actors (Schneider and Maxfield, 1997: 7–9). *CESSI* had developed detailed blueprints for sectoral support (CESSI, 2003; Garcia, 2002) which had benefited from the association's participation in the legislative process (CESSI B, 2012b). These plans provided ready proposals which might be translated into policy (Dumont, 2012). In the second half of 2003, the *MEcon* considered nine sectors for promotion. Of all of these, software was the easiest for government to do something about as there already existed policy proposals in the guise of legislative proposals, a text which had been elaborated as well as the plans put together by the *CESSI* (Dumont, 2012).

Government Intervention Consolidates Software Sector Cohesion

The upswing in private sector associativism which tends to occur during crises often dissipates as conditions normalise and incentives for individual actors to invest in organisation diminish (Schneider, 2004: 38). State intervention in the private sector may encourage and thus maintain business collective action by offering benefits such as political access or participation in policymaking (*ibid.*). In addition to motivations based around the formulation or implementation of policy, the state may also engage with the private sector as a source of political support (Schneider, 2004: 27). In the second half of the 2000s, in addition to involving the sector in policymaking and consultation, the government would also draw on the sector as a source of political support. In T2 Argentina, by engaging with and involving the software sector in policymaking, the government helped to consolidate the sectoral cohesion precipitated by the crisis by maintaining incentives for collective action. Government engagement effectively precipitated positive feedback, as illustrated in Figure 4-1.

Figure 4-1 – Transformation of Software Sector Cohesion between T1 and T2 in Argentina



The government's engagement with the software sector offered sectoral representatives a range of benefits that were likely to encourage collective action.

Government engagement of the sector offered access to policymakers and senior politicians. Presidents of the *CESSI* met with politicians up to presidential level on trade missions. *CESSI*'s then president spoke with the vice-president on a trade mission to Mexico in 2003 (*CESSI B*, 2012a) and the president, Nestor Kirchner in 2004 (*CESSI B*, 2012b).

Government engagement of the sector offered sectoral representatives appointments within the government. Representatives of the *CESSI*, or those proximate to the association were appointed to positions in government or government run initiatives. One of *CESSI*'s director's took up a position in the Secretariat of Industry (interviews, 2012) and another left the association to represent the private sector as a coordinator on a government consultation exercise (CESSI E, 2011).

Firms' participation in business associations is motivated by access to selective benefits, the origin of which may lie within the state (Olson, 1965; Schneider, 2004: 12). *CESSI*'s privileged role in the formulation of sectoral policy, facilitating its ability to influence policy, attracted participation within the association. With *CESSI* representing the single most important representative of the sector, this mechanism reinforced sectoral cohesion.

Government involvement of the sector in policymaking offered sectoral representatives a leading role in the formulation of a sectoral policy for software which would become law (Nº 25.922) in 2004 (Honorable Senado de la Nación Argentina, 2004).¹⁵ The government consulted the sector through a 2004 forum, the *Foro de Software y Servicios Informáticos (FdSSI)*(Gutman et al., 2006; SICPME, 2004) which involved the participation of actors from across the government, private sector, academia and wider civil society (Gutman et al., 2006). The *FdSSI* produced plans for sectoral development and fed into the discussion of the draft sectoral promotion law being discussed in the senate at the time (Briozzo, 2007). To coordinate the *FdSSI*, the government recruited external consultants who were either aligned with or worked closely with the *CESSI* (Consultant A, 2010). The *CESSI* subsequently possessed significant influence in steering discussion in the forum. *CESSI* also possessed direct influence over defining the content of the policy: individuals proximate to the *CESSI* were involved in drawing up the regulations which would be implemented in the

¹⁵ Law 25,922 provided fiscal benefits for eligible economic activity and established a fund to support R&D and human capital development to run for ten years commencing in September 2004 (Presidencia de la República Argentina, 2004)(extended to 2019 in 2011 (CESSI, 2011b)). The fiscal regime offered firms relief of up to 60% on tax paid on revenue earned in eligible activities and the possibility to claim back up to 70% of employers' social security contributions in credits (López and Ramos, 2008: 64). The law also instituted the *Fondo Fiduciario de Promoción de la Industria de Software (FONSOFT)*, an entity based within the Ministry responsible for science and technology (MECyT) which was responsible for evaluating and funding R&D projects (Briozzo, 2007).

promotion law *after* it had been approved in the senate and signed into law by the executive (interviews, 2010; 2012).

Government engagement of the sector involved regular sectoral consultation, allowing sectoral representatives to feed into government initiatives and policy generally. Following the *FdSSI*, institutional channels were established between business associations and the various government departments with a purview over policy areas touching upon sectoral interests. The government consulted the sector on virtually any area that touched upon sectoral interests (CESSI F, 2011).

Sectoral representatives' political access was facilitated as the government drew upon the sector as a source of political support. Under the administration of President Cristina Fernandez de Kirchner, reciprocity between the sector and the government grew (CESSI F, 2011; IP lawyer A, 2011). The president courted the sector as a symbol of national development and a source of private sector support during a period in which the government faced opposition from the agrarian sector (Díaz Echenique et al., 2011; Fairfield, 2011; Picardi, 2012). Speaking at sectoral events (CanalAR, 2009) and receiving firms such as Microsoft publicly (Comuzzi, 2010; Gobierno de Buenos Aires, 2009; Microsoft, 2009), the president's courtship of the sector offered representatives of sectoral business associations – and their members – high level political access.

PS Advocates' Capacity to Coordinate Sectoral Interests Strengthens

Increased cohesion within the software sector allowed PS advocates greater capacity to coordinate sectoral interests. As the *CESSI* effectively became the single most important representative of the sector, the interests of national as well as multinational firms came to be represented by just one actor. Large firms are likely to command greater power than smaller local firms within an association even if the latter greatly outnumber the latter (Hart, 2004). Multinational PS firms' dominant position within the *CESSI* offered these firms a strong hand in determining the association's preferences. Perhaps unsurprisingly, the *CESSI*'s software licensing policy preferences were pro-PS. *CESSI*'s presidents and directors from the 1990s to the 2000s expressed strong opposition to F/OSS promotion (interviews, 2011; 2012). Aggregation of sectoral

interests largely beneath a single organisation with pro-PS preferences meant these interests were presented as pro-PS.

Facilitating PS advocates' capacity to influence the preferences of the *CESSI* was their role in the mobilisation of resources. MNCs may exert influence within business associations through the provision of resources (Hart, 2004: 50). Microsoft had supported the *CESSI* through the difficult periods in which the association had struggled to mobilise resources (CESSI E, 2011). The continued significance of Microsoft within the organisation in relation to raising resources was signalled by its role as treasurer throughout the 2000s. Figure 4-2, which details the composition of the *CESSI*'s board between 2002 and 2007, shows Microsoft remained treasurer throughout this period.

Figure 4-2 – Composition of Board of CESSI

Position	2002-03	2003-04	2004-05	2005-06	2006-07
President	National SME		National SME		
Vice-president 1	MNC	National SME	National SME		
Vice-president 2	National SME		National SME		
Secretary	National SME		National SME	National SME	
Pro-secretary	National SME	National SME	National SME		
Treasurer	Microsoft				
Pro-treasurer 1	MNC (IT services/consulting)				
Pro-treasurer 2	National SME	MNC		MNC	

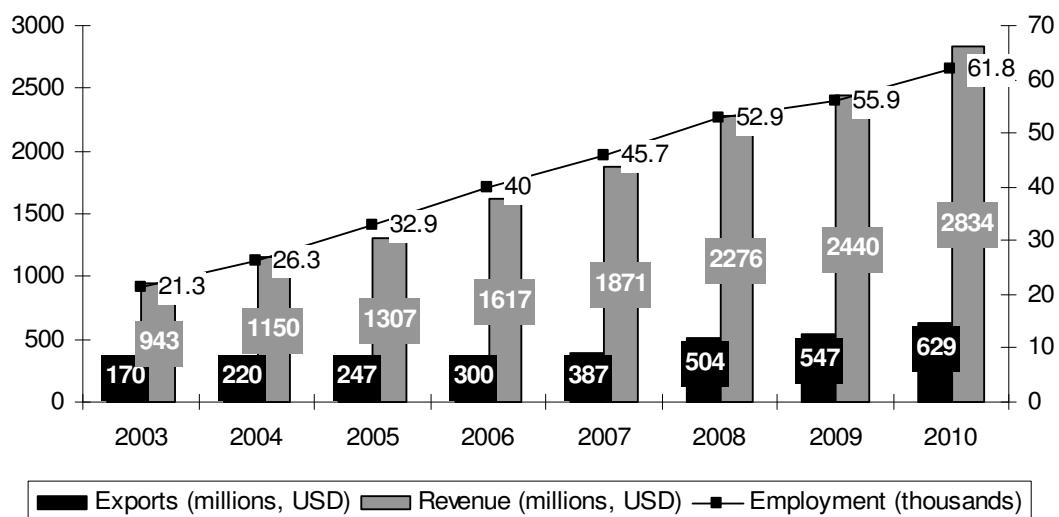
Source: CESSI (n.d.).

Strong sectoral cohesion allowed multinational PS firms to capture political benefits from economic activity to which they contributed little in economic terms yet with which they were associated through the sector's institutional representation. As illustrated in Figure 4-3, the software sector witnessed rapid growth after 2003. Whilst throughout the 2000s, the Argentinean software sector's participation in GDP and total exports remained under 1%¹⁶ (see Chapter 1), sectoral revenues and exports each grew by around a fifth year on year between 2003 and 2008. In 2003 alone, exports grew by almost 42% (Lanacion.com, 2003b). The sector was one of Argentina's fastest growing, its rate of annual growth out-pacing that of the economy as a whole (Valente,

¹⁶ Based on data from CESSI and World Bank.

2007). In the wake of the crisis, the government welcomed this growth, boosting the sector's political capital and the lobbying power of sectoral representatives.

Figure 4-3 – Revenues, Exports and Employment in Argentinean Software Sector, 2003 – 2010



Source: CESSI

The growth of sectoral revenues and exports largely stemmed from IT services such as business process operations, call centres, body shopping¹⁷ and software factories (López and Ramos, 2008) – economic activity with little to do with the commercialisation of PS (see López and Ramos, 2009: 34). Yet multinational PS firms – whose primary activity in Argentina concerned the commercialisation of PS – were able to share the political benefits deriving from this activity. Strong sectoral cohesion and coordination permitted multinational PS firms to pass off their interests as those of the sector overall, helping to legitimate and strengthen these firms' arguments that PS contributed to economic growth. With government focused on the economic benefits the sector could provide and PS firms able to pass off their interests as convergent with those of the sector as a whole – and country at large – these firms were in a stronger position to persuade politicians to oppose F/OSS promotion, which could be portrayed as adverse to the interests of the sector and government alike.

¹⁷ Provision of human resources, where a supplier provides a client with personnel to work within the client's organisation, either on or off-site.

PS advocates' ability to benefit politically from growth in IT services reflects the crucial role the government's intervention in the sector played in strengthening these actors' lobbying power by consolidating sectoral cohesion. This role may be highlighted by invoking a counterfactual scenario: had the government not intervened in the sector, it is unlikely sectoral cohesion would have consolidated, reducing the likelihood that multinational PS firms would have been able to benefit from economic activity with which they were not directly associated. If PS advocates' lobbying power strengthened as a result of sectoral growth, it was not this growth *per se* that yielded this effect but the combination of growth and strong sectoral cohesion – cohesion precipitated by government intervention.

PS Advocates' Lobbying Power Strengthens

The sector's increased ties with the government, stronger cohesiveness and economic growth all strengthened its lobbying power and by extension, the lobbying power of PS advocates within it. As mentioned above, the sector's ties with the government encompassed government appointments, participation in policymaking, formal channels for consultation, the sector as a source of political support for the government and informal contact. The proliferation of government-sector ties which emerged in T2 Argentina and the influence the sector gained within the government as a result of them marked a stark contrast to T1, when the sector lacked both. Where the sector's influence within the government was inconsequential before the crisis, it became involved in policymaking in virtually any area that touched upon sectoral interests from 2004 (CESSI F, 2011).

State-Sector Relations: Increased Opportunities for Lobbying

Ties between the *CESSI* or individuals close to the association and the government were represented by the high level political access of these individuals as well as their appointment to government positions. As noted above, representatives of the *CESSI* met with politicians up to the level of the presidency, meeting the vice-president and president on trade missions. Representatives of the *CESSI* took up positions in the Secretariat of Industry (interviews, 2012) and on the coordinating committee of the *FdSSI* (CESSI E, 2011).

Involvement of Business in Policymaking

The government's involvement of the sector in policymaking facilitated the strengthening of *CESSI*'s power in multiple dimensions. *CESSI*'s capacity to mobilise resources increased: the selective benefits the association was able to dispense encouraged associativism behind it. *CESSI*'s influence over the output of the *FdSSI* and content of the sectoral promotion law allowed the association to strengthen its position as principle representative of the software sector. As noted above, the *CESSI* possessed significant influence over discussion in the forum because coordinators of the forum were either aligned with or worked closely with the association (Consultant A, 2010). *CESSI*'s influence was reflected in the plans for sectoral development formulated in the *FdSSI*. These plans, published in a report (Briozzo, 2007), reflected recommendations advanced by the *CESSI* in its own 2003 plan (CESSI, 2003). *CESSI* influenced the content of the sectoral promotion law both directly and indirectly. Indirectly, its ability to coordinate the forum allowed it to wield influence. The decree by which implementation of the law was approved recommended the law reflect the guidelines formulated and set out during the *FdSSI* (Presidencia de la República Argentina, 2004). Directly, the association wielded influence through the involvement of personnel with close links to the *CESSI* in defining the regulations to be implemented in the law. Those involved in or close to this process asserted that the level and scope of the benefits of the law saw significant expansion during the definition of these regulations (CESSI D, 2012; Consultant A, 2010; PJ deputy C, 2012).

The institution of the *FdSSI* itself reflected the influence of the *CESSI* as it embodied the answer to the association's call for a policymaking committee through which the sector might coordinate with all those government entities with responsibility for areas that connected to its interests (Lanacion.com, 2003a; PJ deputy C, 2012). The *FdSSI* lowered the costs *CESSI* faced in coordinating with the government. Through the *FdSSI*, *CESSI* established and consolidated links with actors across the government including the *MEcon*, the Ministry of Education, Science and Technology (*MECyT*)¹⁸, Ministry of Employment (*MTEySS*) and Ministry of Foreign Relations amongst others

¹⁸ The *MECyT* later split to become two separate ministries, the Ministry of Education (*ME*) and Ministry of Science and Technology (*MCyT*).

(Briozzo, 2007: 23; SICPME, 2004). These links constituted channels through which the *CESSI* would subsequently become involved in regular consultation in the formulation of initiatives and policy in the areas of industrial policy, employment, education, government procurement and foreign trade (see Briozzo, 2007; López and Ramos, 2008).

In the *MEcon* (which would subsequently become the Ministry of Industry) the sector maintained a close working relationship with the Secretariat of Industry, the entity responsible for the administration of the sectoral promotion regime (interviews, 2011; 2012). In the *MCyT*, *CESSI* worked with *FONSOFT* in the development of a range of initiatives associated with promoting innovation. In the *ME*, a committee was setup on which the *CESSI* liaised with the Secretariat for University Policy in the formulation of policies in higher education (ME, 2012). In the *MTEySS*, the *CESSI* together with multinational IT firms coordinated with the Employment Secretariat in the formulation of a number of initiatives to develop workers' IT skills (MTEySS, 2012; MTEySS A, 2012; MTEySS B, 2012).

The *FdSSI* answered the sector's demand for a committee involving all areas of the government which connected to software but as a consultation exercise it was only temporary. At the insistence of the *CESSI* (CESSI D, 2012), a permanent embodiment of this forum was instituted in June 2009 in the shape of the *Fundación Sadosky* (Presidencia de la República Argentina, 2009b), which united both public and private sector entities. Another similar initiative was the *Agenda Digital* (Presidencia de la República Argentina, 2009a), which was proposed by the sector (CABASE et al., 2008) as a forum for the private sector to participate in policymaking in the area of ICTs.

Business as Source of Political Support for the State

Business may increase its power as the state comes to rely on it as a source of political support. The state may use business to “seek only to generate support and minimize opposition” (Schneider, 2004: 27) or to “play one sector off against another” (ibid.). Business may also represent a constituency for incumbent political forces (Fairfield, 2011: 428). Even if business does not represent a core constituency for incumbent political forces, business support is important to a government’s capacity to govern

effectively (Lindblom, 1980). The economic significance of a sector may also play a role in the state's relationship with business actors (Gourevitch, 1986).

Business did not constitute a core constituency for the Kirchner governments (Corrales, 2008) but certain business sectors associated with domestic industry were supportive of the government (see Lewis, 2009: 163; Wylde, 2012: 126) as they benefited from the Kirchners' drive to revive national productive forces (Grugel and Riggiorozzi, 2007; Riggiorozzi, 2009) especially in relation to exporting sectors (Wylde, 2010: 1). Nominally representing the interests of national firms – and headed up by representatives of such firms – *CESSI* embodied such a sector.

Certain business sectors may provide a source of support where other business sectors withdraw support (Schneider, 2004). When confronting opposition from business the Kirchner governments would employ strategies which drew upon bases of support elsewhere, including other areas of the business community (Bonvecchi, 2011). In 2008, the government of Cristina Fernandez de Kirchner faced opposition from the agrarian sector as it sought to raise taxes on agricultural exports (Díaz Echenique et al., 2011; Fairfield, 2011; Picardi, 2012; Vivares et al., 2009: 207). Against the backdrop of this crisis, the government maintained cordial relations with the software sector, relations which were indicative of business support which offset opposition from elsewhere in the private sector.

The economic significance of the sector represented another factor in the political support the sector offered the government. Whilst the sector contributed a tiny share of Argentina's total GDP and exports (see above), its rapid growth and the relatively skilled employment which it provided afforded it a political significance disproportionate to its share of total production. More than a source of economic growth, the software sector represented an advertisement for the government's stewardship of the economy, nominally symbolising high-added value economic activity and an advanced level of development.

The mutual interest in the sector's economic success shared between the private sector and the government facilitated reciprocity between the two, bolstering the power of sectoral representatives. As discussed above, strong sectoral cohesion and coordination

allowed PS advocates to capture the political benefits bestowed upon the software sector.

Government support for the sector as a whole was reflected in the President's attendance at sectoral events (CanalAR, 2009), the institution of the *Agenda Digital* and the *Fundación Sadosky* in 2009 and her petition to congress that legislators approve a bill extending the period under which firms could benefit from the promotional regime (Law 25.922) from 2014 to 2019 (Dergarabedian, 2010; Taringa!, 2010). The way in which PS advocates unrelated to the sector's growth were able to benefit politically is signalled by the President's public reception of Microsoft in 2009 and 2010 (Comuzzi, 2010; Cortina and Torres, 2010; Gobierno de Buenos Aires, 2009; Microsoft, 2009).

4.3 Software Licensing Related Initiatives in T2 Argentina

This subsection examines the fortunes of legislative and executive initiatives associated with software licensing policy in T2 Argentina to elucidate the ways in which actors' power – mediated by institutional embeddedness in the case of F/OSS advocates and software sector cohesion in the case of PS advocates – conditioned software licensing policy outcomes. Unsurprisingly, given the strength of PS advocates' ties with the executive in terms of extensity and level of political access, together with the political support the software sector received from the highest levels of the executive, PS advocates attained the outcomes they sought with apparent ease. On the other hand, by avoiding engagement with the executive, F/OSS advocates effectively excluded themselves from spaces within the government providing opportunities to influence policy decisions through policymaking or advisory roles to politicians, leaving PS advocates with a virtual monopoly over societal input into software licensing policy.

Executive Initiatives

In T2, software licensing policy was characterised by actions which acted to favour the use of PS. Despite occasional expressions of support for F/OSS – the most notable by the Cabinet Chief at the very end of T2 in 2010 (CanalAR, 2010) – an official position on software licensing policy was not enunciated by the executive in the period. This notwithstanding, there was a consensus across all actors – be they located within or

outside the state, F/OSS advocates and PS advocates alike – that this position was ‘neutral’ in so far as the government favoured neither PS nor F/OSS (interviews, 2011). In de facto terms however, the actions of the government tended to favour use of PS over F/OSS. Where actors within the government initiated initiatives which looked likely to increase F/OSS adoption, these initiatives were curtailed. Where government adopted initiatives involving software, they tended to involve partnerships with multinational PS firms and feature PS. Whilst PS advocates sought to prevent the appearance of F/OSS promotion and made their opposition to F/OSS promotion clear to those in government (CESSI F, 2011), where government adopted initiatives featuring PS, outcomes were as much a result of lobbying as they were a function of politicians’ imperfect knowledge and the dominance of PS advocates within the teams involved in advising politicians on technology related matters.

The ASLE

As already mentioned above, the *ASLE* was launched by IT administrators in mid 2003, separate to the *FRI* but with similar aims in terms of sharing knowledge through a forum to facilitate the utilisation of F/OSS within the government. Like the *FRI*, the *ASLE* emerged independently of the F/OSS community. However, unlike the *FRI*, which operated within exclusively within the state and involved only public sector employees, the *ASLE* engaged the F/OSS community. At a time when the government was still suffering from the effects of the crisis, the initiative marked an attempt to overcome resource constraints whilst avoiding use of unlicensed PS (see Román, 2003) and sought to draw on the F/OSS community as a source of knowledge and even labour (Couture, 2006: 59); participants in *SoLAr* offered their skills on a voluntary basis to develop software (SoLAr B, 2011). Although the *ASLE* involved the F/OSS community, including F/OSS advocates, it was controlled by its protagonists within the government who were careful to downplay any threat the initiative might pose to the interests of PS firms; these protagonists stressed that they did not advocate preferential use of F/OSS over PS (see Irigoyen, 2003; Román, 2003). For the protagonists of the *ASLE*, F/OSS represented a means to an end rather than an end in itself and motivations for its use were essentially financial such that like the *FRI*, the initiative was characterised by a pragmatic rationale. Without wider motivations for adopting F/OSS, the basis for the *ASLE* dissolved where financial issues could be overcome. Unlike the

FRI, the *ASLE* was conducted in a way which maximised its profile, its launch being publicised through the media secretariat of the offices of the presidency where one of its protagonists worked (interviews, 2011; 2012; see Irigoyen, 2003). The high profile of the *ASLE* made it a target for opposition from PS advocates and its emergence at a time when the software sector was beginning to gain increased access to the executive and influence within it facilitated PS advocates' capacity to stymie the initiative. Lodging objections to the political superiors of those responsible for the *ASLE*, the *CESSI* argued that the initiative ran counter to the objectives of the legislative proposals to promote the sector which at the time had received the support of the Minister of Economy, Roberto Lavagna and the protagonists of the *ASLE* were asked to drop the initiative (interviews, 2012). The susceptibility of F/OSS initiatives based principally upon financial motivations to be neutralised by PS advocates was signalled by *ASLE*'s protagonists' subsequent involvement in a migration to Microsoft software. In July 2004, little over a year from the inception of the *ASLE*, the initiative's instigators adopted software donated by Microsoft for the operation of the public media platform, the *Sistema Nacional de Medios Públicos* (Busaniche, 2004; Microsoft, 2004) in a high profile agreement signed off by Argentina's vice-president, Daniel Scioli (Cronista.com, 2004). Whilst *ASLE*'s demise and the subsequent migration signalled PS vendors' capacity to buy-off F/OSS initiatives based mainly upon cost, it also signalled the limited rationale for such initiatives where financial conditions improved. By 2004, as Argentina's economy recovered (Chudnovsky and López, 2007), the resource constraints in the government began to ameliorate (Carlini, 2012), diminishing the rationale on which the *ASLE* was based. The episode also telegraphed PS advocates' increasing influence within the government as their lobbying power grew as well as the low influence of F/OSS advocates. Without influence within the executive, F/OSS advocates were unable to persuade politicians to adopt F/OSS for wider, non-financial reasons which might facilitate the resilience of F/OSS initiatives.

Executive Initiatives Concerning PS

In the wake of the *ASLE*, PS advocates' capacity to translate their preferences into executive initiatives was demonstrated in several other examples. In 2004, the *MECyT* – which worked closely with the software sector on a consultative basis (CESSI B, 2012; see López and Ramos, 2008; ME, 2012) – signed an agreement with Microsoft to

provide software and training through the firm's Education Alliance programme in relation to a computers for schools initiative (Busaniche, 2004; MECyT, 2004). This agreement demonstrated both the ease with which PS advocates could translate their preferences into initiatives and the difficulties F/OSS advocates with low institutional embeddedness faced in doing so.

F/OSS advocates lobbied the *MECyT* to adopt Linux instead of Microsoft Windows in the computers for schools initiative – efforts which included a meeting between Richard Stallman and the Minister for Education (Educ.ar, 2004; Lavaca.org, 2009). However, F/OSS advocates' fragmented organisation and distance from the government reduced their capacity to advance a viable solution for implementing F/OSS. Administrators responsible for organising the initiative within the *MECyT* lacked recourse to in-house personnel with knowledge of F/OSS who they could trust to advise them and assist with implementation; faced with piecemeal offers of assistance from small firms linked to F/OSS advocates, these administrators instead favoured signing an agreement with Microsoft which could arrange implementation at lower costs and provide training to boot (MECyT A, 2011). Lack of cohesion in F/OSS advocates' organisation reduced their capacity to advance a credible and efficient proposal for implementation of F/OSS; lack of institutional embeddedness, which may have enhanced F/OSS advocates' ability to mobilise resources and organise more effectively, also reduced the viability of adopting F/OSS in the eyes of administrators within the *MECyT*; external to the government, F/OSS advocates lacked administrators' trust and reduced the knowledge available to administrators in decision making. The *MECyT* initiative ultimately represented a partial win for F/OSS advocates as the Ministry agreed to implement a dual-boot solution featuring both Windows and Linux (see Educ.ar, 2004; MECyT A, 2011). However, there was criticism that the Linux implementation did not boot (FVL A, 2010a) and with training only available for Microsoft's software and knowledge of Linux scarce, the degree to which Linux was actually utilised by recipients of the initiative is questionable.

In March 2005, the *MEcon*, which had played a key role in the formulation of the sectoral policy for software, launched in conjunction with Microsoft, *Mi PC*, an initiative which aimed to stimulate economic activity through local hardware assembly and at the same time improve social access to ICTs (Cassia, 2005; Clarín, 2005;

Finquelievich, 2005: 17). From 2005, the *MTEySS*, which also worked with the *CESSI* on a consultative basis, launched a number of workforce ICT training initiatives in conjunction with Microsoft, Oracle and other multinational IT firms (MTEySS A, 2012; MTEySS B, 2012).

The *FRI*

PS advocates' ability to neutralise F/OSS related initiatives within the executive was signalled again with relation to the winding down of the *FRI* in 2008. In the second half of the 2000s, the *FRI* and its F/OSS related activities began to attain a higher profile following the participation of its coordinator and his boss, the head of the *ONTI*, in the 2005 edition of the *Jornadas Argentinas de Informática (JAIIO)*, an annual IT event which drew participants from across Argentina and neighbouring countries (Carllinni, 2012; see Meffe, 2005). In 2006 the *FRI* began to focus on interoperability (Carllinni, 2007) and push the adoption of the Open Document Format (ODF) as a government wide standard (Carllinni, 2012). The ODF was an ISO approved open standard which allowed users to migrate away from Microsoft's desktop publishing Office suite – a key source of revenue for the firm (Curtis, 2009: 232) – to F/OSS equivalents such as StarOffice and Open Office. The ODF marked an important threat to Microsoft and the firm responded by seeking to get its own OpenXML standard recognised as an open standard in international standard bodies (Curtis, 2009: 237; Foley, 2008: 54). The company also pressured governments considering adopting the ODF format to drop the idea (Curtis, 2009: 263). Microsoft was opposed to the *ONTI*'s plans to adopt the ODF as a government wide standard and following lobbying at the highest levels of the government, the *FRI*'s coordinator and the head of the *ONTI* were dismissed from their positions (Busaniche, 2008; Heinz, 2008; interviews, 2011; 2012).

Following the dismissals, a new director favoured by the private sector was appointed to head up the *ONTI* and the activities of the *FRI* were wound down (interviews, 2010; 2011). The subsequent influence of the private sector within the *ONTI* was signalled in the launching of the *Agenda Digital* (Díaz Rato, 2008), an initiative put together by the sector (see CABASE et al., 2008), which sought to centralise coordination of government policy towards ICTs.

Legislative Initiatives

In T2, F/OSS advocates continued to focus upon the legislature in their desire to see the government promote F/OSS, supporting re-submitted versions of the legislative project originally authored by Dragan which called for mandated use of F/OSS in the government. However, F/OSS advocates' chosen strategy for getting the government to adopt F/OSS promotion saw little chance of success, not least because the legislative projects they supported were submitted by legislators affiliated to minority parties in opposition to incumbent political forces, forces which enjoyed a strong position in the legislature and amongst which PS advocates were gaining increasing influence.

PS advocates' increasing influence within the executive in T2 enhanced their capacity to impress their preferences on software licensing policy in the legislature too, due to the executive's capacity to control behaviour in the legislative branch. In general terms, political forces incumbent in the executive between 2003 and 2010 enjoyed either straight majorities or alliances providing a dominant position within the legislature which allowed the executive a strong hand in setting the legislative agenda and outcome of legislative initiatives throughout this period (Jones and Hwang, 2005: 127; Jones and Micozzi, 2011). Strong party discipline within the Argentine congress in general (Jones, 2002), the strong capacity of incumbent parties to influence the legislative behaviour of their party through both institutional and party-based mechanisms (Jones, 1997) and the strong capacity of majority parties or coalitions to determine the legislative agenda and outcome of legislative initiatives (Calvo, 2007) leveraged the executive's capacity to influence activity in the legislature. Further to the influence PS advocates could wield within the legislature indirectly through the executive, they also exert influence directly through lobbying a committee's president, who controlled the legislative agenda and outcome of projects placed before a committee (Legislative assistant B, 2011). In both 2003 and 2008, the F/OSS promotion bills were discussed in the committee for communications and technology, a committee which was headed up by legislators affiliated with incumbent political forces between 2003 to 2010 (PJ deputy A, 2011; PJ deputy B, 2011) allowing the executive significant room to influence the progress of these bills.

In both 2003 and 2008, the re-submitted version of Dragan's proposal was also merged with projects sponsored by legislators affiliated to the government, representing another mechanism by which the executive might influence the progress of F/OSS promotion initiatives. Under the rules of the lower house, a project's author was offered greater time to speak during debate over their project and thus greater control over its content (Legislative assistant B, 2011; Surdo, 2011); the submission of a project similar to one already in existence albeit by a political faction rivalling that responsible for the earlier project marked a strategy to prevent a rival faction controlling a project (*ibid.*); similar bills would be merged and the leverage each faction would wield over a bill's content would be more equally matched.

In 2003, due to PS advocates' opposition to F/OSS promotion, the author of the project associated with the government (see Fontdevila, 2002) opted for a softer line than the mandate called for in Dragan's project (see Dragan et al., 2002), instead calling for a preference with a view to increasing the chances of the project gaining approval (PJ deputy B, 2012). However, F/OSS advocates refused to support anything other than mandated use of F/OSS; in the eyes of F/OSS advocates seeking openness and accountability – conditions which could only be guaranteed through use of free software – anything other than a mandate was pointless. With no overlap between PS advocates' and F/OSS advocates' preferences and both sides refusing to compromise, legislators were left with little possibility of drafting a project with any chance of gaining approval. The timing of the resurgence of discussion of F/OSS promotion in the legislature in 2003 coincided with discussion of the bills to promote the software sector (see Román, 2003), bills which were also debated in the committee for communications and technology. The *CESSI* voiced strong opposition to any promotion of F/OSS (*ibid.*) and with its strong connections to participants in the committee for communications and technology and its influence increasing within the government, the project failed to advance.

In 2008, by, the project submitted by a minority, opposition party (Macaluse, 2008) was again merged with a similar proposal sponsored by legislators affiliated with the government (Cordoba, 2008; Tomoyose, 2008). It appears support within the committee itself was sufficient for the project to gain approval (Busaniche, 2008; Legislative assistant B, 2011; Macaluse, 2008). However, PS advocates, now enjoying

support within the executive up to the level of the presidency, were able to stymie the bill through lobbying. One of the mechanisms by which the passage of legislation may be affected is through lack of engagement (Jones, 1997: 279). Recognising the importance of *ONTI*'s buy-in to the viability of the proposal, the committee invited *ONTI* to attend discussion of the bill (Legislative assistant A, 2011). However, with *ONTI* now closer to the software sector in the wake of the dismissal of the *FRI* coordinator and his boss, *ONTI* failed to attend the committee meetings and its lack of engagement, presumed to reflect disinterest, cast doubt over the viability of the project (*ibid.*). Notwithstanding *ONTI*'s lack of engagement, progress of the bill was ultimately halted through its removal from the legislative agenda following pressure from representatives of the software sector (interviews, 2010; 2011). Where the majority party opposed legislative initiatives, such initiatives would be placed in a draw or “*cajoneada*” (Calvo, 2007: 265; HCDN A, 2011) and such was the outcome of the 2008 F/OSS promotion bill (interviews, 2010; 2011).

By pursuing F/OSS promotion through the legislature, F/OSS advocates pinned their hopes on a strategy with a slim chance of success in the absence of widespread support in either wider society or the government.

Technological Neutrality

Another indication of PS advocates' influence within the government concerned a 2007 legislative declaration which called upon the executive to observe principles of ‘technological neutrality’ where adopting technology and resist making choices on the basis of licensing schemes (see Nemirovsci, 2007; Wegbrait, 2009). This project was initiated at the request of PS advocates (CESSI C, 2012; PJ deputy A, 2011) at a time when the *FRI* was involved in pushing the ODF format and marked a response to what PS advocates perceived as a growing threat from F/OSS promotion within the government.

4.4 Conclusion

In this chapter, it has been argued that the Argentinean government's predisposition to intervene in the software sector strengthened a pro-PS constituency, subsequently constraining the government's ability to promote F/OSS. The case of T2 Argentina illustrates how path dependency may lock governments into pursuing particular policy choices. By engaging with the software sector in the wake of the crisis, the government consolidated sectoral cohesion, strengthening multinational PS firms' political domination of the sector and allowing them to benefit politically from growth in IT services with which they would otherwise have been unassociated. The lobbying power of PS advocates increasing as the government welcomed growth of a sector associated with high added value economic activity and an advanced level of development, this power enabled these actors to persuade the government to resist promoting F/OSS and maintain policies favourable to PS as calls for F/OSS promotion and government F/OSS initiatives emerged.

As PS advocates' lobbying power strengthened, F/OSS advocates effectively passed up opportunities to strengthen theirs. Remaining aloof from the government, incumbent political forces and social movements with ties to the government, F/OSS advocates lacked access to political decision-makers and were able to mobilise limited resources. Unlike the F/OSS advocates of RS in Brazil who were able to mobilise and coordinate a coalition through access to state resources, Argentinean F/OSS advocates were unable to mobilise wider support for F/OSS as cooperation amongst them was confounded by heterogeneous interests. Even when opportunities arose to forge stronger government ties and mobilise wider public support, these opportunities were missed for the differences that existed between F/OSS advocates.

By illustrating the ways in which software sector cohesion and F/OSS advocates' institutional embeddedness connected to policy choices in T2 Argentina, this chapter has shown how both these factors contributed to the choices that were taken. Figure 4-4 shows how combinations of these factors co-vary with policy outcomes across T1 and T2 in Argentina. It can be seen that policy remained favourable to PS as software sector

cohesion strengthened in T2. As in the cases of T1 Argentina and Brazil, the policy outcome is consistent with what the power asymmetries between F/OSS advocates and PS advocates would predict. If policy favours PS under the combination of factors found in T1 – a combination in which PS advocates enjoy superior lobbying power to F/OSS advocates due to the power asymmetries between the two sets of actors – a strengthening of PS advocates’ power on account of strong software sector cohesion only suggests policy is even more likely to favour PS.

Figure 4-4 – Combinations of F/OSS Advocates’ Institutional Embeddedness and Software Sector Cohesion in T1 and T2 Argentina

	T1 (1999-2003)	T2 (2003-2010)
F/OSS advocates’ institutional embeddedness	Weak	Weak
Software sector cohesion	Weak	Strong
Software licensing policy outcome	Favourable to use of PS	Favourable to use of PS

The findings of this chapter demonstrate how politics rather than technical or financial considerations may determine policy toward software licensing. Whilst cost considerations motivated government IT administrators to initiate F/OSS initiatives, the political context put a stop to these initiatives and resulted in politicians resisting calls to promote F/OSS through policy. The findings highlight how pragmatic motivations for adopting F/OSS are in themselves likely to be insufficient as a basis for policy promotion of F/OSS. Because PS vendors have the incentives and capacity to heavily discount PS, offering governments deals that may make PS appear more financially attractive than F/OSS in the short term, F/OSS is only likely to be promoted where motivations transcend financial and technical considerations. To employ the terminology of Richard Stallman, politicians have to appreciate F/OSS as free speech rather than free beer if they are to recognise benefits in promoting it.

5 The Politics of Software Licensing Policy under the Lula Governments in Brazil (2003 – 2010)

As Lula came to power, F/OSS promotion seemed as improbable as ever. Typically regarded as a byword for antipathy toward the US and capitalism, F/OSS evoked the polar opposite of the image projected by the Lula government. With a view to allaying the fears of international investors concerned at the *PT*'s leftwing credentials, Lula committed to maintain the market friendly policies of the preceding Cardoso administration (Hunter, 2008; 2011; Panizza, 2009; Power, 2008). With its reputation for moderation and support for economic orthodoxy, this government looked likely to resist calls to promote F/OSS. Resistance appeared likely because such a policy sat uneasily with the tenets of *laissez-faire* and contradicted conventional interpretations of IP as a mechanism for appropriating knowledge. Resistance appeared likely in relation to foreign policy stance as well. Notwithstanding its pursuit of greater independence from the US than had been the case under Cardoso, the Lula government's cordial ties with its northern neighbour (Baiocchi and Checa, 2008; Vigevani and Cepaluni, 2007) suggested it was unlikely to adopt a policy which might upset this bilateral relationship. In its wider international relations, this government's continued emphasis upon collaboration and multilateralism implied it would act in accordance with the liberal norms of the international environment and avoid policies that were markedly radical.

In line with the incumbent *PT*'s strategy of assuaging business interests, control of the ministry responsible for industry (*MDIC*) in the incoming Lula government was handed to a pro-market figure, implying the ministry's receptiveness to the views of the private sector. With the local software sector dominated by proprietary software (PS) and the presumably strong say the *MDIC* would have possessed in decisions over any policy affecting the sector's interests, the government would apparently have left the private sector to decide how software should be licensed.

Within the local software sector, as Lula came to power, the expectation was that the incoming administration would favour local firms which developed PS products. The inclusion of software within a strategic export programme signalled that the *MDIC* took

a strong interest in the PS dominated software sector and the minister for industry even spoke out in favour of promoting PS.

If the Lula governments suggested a political context apparently hostile to F/OSS promotion, they surprisingly became avid supporters of this policy, gaining a reputation for being a world leader in F/OSS promotion. Brazil arguably did more than any other country anywhere to promote F/OSS, adopting F/OSS initiatives in a range of policy areas including social access to ICTs, education, public IT administration and industrial policy. The Brazilian foreign ministry even pushed for F/OSS' to be recognised as an opportunity for developing countries to address the digital divide in the declaration of the World Summit of the Information Society.

This chapter explains the unexpected uptake of F/OSS promotion by the Lula governments, arguing that this outcome was largely down to a strengthening in F/OSS advocates' embeddedness within the government in T2 while cohesion in the organisation of the software sector remained weak. In T2, F/OSS advocates gained influence amongst political leaders in the federal executive through high-level government appointments and partisan ties when the *PT* gained power at the national level. F/OSS advocates' strong ties to the leadership of the executive – the support of which was crucial for the adoption of a general policy conducive to use of F/OSS – facilitated their capacity to persuade political leaders to back F/OSS promotion. Brazilian F/OSS advocates' ability to mobilise resources through the federal government enabled them to unify and coordinate the heterogeneous interests surrounding F/OSS.

As the federal government adopted a F/OSS promotion policy, opponents of F/OSS promotion found their capacity to stymie F/OSS initiatives undermined by the fragmented organisation of the software sector. Represented by several actors displaying varying preferences towards F/OSS promotion, ranging from strong opposition to ambivalence, the software sector was organised in such a way that it not only reduced the influence of the sector as a whole within the executive but also left collective actors representing the interests of multinational PS firms and their local affiliates isolated within the sector. Historically weak institutional links between the sector and the government and political leaders' backing of F/OSS advocates left

opponents of F/OSS promotion effectively locked-out of those areas of the government with the capacity to control F/OSS promotion.

On the one hand, the case of Brazil reflects how actors that would ordinarily be weak and unlikely to translate their preferences into policy may do so through institutional structures such as the state and political parties. Institutions strengthened F/OSS advocates' lobbying power by facilitating their capacity to forge ties with government and mobilize resources. On the other hand, this case reflects how interest based factors might confound amongst the most powerful actors from translating *their* preferences into policy. Weak coherence in private sector organisation prevented multinational firms from presenting their interests as coherent with those of the wider software sector and mobilising a more powerful alliance. A combination of fragmented interests and institutional 'lock-out' showed that combinations of interests and institutions may prevent even the most powerful actors from getting what they want.

The chapter proceeds as follows. First, the character of F/OSS advocates' institutional embeddedness within the Lula governments is examined, explaining how this strengthened and how stronger embeddedness enabled F/OSS advocates to translate their preferences into policy through ties to politicians and by mobilising support in wider society through access to resources. The second section examines how continued weakness in the cohesion of the software sector attenuated PS advocates' ability to rollback F/OSS promotion.

5.1 F/OSS Advocates' Institutional Embeddedness Strengthens

This subsection explains how F/OSS advocates' institutional embeddedness strengthened at the national level in Brazil in T2 and how this strengthening enabled these actors to translate their preferences into policy. As active members of the *PT* and participants in *PT*-held, sub-national governments in the years leading up to 2003, leading F/OSS advocates' existing embeddedness within the *PT* and the state facilitated their ability to forge ties with the government when the *PT* won power at the national level. The character of these ties and the way they mapped onto the contours of government made political support for F/OSS more likely for multiple reasons.

Ties to government – encompassing government appointments and relationships with policymakers and politicians – enhance actors' power by increasing the likelihood that “deliberate political actions” such as “lobbying … participat[ion] in policymaking … or collective action” (Fairfield, 2011: 428) will be successful. The influence of the structure of the state upon what actors might be capable of (or not)(Adler, 1986; Sikkink, 1991) meant that the usefulness of these ties in terms of lobbying power was affected by where in the state ties connected actors, either directly through appointments or indirectly by way of relationships with others.

In view of the fact that F/OSS advocates' interests involved influencing IT adoption, ties to those areas of the state with faculties relating to IT were important to these actors' ambitions. Three areas of the government were important in this respect (Sobota, 2011). The first was the federal data processing agency, *SERPRO*, an entity attached to the Ministry of Finance which performed a function similar to *PROCERGS* albeit at the federal level. Whilst *SERPRO* lacked policy faculties, it was able to influence technology use in the wider population as well as within the federal government through network effects. Representing the largest IT company in Latin America (Schoonmaker, 2009) with around 9,000 employees (Botelho et al., 2005), *SERPRO* was the principle supplier of IT services to the federal government (Mazoni, 2011). Because the government represented a principle source of demand within the Brazilian market for IT goods and services (Marques, 2009; Schoonmaker, 2009) and the services it provided affected the lives of ordinary Brazilians, the choices *SERPRO* made in software adoption impacted the wider population as well as those working within the government. The second was the Secretariat of Logistics and IT (*SLTI*), located within the Ministry of Planning. The *SLTI* offered opportunities to influence technology adoption within the government as the entity charged with formulating government guidelines for IT adoption (Santanna, 2011) – a function analogous to that performed by *ONTI* in the Argentinean government. The third was the IT policy secretariat, *SEPIN*, within the Ministry of Science and Technology (*MCT*). Responsible for the formulation and execution of policy toward the IT sector (SEPIN A, 2008), *SEPIN* potentially offered the greatest opportunities to influence technology adoption through policy.

During the first Lula government, F/OSS advocates gained a significant presence within *SERPRO* and the *SLTI* and would encounter sympathy from the director of *SEPIN*.

However, it was from within an area of the state lying away from those typically associated with holding influence over IT policy that F/OSS promotion would be spearheaded.

Ties: Mobilisation of Support for F/OSS Promotion within the Government

F/OSS advocates' ties and positions within the *PT* relative to senior party figures and internal party factions conditioned those ties they were able to forge with the government. With regard to appointments, the internal party organisation – specifically the politics surrounding internal party factions – affected who received government jobs. Appointments were controlled by the moderate *Articulação* faction (interviews, 2011) which was headed up from São Paulo where the *PT* emerged. *Articulação*, held the majority of seats on the *PT*'s national executive, was the dominant party faction and its leadership represented the locus of power within the party (Flynn, 2005; Kucinski, 2005: 38–40). In the years leading up to Lula's presidential election win, *Articulação* had sidelined more leftist factions such as *Democracia Socialista (DS)*, to which the leading proponents of F/OSS in RS were affiliated. When it came to allocating appointments, a deal with smaller parties which had formed a coalition with the *PT*, meant that smaller *PT* factions lost out to these parties and more dominant factions.

With the marginalisation of smaller, leftwing factions in the allocation of appointments, the highest profile RS F/OSS proponents, as *DS* affiliates, initially remained outside the government (Branco, 2005b). However, whilst *Articulação*'s role in coordinating appointments did little to enhance the ability of F/OSS advocates from RS to obtain government positions, the opposite was the case for São Paulo's leading F/OSS advocate, Sergio Amadeu (interviews, 2008). Amadeu's involvement in the *PT* of São Paulo meant he possessed ties with the leader of the *Articulação* faction, Jose Dirceu, who became Cabinet Chief in 2003. As a result of these ties, Amadeu was invited by Dirceu personally to take up an appointment heading up the *Instituto Nacional de Tecnologia da Informação (ITI)*, an entity responsible for administering Brazil's public

key infrastructure – a system involving software which provided Internet security services such as user identity verification and encryption.¹⁹

Together with affiliations to internal party factions, allocation of government appointments was affected by pre-existing participation within the state. Where F/OSS advocates possessed administrative experience as a result of participation in sub-national *PT* held governments or as professional bureaucrats in governments controlled by other parties, such experience made it more likely that these actors' would obtain appointments, especially if associated with projects deemed successful within the party.

Amadeu's participation in the municipal government of SP contributed to his receiving an invitation to head up the *ITI*. By profession, Amadeu was a sociologist with an academic career and his background reflected that his appointment to head an agency concerned with cryptography was based on his political, rather than technical, credentials. However, if Amadeu's appointment rested on political trust, he was approached to head up an IT related agency because of the success of the high profile Sao Paulo telecentre project which he had coordinated during his time working for the municipal government of Sao Paulo. In addition to Amadeu, a good number of lower profile F/OSS advocates with backgrounds working in the state, obtained mid to high level IT related appointments.

Although the leading protagonists of F/OSS in RS did not immediately gain appointments, they were nonetheless well connected to the federal government as a result of the significance of RS as a source of expertise in public administration within the *PT*. When the *PT* took power in 2003, it was the first time the party had governed at the national level and it turned to its experience of governing at the sub-national level to fill appointments. Representing what were generally considered the *PT*'s most successful experiences of public administration at the time (Bruce, 2004; Goldfrank and Schneider, 2003: 159–160), the state government of RS and municipal government of Porto Alegre (the state capital of RS), were particularly significant as sources of administrative experience and a good number of those who had served in these governments went on to take up positions in the Lula administrations. With these

¹⁹ For a detailed explanation of public key infrastructure, see Adams and Lloyd (2003).

personnel having worked alongside the leading F/OSS advocates of RS, they were proximate to these F/OSS advocates in informal as well as more formal partisan terms.

It was Amadeu, based within the *ITI*, who would play a leading role in prompting the uptake of F/OSS promotion within the government. However, it is noteworthy that Amadeu was capable of doing so, as the *ITI* formally lacked the faculties to influence wider IT adoption. Focused upon the administration of the national public key infrastructure, the *ITI*'s resources and purview were accordingly limited. In terms of institutional capacity, lying away from those areas of the state with faculties pertaining to wider IT adoption, Amadeu's situation in the *ITI* contrasted that of *PROCERGS* managers in the Dutra government. Unlike *PROCERGS*, the *ITI* did not possess significant financial resources and lacked large numbers of personnel and control over IT infrastructure. The entity was also relatively insignificant in terms of authority within the wider government, the presidency of the *ITI* – the position which Amadeu occupied – being located three tiers below ministerial level in the ministerial hierarchy (interviews, 2010).

Amadeu and F/OSS advocates more widely were able to overcome limitations presented by their peculiar locations within the state or outside it through their partisan ties. Through these ties, F/OSS advocates were well connected with and could consequently access senior levels of the government, right up to the level of the President. F/OSS advocates' participation in the *PT* – participation that often encompassed active involvement within the party from its inception and personal acquaintance if not informal bonds with leading party members – made it more likely that senior government actors would listen to them on the basis of trust. Amadeu was located in a position proximate to Lula as well as Cabinet Chief, Jose Dirceu, in terms of the formal institutional structure of the government as the *ITI* was attached to the offices of the cabinet, the *Casa Civil*. Leading F/OSS advocates from RS also enjoyed strong ties to the highest levels of the executive as a significant number of their colleagues took up senior positions – including appointments within the president's inner circle and ministerial positions.

Ties to government leaders not only facilitated F/OSS advocates' lobbying power but also, where these actors were located within the government, strengthened their

positions inside it. An important factor which affected Amadeu's capacity to instigate F/OSS promotion from within the *ITI* concerned the way in which power within the *PT* was imposed upon the formal institutional structure of the government. As well as being leader of the *Articulação* faction – which controlled the allocation of executive appointments when Lula came to power – and Cabinet Chief, Jose Dirceu was also Lula's most powerful aide (Flynn 2005). Dirceu's strong political position meant that his sponsorship bolstered Amadeu's capacity to act outside his formal institutional role.

Whilst it was under the auspices of Dirceu that Amadeu was able to promote F/OSS, Dirceu himself knew little about technology. Amadeu was able to gain Dirceu's support for the promotion of F/OSS largely on the strength of the SP telecentre project. Weir and Skocpol (1985) note that existing policies and competencies affect the policies that come to be adopted by conditioning what is deemed acceptable and what is possible. Amadeu's responsibility for the deployment of F/OSS in the SP telecentre project and the success of this deployment in terms of its wide scale and the large numbers of users served, strengthened his ability to persuade Dirceu that F/OSS adoption was viable and that the competencies to adopt it were present.

The physical location of Amadeu's offices within the buildings that housed the government provided him unique possibilities to lobby the highest levels of the executive. Amadeu's office was located in an annex of the *Palácio do Planalto* which accommodated the offices of the cabinet and the president, offering Amadeu opportunities to speak personally with Lula and Dirceu that would have been the envy of any lobbyist.

The ideas that top officials hold has a significant bearing upon the policies that get adopted and the role of advisors in shaping these ideas is key (Sikkink, 1991). Amadeu's face-to-face contact with Lula and Dirceu meant he possessed opportunities to shape their ideas in a way that actors lacking personal contact could not. Playing an advisory role, he was able to persuade Lula as well as Dirceu to support the promotion of F/OSS. Existing ideas are key to actors' capacity to frame objectives (Goldstein and Keohane, 1993; Sikkink, 1991; Weir and Skocpol, 1985) and paralleling the way in which *PROCERGS* managers were able to obtain backing for F/OSS promotion from

political leaders in RS in T1, Amadeu convinced Lula to support F/OSS by framing it in the context of wider ideas and interests with which Lula identified.

In addition to the ideas used to frame F/OSS in RS – ideas relating to democracy – the notion of technological autonomy was also important in Amadeu’s framing of F/OSS (see Silveira, 2004: 40; 2007: 52). Technological autonomy had a long trajectory in Brazil, having formed the motivation to develop an indigenous computer industry (Adler, 1987; V. Dantas, 1988; M. Dantas, 1989; Helena, 1984). In a further parallel to *PROCERGS* managers’ ability to gain political backing, Amadeu’s capacity to gain Lula’s support rested on the trust afforded through partisan ties. With his peculiar location within the *PT*, close to the locus of power within the party, Amadeu’s partisan credentials made it more likely that his superiors would listen to him than had he been a non-partisan, career bureaucrat.

It is important to emphasise that high level support for F/OSS promotion was the outcome rather than the cause of F/OSS advocates’ strong embeddedness within the government. Lula and other leading members of the executive possessed limited knowledge of IT and consequently, prior to their contact with Amadeu, they knew little if anything about F/OSS. Amadeu’s government appointment, whilst motivated partly on the success of the SP telecentre project in which F/OSS had been deployed, stemmed from the fact that Dirceu knew Amadeu personally rather than because of any prior support for F/OSS on Dirceu’s part. It was *after* contact with Amadeu that Dirceu and Lula came to learn of F/OSS, signalling that their support for F/OSS was the result rather than the inspiration for Amadeu’s appointment. The direction of causation in the uptake of high level support for F/OSS promotion – and by extension, the role of F/OSS advocates’ institutional embeddedness in this uptake – may be illustrated by invoking a counterfactual scenario: had Amadeu not been invited to take up an appointment proximate to political leaders, political leaders would have been unaware of F/OSS and they consequently would not have come to support F/OSS promotion.

Whilst ties and proximity to the President and cabinet members enhanced F/OSS advocates’ capacity to gain backing for their policy proposals, the policymaking role of the chief executive in Brazil together with the executive’s relations with the *PT* in congress and legislature more widely in turn bolstered their political backers’ capacity

to have these proposals approved and implemented. The presidential style of government in Brazil meant the president was a crucial actor in policymaking (Scartascini, 2008; Sikkink, 1991). The cabinet was also important to policymaking because it could not only initiate policies but was also responsible for their implementation (Scartascini, 2008). The powers of the Brazilian presidency concentrated policymaking capacity in the hands of the chief executive (Alston et al., 2008; Santos and Vilarouca, 2008). As well as the power to issue ‘provisional decrees’, which in effect allowed the president to ordinarily bypass congress (Alston et al., 2008: 125; Neto, 2002: 57; Shugart and Carey, 1992: 140–141; Shugart and Haggard, 2001: 73), there were also a number of mechanisms by which the chief executive could gain legislators’ acquiesce to have legislation approved in congress (Santos and Vilarouca, 2008). The rules of the congress meant party leaders played a key role in determining committee appointments and this, combined with the ability of the presidency to provide resources (Alston et al., 2008: 127) allowed the chief executive to trade inducements for legislative support. Through control over the distribution of resources, Lula was able to build a governing majority within congress despite controlling only a minority of seats through a *PT*-led coalition (Samuels, 2008).

The high level political support F/OSS advocates were able to secure through partisanship enabled these actors to precipitate F/OSS promotion across the government. With relatively modest financial resources at the disposal of the *ITI*, Amadeu was limited in what he was capable of doing to promote F/OSS through the *ITI* directly. Instead, he advanced a policy of F/OSS promotion by instigating initiatives in and through other areas of the government. His ability to do so was facilitated by his partisan sponsorship. Together with the backing he obtained from Lula and Dirceu, another partisan factor which aided Amadeu in his ability to mobilise support for F/OSS concerned the significance amongst the upper tiers of the government of personnel who had served in sub-national administrations in RS. Even if these personnel knew little about F/OSS themselves, having been exposed to F/OSS during their time in RS and often closely tied with those who had led the call for it to be promoted there, they were generally sympathetic to its promotion if not conversant in the arguments for doing so (interviews, 2011).

Together with partisan sponsorship, the role of the *Casa Civil* in formulating and implementing policy was important to Amadeu's ability to advance his agenda. As Cabinet Minister, Dirceu coordinated a programme that had been initiated under the preceding Cardoso administration to advance social access to ICTs, the *Programa de Governo Eletrônico*. In the first meeting of the *Comitê Executivo do Governo Eletrônico (CEGE)* in May 2003, Dirceu announced that Amadeu was to play a key role in defining in IT policy broadly (PSL, 2003). It was through the *Governo Eletrônico* programme that F/OSS would be promoted in two principle areas: government use of software and digital inclusion.

To execute and implement the adoption of F/OSS within the government, a *Comitê de Implementação do Software Livre (CISL)* was instituted by decree in October 2003 (Presidência da Republica do Brasil, 2003). Amadeu was appointed to coordinate the *CISL*, drawing up guidelines that involved participation from all areas of the government (ITI, 2003). To encourage government-wide engagement with F/OSS adoption, the institution of the *CISL* was followed shortly afterwards with a November memorandum from Dirceu which was circulated around all areas of the government. In this memorandum, Dirceu requested that government actors observe a ruling by the *Tribunal de Contas da União (TCU)*²⁰ which recommended that the government use F/OSS where such an option was available (ITI A, 2008; Kuhn, 2011: 29). Commencing with involvement from 42 government entities – a number which had climbed to 93 by 2005 (Zúñiga and Couture, 2005) – *CISL* involved participation from actors across the government (Tema, 2004a).

In terms of digital inclusion, Amadeu influenced the uptake of F/OSS by obtaining resources from, as well as mobilising support in, other areas of the government.

Through support from his superiors and other areas of the government, Amadeu was in 2005 able to initiate his own telecentre project, *Casa Brasil*, with initial funding of around US\$81 million²¹ from the *MCT* (Mori, 2011). The *Casa Brasil* project was coordinated by the *ITI* but funded – via annual amendments to the national budget – by

²⁰ A body within the judicial branch of the federal government that holds responsibility for auditing public expenditure.

²¹ Converted using 2005 exchange rate (World Development Indicators) from figure quoted in Brazilian reales in source.

the *MCT* and implemented by the *Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)*, an organ dependent on the *MCT* (Mori, 2011; Sobota, 2011).

Allied with F/OSS advocates and sympathisers inside the government and outside it, Amadeu's ability to mobilise support for F/OSS promotion was further bolstered by the media access that his position within the state afforded. Amadeu's location within the *Casa Civil*, together with the name of the *ITI* – which obscured its association with cryptography, instead suggesting a focus on IT in general – allowed him to play-up his politically appointed role as IT policy architect vis-à-vis the media. Conducting regular interviews with international as well as national media (see Benson, 2005; Kingstone, 2005; Marques, 2004a) Amadeu was able to raise the profile of F/OSS, helping to mobilise public support and enhance the incentives for government actors to back F/OSS promotion.

Support from Lula, Dirceu, a number of *PT* ministers and high ranking officials facilitated F/OSS advocates' ability to garner support for F/OSS across the government. A demonstration of this support were the pledges Amadeu received from several ministries and heads of autonomous federal government organs to migrate to F/OSS, including the *MCT*, Mines and Energy (*MME*), Culture (*MinC*) and Foreign Relations (*MRE*) (Colitt, 2004; Marques, 2004b). Other areas of the government that adopted F/OSS initiatives included the Ministry of Education (PSL, 2004a; 2004b), *SERPRO* (PSL, 2005b) and *DATAPREV* (Schoonmaker, 2007; Teza, 2004a). Together with the activities of the *PSL* and *FISL*, partisan support assisted F/OSS advocates in garnering support from ministries controlled by other parties within the *PT*-led coalition. The Ministry of Culture (controlled by the Green Party), the *MCT* (controlled by the *Partido Socialista Brasileiro*), Ministry of Communications (*MC*) (controlled by *Partido Democrático Trabalhista*) (see Estado.com.br, 2004; Queiroz, 2003) and *MRE* headed up by a professional diplomat, all expressed public support for F/OSS promotion.

Those F/OSS advocates situated outside the government were able to assist with the mobilisation of support for F/OSS within it through their ties. Such ties facilitated the instigation of a week of free software related activity in the legislature in August 2003 (Costa, 2011: 170). F/OSS advocates were able to influence support for F/OSS through

the *FISL* too, attracting politicians, such as Gilberto Gil (ibid.) and functionaries, such as the head of *SEPIN*, Arthur Nunes (Nunes, 2011).

The most high profile and strongest ally of F/OSS advocates was the *MinC*, where the Minister, Gilberto Gil became a vocal advocate of F/OSS (Costa, 2011). Coming to learn about F/OSS through the participation of the *MinC* in the *FISL* and the activities of F/OSS advocates within the government, Gil allied the *MinC* to the *ITI* (ibid.). A musician of international renown (Burkeman, 2005; Dibbell, 2004), Gil's high-profile and pop-star credentials meant his support was important to F/OSS advocates for his capacity to raise the visibility and popularity of F/OSS amongst the wider public by promoting it through wider themes. Under Gil, the *MinC* adopted a digital inclusion project featuring F/OSS (Kuhn, 2011: 79; Mori, 2011), worked to migrate internal systems to F/OSS, engaged with the F/OSS movement online and through the *FISL* and employed hackers and F/OSS activists to implement projects (Costa, 2011; Fonseca, 2012; Murilo, 2011).

Within the *MCT*, the head of *SEPIN*, Arthur Nunes came to support F/OSS after attending the *FISL* (Nunes, 2011). Nunes had been involved with the development of Brazil's informatics policies from their inception in the 1970s and identifying with the ideas of technological autonomy and development, sympathised with Amadeu's push to promote F/OSS (ibid.). *SEPIN*'s support for F/OSS advocates was important because of its role in defining policy towards IT generally (Sobota, 2011). Commissioning studies into F/OSS' commercial viability and government use (see Softex, 2005a; 2005b) and initiating a project offering business grants for the development of software licensed under F/OSS license schemes (FINEP, 2003), Nunes' support for F/OSS gave it credibility (Teza, 2005a). Heading up one of the areas of the state with which the software sector liaised with the government, Nunes' support for F/OSS was also important as a check on the capacity of opponents of F/OSS promotion to influence policy.

The *MRE* came to support F/OSS promotion during preparations for Brazil's participation in the meetings for the World Summit on the Information Society (WSIS), the first meeting of which was held in 2003 (Lopes da Cruz, 2006). Amadeu's role as advisor to the government on IT policy meant that he played an influential role in these

preparations (*ibid.*), facilitating his ability to shape Brazil's positions at the WSIS. The *MRE* pushed for F/OSS to be included in the WSIS declarations (Amorim, 2011; Lopes da Cruz, 2006; Rezende, 2011; see SERPRO, 2005), a proposal which was opposed by the US and other industrialised nations but which nonetheless helped to raise F/OSS' profile internationally. In another example of pre-existing policies affecting policy choices (see Weir and Skocpol, 1985), support for F/OSS became institutionalised within the *MRE* as officials tended to look back at past decisions when considering policy choices (Sobota, 2011).

F/OSS advocates' capacity to obtain high-level political backing helped protect F/OSS promotion from resistance and opposition towards the policy from within as well as outside the government. The role of this backing in protecting F/OSS promotion from threats from within the government was demonstrated during the formulation of the *PC Conecada* initiative. *PC Conecada* concerned making locally assembled computers more accessible to less affluent sections of the population on favourable credit terms (Kuhn, 2011: 70; Schoonmaker, 2009). Within this programme, computers with F/OSS installed were to be made available on preferential rates of credit with a view to promoting F/OSS (Godói, 2005). Apart from pressure from Microsoft to ensure Windows was adopted in the programme (Cruz, 2005), the proposal to offer machines featuring F/OSS available at preferential rates of credit faced opposition from the Ministry of Finance on fiscal grounds (Alvarez, 2011; Aquino, 2011). The Ministry of Finance was one of the most powerful ministries in the government and generally well placed to impose its preferences upon policy. However, having been persuaded of F/OSS' development benefits by Amadeu, Lula stood by his decision to favour F/OSS and the proposal was approved in spite of opposition from the Ministry of Finance.

The high-level political backing that F/OSS advocates were able to secure was also key to warding off opposition from outside the government. With F/OSS advocates possessing influence within the leadership of the executive, senior politicians were coy to Microsoft's entreaties. In contrast to T2 Argentina, where the President received Microsoft CEO Steve Ballmer publically to much media fanfare, President Lula avoided meeting Bill Gates when the Microsoft founder sought an audience with the Brazilian president in 2005 (Kingstone, 2005; Seattle Times, 2005).

With political leaders resistant to opposition to F/OSS promotion, opponents had little alternative other than to approach each area of the government separately to sound out support, a strategy which was more costly and likely to yield partial success at best. For example, Microsoft approached ministries individually to sound out potential sources of support within the government (MDIC A, 2011; SEPIN A, 2011), reflecting its limited influence at the top of the executive.

Microsoft's weak influence within the executive was also signalled by the firm's attacks against government support for F/OSS promotion in the media (Cassidy, 2004; Microsoft C, 2011; Wired.com, 2003), reflecting its inability to obtain its objectives by working with the government directly.

F/OSS advocates' strong institutional embeddedness not only limited the capacity of opponents of F/OSS to stymie its promotion but also prevented them from dislodging F/OSS advocates from their positions within the state. A high profile example concerned Microsoft's attempt to sue Sergio Amadeu for defamation in 2004 over comments made in a magazine interview (Cassidy, 2004; Marques, 2004b; Mcmillan, 2004), an action widely viewed as an attempt to remove Amadeu from the government and thus neutralise the threat from F/OSS promotion. With support for F/OSS spread throughout the government, this action backfired spectacularly, instead serving to strengthen Amadeu as government supporters of F/OSS offered solidarity publically (Estado.com.br, 2004). Support for Amadeu from government actors emerging at the same time as a mobilisation against Microsoft instigated by the *PSL* (Branco, 2005a; PSL, 2004a), the firm dropped its court action in the face of public outcry. The outcome, in the attempt to remove Amadeu, contrasted that in the case of public officials associated with F/OSS in T2 Argentina, where similar attempts succeeded.

Whilst high-level partisan sponsorship benefited Amadeu, allowing him to kick-start a movement supportive of promoting F/OSS within the Brazilian government, it also left his ability to push F/OSS vulnerable in the event that this sponsorship was withdrawn. In 2005, Dirceu became embroiled in a scandal which eventually led him to resign as Cabinet Chief (Flynn, 2005). His source of power gone, Amadeu effectively became a lame duck in the wake of Dirceu's departure. Unable to push through his plans, he left the government shortly afterwards (PSL, 2005d). However, the way in which F/OSS

had been taken up within the government, with F/OSS initiatives being distributed across and dependent upon different government areas, meant Amadeu's departure did not directly impinge upon the continuation of these initiatives.

Amadeu served a catalytic function, activating support for F/OSS amongst the highest tiers of the executive in a way that would likely have been more difficult had F/OSS activists been restricted to lobbying from outside the government. Following his departure from the *ITI*, having generated momentum, the publicity and pressure that other F/OSS advocates within the government and those outside it were able to generate ensured that high-level support for F/OSS promotion and F/OSS initiatives themselves continued.

In the wake of Amadeu's departure, the actual deployment and use of F/OSS arguably increased. In terms of maintaining the profile of F/OSS within the government, the *MinC* became the principle actor following Amadeu's departure. Further to continuing with the activities already mentioned above, in conjunction with F/OSS advocates, academic institutions such as the *Fundação Getúlio Vargas (FGV)* and internationally renowned academics such as Lawrence Lessig, *MinC* developed a 'free culture' programme, which promoted the ideas of freedom and sharing embodied in F/OSS through initiatives in the wider ambit of culture (Costa, 2011). In 2007, the *SLTI* launched the *Software Público* initiative which made software developed on behalf of the government available under a F/OSS license so it might be re-utilised, developed and adapted throughout the public sector (Kuhn, 2011: 32; Meffe, 2011; Natal de Souza, 2011). The *SLTI* also introduced the *e-Ping* interoperability initiative which made use of the open standard ODF format obligatory within the government (Kuhn, 2011; Santanna, 2011). Use of the ODF was important in terms of software licensing because it permitted use of free/open source office publishing software. In 2008, ex-director of *PROCERGS*, Marcos Mazoni, was appointed president of *SERPRO* (Bagueros and Bagueros, 2008). Mazoni had directed *PROCERGS* under the 1999-2002 government of Olívio Dutra and was recognised as a champion of F/OSS, not only for his involvement with F/OSS whilst at *PROCERGS*, but also for his promotion of F/OSS at the state data processing company of Parana, *CELEPAR*, which he had gone on to direct afterwards. *SERPRO* was already a large user of F/OSS in both front-end (see Schoonmaker, 2007: 1012) and back end systems (SERPRO, 2006). However,

Mazoni's appointment reflected tacit approval of consolidating F/OSS adoption throughout the government even if he was appointed for other reasons. Whilst *SERPRO* lacked policymaking faculties, as noted above, its strategic significance as a supplier of IT services in Brazil meant that decisions on technology adoption taken within *SERPRO* held ramifications for technology use in the wider population. Shortly after arriving at *SERPRO*, Mazoni instigated the Demoiselle framework, a F/OSS platform to facilitate the integration of existing government systems developed in a range of technologies (Tema, 2009).

Resources: Mobilisation of Support for F/OSS Promotion outside the Government

The ties that F/OSS advocates outside the government possessed with actors within facilitated their capacity to grow the mobilisation around F/OSS promotion in wider society. Compared to F/OSS advocates' previous ties with sub-national government, ties with the federal government offered greater political influence and resources.

The leading proponents of F/OSS from RS who initially remained outside the government continued to mobilise support through the *PSL* and the *FISL*. The partisan – and often informal – ties these actors possessed with the federal government were crucial to their ability to continue their activities. At the same time as Lula won the presidential elections in 2002, the *PT* lost the gubernatorial elections in RS. Under the incoming state administration of RS, *PROCERGS* – up until 2002 the primary source of support for the *PSL* and *FISL* – withdrew support for these activities (Branco, 2011). This withdrawal resulted in the loss of sponsorship but also human and physical resources, for example, the time that *PROCERGS* employees were able to offer during their day jobs. The *PT*'s winning of power at the national level allowed the *PSL* and *FISL* to continue by replacing the resources withdrawn locally.

Resources also became available from the neighbouring state government of Paraná when *PROCERGS*' outgoing director, Marcos Mazoni, was invited by the governor of Paraná, Roberto Requião, to take up direction of Paraná's state data processing company, *CELEPAR* (Mazoni, 2011). With his control over *CELEPAR*, Mazoni was able to continue supplying material support and play an important role in the coordination of the *FISL*.

The resources that those behind the *PSL* and *FISL* were able to mobilise through sponsorship – around 60% of which originated from public sources (ASL, 2013) – enabled them to setup an NGO, the Free Software Association (*ASL*), staffed with a small professional team, to continue coordinating the *FISL* (Branco, 2011). Whilst those who worked for the *ASL* were typically participants of the *PSL*, the *PSL* itself remained a separate, albeit informal entity (Abreu, 2005b).

The *ASL* was able to garner resources from the federal government for the same reasons that *PROCERGS* managers had instigated the *PSL* and *FISL* during the Dutra administration. With F/OSS being adopted across the federal government, government actors had interests in fostering collaboration between the state and F/OSS community with a view to facilitating the government's use of F/OSS. As well as government IT administrators with interests in garnering technical knowledge of F/OSS itself, politicians and functionaries more generally were interested in the *FISL* as a source of policy ideas and information. Attracting participation from leading international figures from the F/OSS community and academia – the 2004 edition of the *FISL* attracted F/OSS advocate Jon Maddog Hall and law professor, Lawrence Lessig (Teza, 2004b) – the *FISL* offered a view on the latest ideas at the vanguard of thinking on ICT and society as well as the technical side of F/OSS. As noted above, Minister of Culture Gilberto Gil and head of *SEPIN*, Arthur Nunes attended the *FISL* and they were motivated to do so to learn about F/OSS and inform policy formulation (Costa, 2011; Nunes, 2011).

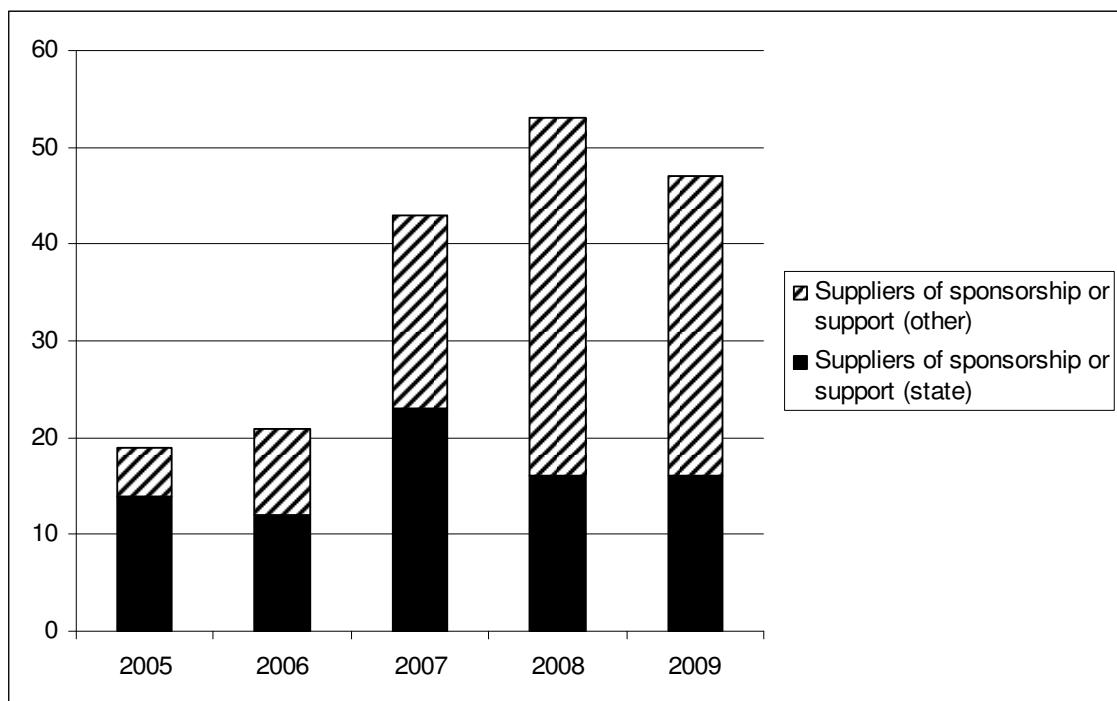
Another factor which attracted government participation within the *FISL* concerned political support. The F/OSS movement included constituencies which did not ordinarily support the *PT* and the ability of the *PSL* to mobilise these constituencies offered opportunities to incorporate them within the government's support base and thus widen it (Branco, 2011). Recognising the political capital associated with F/OSS, Lula was mindful of involving the F/OSS community in government debate of ICT and society (Alvarez, 2011). Demonstrating the value the government placed in F/OSS, President Lula and then Cabinet Chief, Dilma Rousseff attended the *FISL* in 2009 (ASL/PSL, 2009).

Leading F/OSS advocates, encompassing a group within the *PT* which was capable of deploying persuasive arguments at the vanguard of academic thought on ICT and society – arguments which connected to wider political interests – the value these figures held to politicians increased as the political value of social media came to be recognised within the political mainstream following the 2008 US presidential elections (Castells, 2009: 230). Within the leadership of the *PT*, F/OSS advocates and hackers came to be recognised as a means to tap the Internet for political support due to these actors' command of debate on ICT and society. In a signal of this recognition, leading F/OSS advocate, Marcelo Branco, was appointed campaign PR chief in Dilma Rousseff's 2010 presidential election campaign (Branco, 2011).

Government actors' interests in the *FISL* were signalled by their sponsorship and support for the event in the second half of the 2000s.²² Figure 5-1 shows a rise in the number of government sponsors/supporters over this period, if only slight – the spike in 2007 is due to the participation of seven municipalities as sponsors.

²² The term 'support' derives from *ASL*'s reporting of the *FISL* and may entail provision of non-financial resources. However, it may also reflect sponsorship as some government entities were prohibited from appearing as sponsors in reports for legal reasons, even though they provided financial resources.

Figure 5-1 – Number of Suppliers of Sponsorship and Support for the FISL



Sources: ASL/PSL (2007; 2008; 2009); PSL (2005a; 2006).

Figure 5-2, which is not exhaustive, reflects the breadth of public sector organisations which sponsored the *FISL*. In this figure it can be seen that federal government sponsors rose from 8 in 2006 to 12 in 2008.

Figure 5-2 – Public Sector Sponsors of the FISL

Entity	2005	2006	2007	2008	2009
<i>Federal government</i>					
Banco do Brasil	X	X	X	X	X
Caixa Econômica Federal	X	X	X	X	X
Cobra Tecnologia	X			X	X
Correiros			X	X	X
DATAPREV		X	X	X	X
Ministério da Ciência e Tecnologia	X	X	X	X	X
Ministério da Cultura					X
Ministério da Educação	X	X		X	X
Ministério da Saúde	X			X	X
Ministério do Desenvolvimento Social		X	X		
Ministério do Planejamento, Orçamento e Gestão	X	X		X	X
Ministério do Trabalho e Emprego				X	
PETROBRAS				X	X
SERPRO	X	X		X	X
<i>State government</i>					
Assembléia Legislativa do Estado do RS	X				
CELEPAR			X	X	X
PROCERGS	X	X	X		X
<i>Municipal government</i>					
PROCEMPA	X	X	X	X	X

Sources: ASL/PSL (2007; 2008; 2009); PSL (2005a; 2006).

As well as attracting support and sponsorship from government actors, *FISL* also attracted growing numbers of non-state suppliers of resources. Figure 5-1 shows that increasing numbers of non-state sponsors/supporters allowed the *FISL* to attract growing numbers of sponsors/supporters overall. Non-state sponsors/supporters encompassed universities, unions, charitable organisations and other NGOs as well as firms. Figure 5-3 illustrates that the *FISL* was able to attract increasing numbers of multinational as well as large national private firms as sponsors as the 2000s advanced. Participation by large firms suggests provision of greater resources as well as greater publicity.

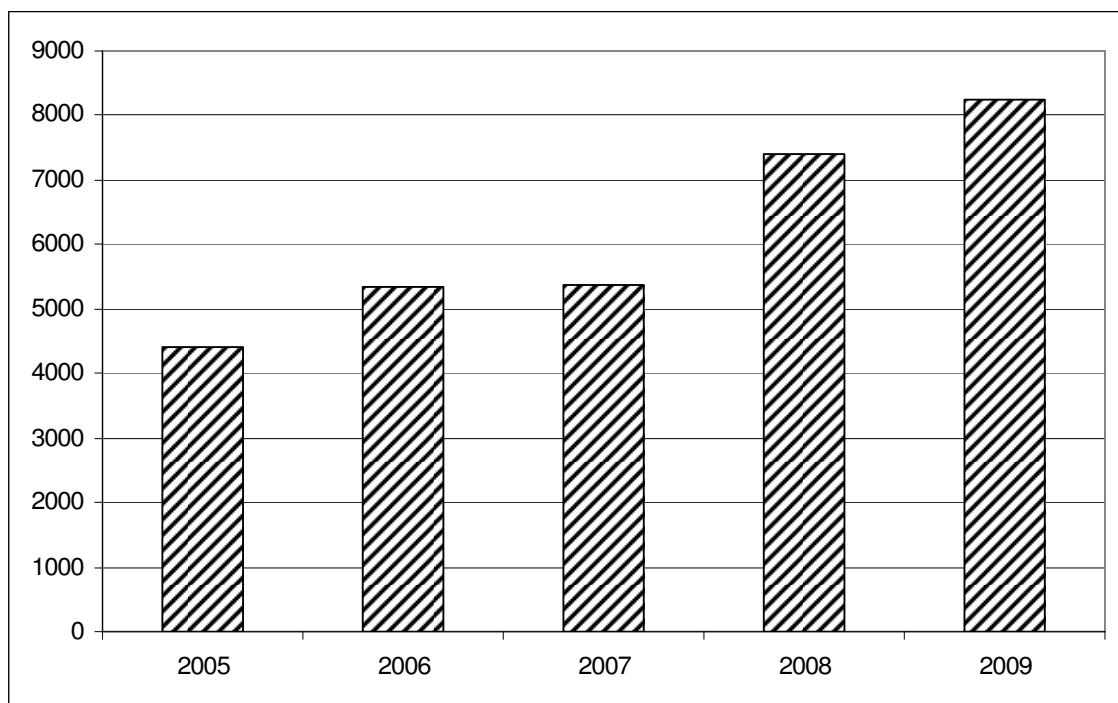
Figure 5-3 - Private Sponsors of the FISL

Company	2005	2006	2007	2008	2009
<i>Multinational firms</i>					
Google			X	X	X
Hewlett Packard		X			X
IBM	X		X		
Intel			X	X	
Oracle					X
RedHat					X
Sun	X		X	X	X
Telefónica				X	
UNISYS	X				
Yahoo				X	
<i>Large national private firms</i>					
Globo			X		X
Terra				X	
UOL				X	X
Oi					X

Sources: ASL/PSL (2007; 2008; 2009); PSL (2005a; 2006).

As *FISL* attracted increasing numbers of actors willing to offer sponsorship and support, it was also able to draw growing numbers of participants. Figure 5-4 illustrates that participant numbers almost doubled in the second half of the 2000s.

Figure 5-4 – Participants attending the FISL (2005-2009)



Sources: ASL/PSL (2007; 2008; 2009); PSL (2005a; 2006).

The *FISL*'s increasing numbers of sponsors and participants in the second half of the 2000s reflect the event's growing profile as well as increasing size and importance during this period. As the *FISL* grew, so too did the wider mobilisation around F/OSS, a trend which was reflected in the expansion of the *PSL*. By 2005, the original '*PSL-RS*' had become the '*PSL Brasil*', and had spawned local networks in most Brazilian states (Zúñiga and Couture, 2005). Whilst the greater resources that the *PSL/ASL* were able to garner through ties to the federal government bolstered their ability to mobilise support, they also enabled a nucleus of F/OSS advocates surrounding the original instigators of the *PSL* in RS to remain at the head of this mobilisation and coordinate it.

In general, the movement around F/OSS was able to continue attracting an ever greater number and range of actors. Within this trend, of note was increasing participation of private sector actors outside large firms. The uptake of F/OSS by the federal

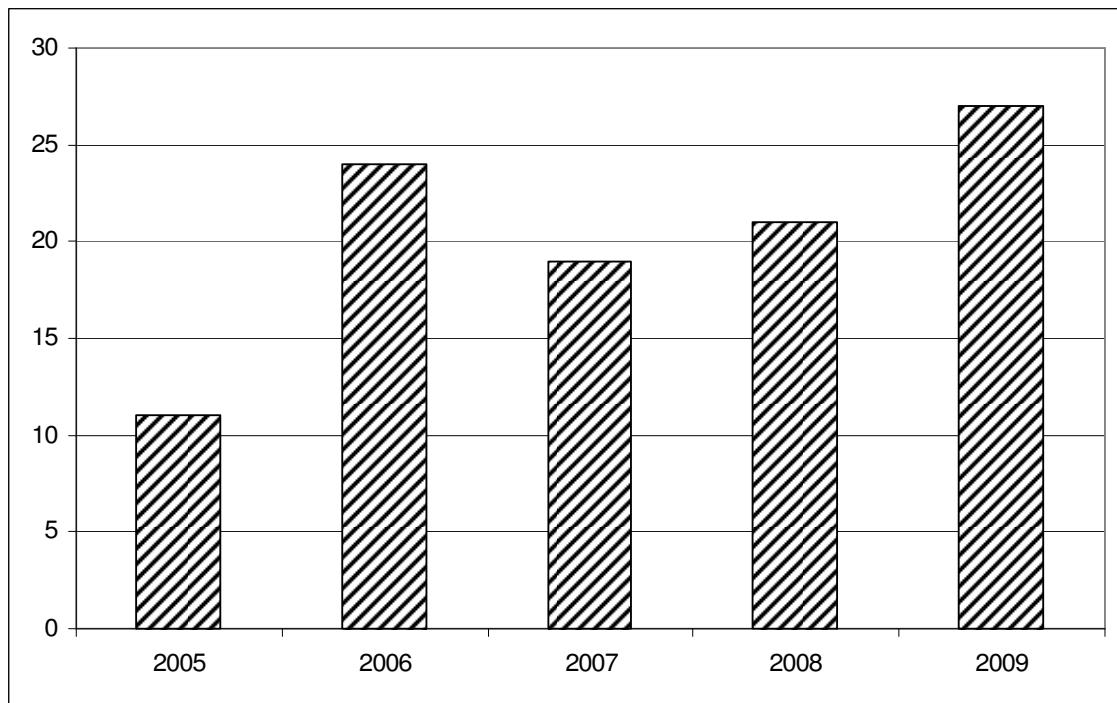
government generated business opportunities for national SMEs as well as larger firms (Tema, 2004b) creating additional impetus for firms of all sizes to participate in the *FISL*. The rising importance of F/OSS for the local software sector was telegraphed by participation of national industry associations such as *ASSESPRO* and *FENAINFO* in the *FISL*. The only sectoral actors which did not take part in the *FISL* were the *ABES* and the Business Software Alliance (BSA) – actors with interests predominantly located in foreign produced PS.

Another set of actors worthy of mention were those linked to academia. Universities generally continued to play an active role in the technical, IT side of the *FISL* but the event also attracted academic participants outside this sphere that enhanced the value of the event as a source of knowledge and ideas. A salient participant in this respect was the *Centro de Tecnologia e Sociedade* of the *FGV* which launched a Brazilian version of the Creative Commons license at the 2004 edition of the *FISL* (Costa, 2011) and assisted the *ITI* with regard to the legal aspects of using F/OSS within the Brazilian government (see Falcão et al., 2007). Together with the World Social Forum – which was hosted in Porto Alegre in 2005 and in which F/OSS advocates participated – the *FISL* also attracted leading international scholars of ICT and society such as Manuel Castells, Yochai Benkler (PSL, 2005a) and, as noted above, Lawrence Lessig. The participation of such scholars in these events not only helped to attract and inform the thinking of policymakers but also assisted leading F/OSS advocates in developing their mobilisation tactics online and honing their arguments for adopting F/OSS (Branco, 2011).

The federal government's engagement with F/OSS served to increase international interest in the *FISL* as the government's F/OSS policy drew attention from the media around the world (see Benson, 2005; Kingstone, 2005). Figure 5-5 reflects the rise in international participation in the *FISL* in the second half of the 2000s. International participation in the *FISL* allowed Brazilian F/OSS advocates to forge links and alliances with actors in the wider, international F/OSS community. Solidarity from the international F/OSS community helped strengthen local actors. An example concerned the attempt by Microsoft to remove Sergio Amadeu from the government, which has already been mentioned above. In a move akin to Keck and Sikkink's (1998) boomerang effect, F/OSS advocates placed pressure on Microsoft by mobilising

opposition to the firm both internationally as well as locally through online publicity (PSL, 2004a) and petitions (Branco, 2005a) which quickly gained the attention of international media commentators (Cassidy, 2004; Mcmillan, 2004).

Figure 5-5 – Number of Nationalities Reflected in Participation of the FISL (2005-2009)



Sources: ASL/PSL (2007; 2008; 2009); PSL (2005a; 2006).

5.2 Software Sector Cohesion Remains Weak

This subsection considers the strength of opposition toward F/OSS promotion in T2 Brazil, arguing that whilst the software sector reflected organisation and formal links with the government as a legacy of the sector's development in the 1980s – attributes that might ordinarily be expected to enhance the lobbying power of PS advocates opposed to F/OSS promotion – cohesion in the Brazilian software sector was weak, attenuating PS advocates' lobbying power. If the history of the Brazilian sector had endowed it with institutional representation, this same history, along with Brazil's expansive geography, also meant this representation reflected heterogeneous interests and fragmented organisation. Heterogeneous interests impeded the construction of a

unified sectoral response to F/OSS promotion and undermined PS advocates' capacity to present the interests of the sector as a whole as hinging around imported PS.

Responses to F/OSS promotion varied across sectoral representatives, both in terms of alignment and the degree to which the issue was prioritised. Each representative's interests intersected software licensing policy differently with responses to F/OSS promotion ranging from support through to staunch opposition.

In contrast to Argentina, where the software sector's concentration in the capital, Buenos Aires, facilitated the strengthening of sectoral cohesion as associativism increased in the wake of the crisis, in Brazil, regionalism worked to weaken cohesion. Although Brazil's size is not viewed as affecting business organisation in general (Schneider, 2004: 39), balkanisation of the software sector along regional lines (Botelho et al., 2005: 113) complicated communication and coordination between actors representing the sector (ABES B, 2011; ASSESPRO B, 2011).

Sectoral fragmentation also had to do with the way representation of the sector had developed historically. Whilst by the 2000s interests in foreign produced PS dominated the Brazilian software sector – local production having been largely supplanted by marketing and distribution of imported PS with the opening of the market in the 1990s – the organisation of sectoral interests reflected divisions between actors reflecting a more nationalist orientation that had grown up around Brazilian firms that had developed software products locally and those wedded to the marketing and distribution of imported PS. To complicate these divisions, there also existed differences between small and large firms and business models based on products versus services (Botelho et al., 2005: 113). By the mid 2000s, the sector boasted organisations reflecting a range of interests, these organisations including employers syndicates and government institutions as well as business associations. The proliferation of sectoral organisations meant over-representation of the sector, resulting in inter-organisational competition for resources (ASSESPRO A, 2011) and sectoral leadership (FENAINFO B, 2011). *ABES* offered an example of the effect that inter-organisational competition could have upon organisational resources. Through the 1990s, as the business association most closely associated with PS, *ABES* had benefited from resources contributed by multinational PS firms to fight software piracy. However, in the 2000s, *ABES* lost these resources when the BSA opened a local branch (interviews, 2011). Of the wide range of actors that

represented sectoral interests, several stood out in relation to the issue of software licensing policy.

Unsurprisingly, of all the sectoral representatives, with strong interests in PS, *ABES* was most vociferous in its opposition to F/OSS promotion. As well as representing Microsoft, *ABES* represented firms with business models based around the sale of products and services linked to Microsoft's technologies. With F/OSS presenting the greatest threat to PS in market segments where software was characterised by “low application specificity” and “high interest in reproduction” (Softex, 2005b: 58–59) – segments which represented Microsoft's core revenue – firms commercialising Microsoft's software had the most to lose from F/OSS promotion. As a result, F/OSS promotion represented a priority for *ABES*.

ASSESPRO's response to F/OSS promotion was characterised by indifference, reflecting neither great enthusiasm nor great concern. Officially acknowledging F/OSS as offering opportunities for the Brazilian sector (see SERPRO, 2004), the association also cautioned that F/OSS offered no panacea for the issues the sector faced (De Luca, 2007). If *ASSESPRO* criticised F/OSS promotion, it was for over emphasis of the issue by the government rather than opposition to the policy *per se*. The association was more concerned with attaining from the government greater support for local firms based around national capital in general. Whilst *ASSESPRO* contained firms supportive of F/OSS promotion, it also contained firms with interests in PS (ASSESPRO A, 2011). However, the PS firms the association represented generally operated in areas of the market where software was characterised by higher levels of “application specificity” and lower levels of “interest in reproduction” (see Softex, 2005b: 58–59). As a result, these firms did not face from F/OSS promotion the same level of threat as those represented by *ABES*. Aware that F/OSS promotion marked a priority for *ABES*, *ASSESPRO* left the issue for *ABES* to address (ASSESPRO A, 2011).

Reflecting a similar response to *ASSESPRO*, *FENAINFO* acknowledged in public that F/OSS might offer benefits for Brazilian firms, but its coordinators were more concerned with gaining policy support for local firms in general (see Bucher, 2007; FENAINFO A, 2011). Coordinated by a team with feet in *Softex* as well as *ASSESPRO*, *FENAINFO*'s preferences were not only influenced by proximity to the government *per*

se. *FENAINFO*'s coordinators were proximate to 'nationalist' IT sectors in both the state (the *MCT*) and private sector and held sympathies for local firms. Their affinities with 'nationalist' sectors shared by the *PT*, these actors were also allied with the party (*FENAINFO A*, 2011). Viewing opposition to F/OSS promotion as Microsoft's battle, they left Microsoft and its allies to fight it, as in common with those actors with which they were aligned, they possessed little sympathy for Microsoft and its interests.

Further diluting sectoral interests, in 2004 there emerged a new sectoral actor: the Brazilian Association of Information Technology and Communication Companies (*BRASSCOM*). *BRASSCOM* was comprised of IT multinationals and focused on IT services such as BPO and call centres (Marques, 2009; *BRASSCOM*, 2011) rather than the commercialisation of software products. For *BRASSCOM*, with its core interests lying away from the commercialisation of software products, F/OSS promotion did not represent a particular priority. With *BRASSCOM*'s multinational members including IBM amongst other firms with interests in F/OSS as well as Microsoft, the latter was not in a strong position to impose a pro-PS spin on the association's response to F/OSS promotion. Officially, the association expressed that the market should be left to decide how software was licensed (*BRASSCOM*, 2011), but it did little else in response to F/OSS promotion.

Affiliated with the *MCT*, in which there existed support for F/OSS promotion, *Softex* exhibited support for F/OSS promotion. Although the organisation was not engaged in activism, it was through *Softex* that the *MCT* conducted investigations to explore F/OSS' participation in the Brazilian market and the opportunities F/OSS might offer for the Brazilian software sector (*Softex*, 2005b; 2005c).

Weak Software Sector Coordination

The fragmented organisation of the Brazilian software sector diminished PS advocates' capacity to mobilise the sector against F/OSS promotion.²³ Because fragmentation impeded coordination generally, it reduced the political weight of the sector as a whole – and thus the political weight of actors such as PS advocates within it – vis-à-vis the government.

Fragmentation also reduced the capacity of PS advocates to coordinate the sector and present sectoral interests as hinging around PS. The situation in Brazil contrasted that in T2 Argentina, where sectoral representation was largely concentrated behind a single business association, offering Microsoft a strong hand in sectoral coordination. In Brazil, with Microsoft's interests represented principally by one business association amongst several other actors reflecting nationalist sympathies, the firm's interests were relatively marginalised. Under such conditions, the arguments of Microsoft and its allies that F/OSS promotion was damaging to the local sector and antithetical to its development lacked credibility and garnered little sympathy from government.

With preferences toward software licensing policy and degrees of concern over F/OSS promotion varying across sectoral representatives, sectoral coordination on the issue was generally absent. The only exceptions occurred when the government threatened to mandate the public sector use of F/OSS in 2005 (see Savazoni, 2005). As such proposals would have forced firms supplying software licensed under any other terms to 'open' their software, they threatened firms across the sector, leading to common ground upon which a coordinated sectoral response could be mobilised (FENAINFO A, 2011). However, the government never followed through with these proposals such that when this sectoral coordination occurred, it resulted in little more than statements signed by several sectoral representatives before melting away.

²³ Within the government as well as across the Brazilian software sector, it was agreed that the varied interests and competition amongst sectoral representatives limited cooperation and a coherent sectoral voice (ASSESPRO A, 2011; FENAINFO A, 2011; FENAINFO B, 2011; MDIC B, 2011).

Fragmentation also allowed F/OSS advocates to mobilise support amongst nationalist orientated sections of the sector as observed above. Such mobilisation simultaneously weakened sectoral opposition to F/OSS promotion whilst strengthening the movement surrounding F/OSS.

Presenting another contrast to Argentina, PS advocates in Brazil were also unable to capture political benefits from the economic performance of the sector as a result of sectoral fragmentation. If anything, Brazil witnessed greater expansion in software exports in the mid 2000s than Argentina, where expansion had allowed the sector to garner political support from the government. Between 2003 and 2006, net revenue from outward facing, foreign activities in the Brazilian sector grew at 53.2% per year (Softex, 2009: 38). Over the same period, the annual growth rate in software exports in Argentina was 48.8%.²⁴ In 2005 and 2006, Brazilian software exports grew around 40% whilst the rates in Argentina were around 12% and 22% respectively.²⁵ Like Argentina, Brazil was a net importer of software products and it can be safely assumed that Brazil's export growth reflected mainly services, as did Argentina's. Between 2004 and 2005, Brazilian firms providing software services witnessed an increase in foreign revenue as a share of their total revenue from 2.7% to 3.6% (Softex, 2009: 38). However, whilst growth in software exports was apparently greater in Brazil than in Argentina, such activity was principally associated with *BRASSCOM*, the interests of which lay away from PS, making it difficult for PS advocates to capture political benefits from this growth.

Government-Sector Relations

Although the Brazilian software sector possessed institutional links with the government as a legacy of its history, these links offered PS advocates limited opportunities to roll-back F/OSS promotion. For starters, the sector as a whole reflected a limited capacity to garner the government's attention. With cooperation limited, the sector articulated a voice which was neither coherent nor carried the weight of the sector as a whole behind it (Botelho et al., 2005: 113). From within the government, the coordination issues raised by the sector's weak cohesion were viewed as an obstacle to

²⁴ Based on data from *CESSI*.

²⁵ Brazilian rates calculated using data from *ABES*. Argentinean rates calculated using data from *CESSI*.

working with the sector and formulating policies that the sector wanted (MDIC B, 2011).

With its weak voice, the government showed relative disinterest in the sector. Although a 2004 announcement that software was to comprise one of four sectors to be included in *MDIC*'s industrial policy (Marques, 2009; MDIC, 2004) suggested reinvigorated interest in the sector on the part of the government and hence opportunities for the sector to gain greater influence within the government, little action followed the announcement (Botelho et al., 2005).

Compounding the sector's weakness *vis-à-vis* the government was a divergence between the government's interests and the sector's performance. The move to open IT markets in the early 1990s not only destroyed a nationalist software constituency which had enjoyed political influence. It also marked an apparent loss of interest in the software sector on the part of the government henceforth (ABES B, 2011; see Bucher, 2007), signalled by the absence of a specific policy toward software through the 1990s (Marques, 2009). This loss of interest accompanied a divergence between what the government sought from the software sector and how the sector actually performed. In the 1990s, the government re-orientated IT policy towards boosting exports, yet with the opening of the market, software firms encountered easier pickings marketing and distributing imported PS in the domestic market. Failing to significantly increase exports through the 1990s and 2000s, the sector instead represented a negative trade balance, importing substantially more than it exported (*ibid.*). In 2005, the sector accounted for imports of 2.2 billion US dollars to exports of just 247 million (ABES, 2007), importing almost nine times what it exported. In this light, the sector possessed little political leverage over the government as a function of its economic characteristics.

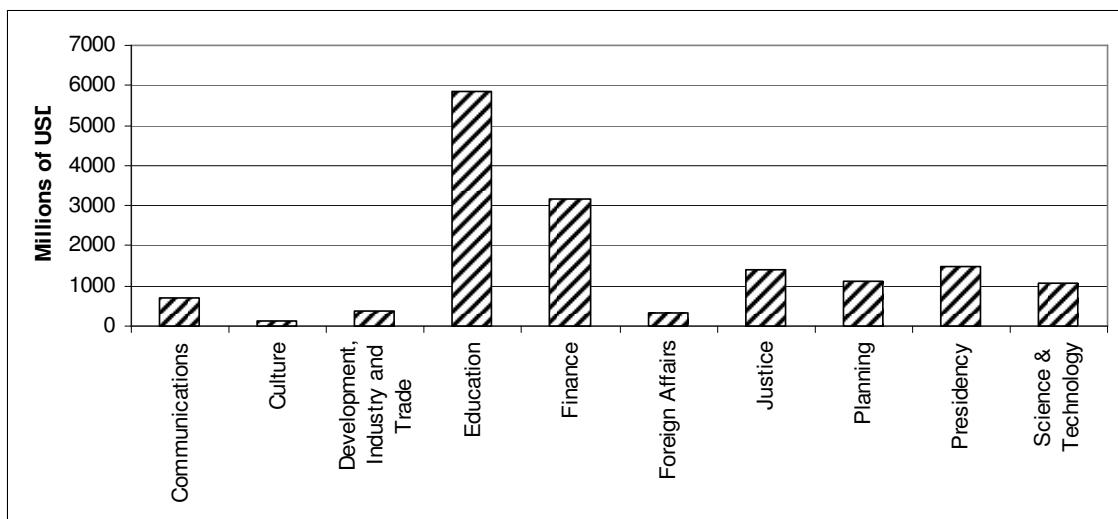
PS advocates' ability to lobby against F/OSS promotion was not only affected by the government's relative disinterest in the software sector generally but also the character of government-sector links. As observed above, with the leadership of the executive supportive of F/OSS promotion and resistant to PS advocates' entreaties, PS advocates effectively found themselves locked out of the one area of the government with the capacity to determine software licensing policy. Under these conditions, PS advocates

were restricted to seeking political backing from those areas of the government to which they did possess access – the *MCT* and *MDIC*. However, these areas offered PS advocates few opportunities to halt F/OSS promotion.

The character of the sector's links with the *MCT* together with the preferences of the actors with which the sector liaised within the ministry reduced PS advocates' opportunities to garner the *MCT* as an ally. In formal terms, the sector liaised with *SEPIN* through the *CATI*, yet the *CATI* was viewed by the sector as an ineffective forum for influencing policy. Convened at a relatively low level within the ministerial hierarchy, one industry commentator referred to it as little more than a 'talking shop' (FENAINFO B, 2011). The limited importance of the committee was signalled by the low frequency at which it was convened, meetings ceasing completely from 2005 (SEPIN A, 2011). In terms of preferences, as observed above, the head of *SEPIN* was supportive of F/OSS such that receptiveness to PS advocates' arguments was limited. However, the *MCT* more widely was regarded by industry commentators as being sympathetic to F/OSS on the basis of the ministry's putative leanings toward a more interventionist state and close ties with the academic sector in which support for F/OSS was strong (ABES B, 2011; ASSESPRO A, 2011).

In the *MDIC*, PS advocates found an actor more amenable to their petitions, the Minister of Industry, Luiz Furlan openly questioning the merits of F/OSS promotion (PSL, 2005c). However, both the weight of the *MDIC* within the government and the way in which F/OSS promotion played out prevented the ministry from doing much to impede the policy. Although the *MDIC* represented the powerful business constituency, in relation to the wider government it was not a particularly powerful ministry, as signalled by its resources. Figure 5-6 shows the budgets of a selection of ministries in 2003 to illustrate the relatively small resources of the *MDIC*. In 2003, the *MDIC*'s budget was US\$389 million, around a third of the *MCT*'s US\$1.1 billion budget.

Figure 5-6 – Budgets of Selected Ministries in 2003



Source: *Secretaria de Orçamento Federal, MPOG* (<http://www.orcamentofederal.gov.br/>)

Whilst *MDIC* reflected opposition to promoting F/OSS, it possessed limited capacity to influence the policy in the face of backing from the leadership of the executive and support distributed throughout the government. Whilst the ministry lobbied against F/OSS promotion within the government, it found itself politically isolated on the issue and its opposition was ineffective. Whilst *MDIC* supported PS advocates, their support was little use. A former president of *ABES* conceded that it made little difference speaking to the Minister of Industry when F/OSS promotion was coordinated from the *Casa Civil* (*ABES A*, 2011).

5.3 Conclusion

In this chapter, it has been argued that a strengthening in F/OSS advocates' institutional embeddedness at the national level enhanced these actors' lobbying power, allowing them to translate their preferences into policy despite opposition from powerful opponents. Strong embeddedness within incumbent political forces meant F/OSS advocates strengthened ties with the government through government appointments and partisan ties. Through these ties, F/OSS advocates were able to acquire support for F/OSS promotion from the highest levels of the executive by gaining the ear of political leaders and receiving their reciprocation on the basis of political trust. The high level executive support that F/OSS advocates were able to attain allowed them to mobilise

support for F/OSS promotion throughout the government. Strong embeddedness within incumbent political forces also enabled F/OSS activists outside the government to garner greater resources, facilitating their ability to strengthen wider societal mobilisation around F/OSS.

With the software sector fragmented, PS advocates were unable to roll-back the promotion of F/OSS. Weak sectoral cohesion not only diminished PS advocates' lobbying power by reducing the political weight of the sector as a whole. It also left these actors politically isolated within the sector, attenuating their capacity to coordinate sectoral interests and portray them as coherent with PS. As in Argentina, sectoral exports grew as a result of activity in IT services. Yet unlike their counterparts in Argentina, multinational PS firms in Brazil were unassociated with this activity politically and consequently unable to derive political benefit from it.

The support for F/OSS promotion that F/OSS advocates were able to secure from the most powerful figures in the government meant actors opposed to F/OSS promotion *within* the government also found themselves politically isolated. Whilst F/OSS promotion was backed by the presidency and F/OSS initiatives were executed independently by actors distributed throughout the government, those few actors opposed to the policy were able to do little to prevent it.

Demonstrating the ways in which configurations of interests and institutions surrounding software licensing linked with policy choices in T2 Brazil, this chapter has illustrated how both sets of factor contributed to the choices that were taken. Figure 5-7 shows how combinations of these factors co-vary with policy outcomes across T1 and T2 in Brazil. Comparing periods T1 and T2, it can be seen that a strengthening in F/OSS advocates' institutional embeddedness whilst software sector cohesion remains weak is associated with a change from a policy favourable to PS to one that privileges F/OSS instead. This result suggests that the combination of factors found in T2 may be sufficient to reverse the asymmetries in lobbying power between F/OSS advocates and PS advocates.

Figure 5-7 – Combinations of F/OSS Advocates’ Institutional Embeddedness and Software Sector Cohesion in T1 and T2 Brazil

	T1 (1999-2003)	T2 (2003-2010)
F/OSS advocates’ institutional embeddedness	Weak	Strong
Software sector cohesion	Weak	Weak
Software licensing policy outcome	Favourable to use of PS	Favourable to use of F/OSS

6 Conclusion

The research has investigated why outcomes in software licensing policy varied in the way they did across Argentina and Brazil through the 2000s. Software may be licensed under terms that are either proprietary and closed which prevent appropriation of underlying software source code or ‘free’ or ‘open’ which allow appropriation. By affecting the way in which software is licensed, policy holds both political and economic implications for development due to the potential this technology offers for technological self-reliance as well as its importance to the generation of wealth.

In the 2000s, some governments began promoting F/OSS. Media commentary and academic discussion has suggested that this policy was associated with left-wing political bias. From patterns of policy variation across Latin America, F/OSS promotion appeared to co-vary with radical leftist governments. In view of this putative association, policy outcomes in Argentina and Brazil between 2003 and 2010 present a puzzle. During this period, Argentinean governments were popularly viewed as radical and leftist, yet they favoured PS across a range of policy areas. In Brazil, governments were leftist but widely regarded to be more moderate and wedded to liberal norms, yet they exhibited staunch promotion of F/OSS.

The contrasting policy outcomes analysed here are a consequence of how the lobbying capacities of those actors that surround software licensing were affected by institutions and the way in which interests were organised. Where the lobbying capacity of F/OSS advocates was mediated by the extent to which they participated – or were ‘embedded’ – within institutions, that of PS advocates was conditioned by the level of concentration within the organisation of the software sector.

The structure of incentives for collective action around software licensing together with the economics of information goods mean PS advocates’ lobbying power – and consequently, their capacity to translate their preferences into policy – will ordinarily be far greater than that of F/OSS advocates. This suggests that policy will typically favour PS instead of F/OSS. By mediating actors’ capacities and lobbying power, surrounding

configurations of interests and institutions might reverse the balance of power ordinarily to be found between PS advocates and F/OSS advocates, raising the likelihood of F/OSS promotion. Institutions may allow weak actors opportunities to become stronger by providing resources that lower collective action costs and ties that offer access to political decision-makers. Where F/OSS advocates are embedded within institutions such as incumbent political parties and the state, they may thus find it easier to mobilise support and lobby politicians. At the same time, the way in which interests are organised may attenuate the power of strong actors by inhibiting their capacity to mobilise and coordinate support. Where the software sector is characterised by lower levels of cohesion, the lobbying power of PS advocates may be diminished in this way.

I have argued that the divergence in policy outcomes in Argentina and Brazil post 2003 corresponded to changes in F/OSS advocates' institutional embeddedness and software sector cohesion in each country. Pre-2003, policy was favourable to PS in both countries and both F/OSS advocates' institutional embeddedness and sectoral cohesion were weak. Fragmentation in the organisation of the software sector in Brazil and limited development of institutional representation of the sector in Argentina meant that in both countries, PS advocates' lobbying capacity was impeded by the limited political weight of the sector overall and limited opportunities to coordinate sectoral interests. Yet whilst PS advocates' lobbying capacity was reduced, the absence of pre-existing policy intervention over software licensing – due to the fact that awareness of choice in software licensing was only just emerging with awakening recognition of F/OSS – meant policy favoured PS by default, due to PS' market dominance. Although mobilisation around FOSS promotion emerged, F/OSS advocates were isolated from government and unable to translate their preferences into policy. In Brazil, embeddedness within the state at the subnational level allowed F/OSS advocates some success in mobilising support, yet these actors possessed few opportunities to lobby politicians incumbent at the national level for lack of partisan ties. In Argentina, further to lacking ties to politicians, F/OSS advocates were able to mobilise only small numbers in the face of differences amongst the fractious F/OSS community.

I have contended that policy continued to favour PS under the Kirchner governments because of a strengthening of cohesion in the organisation of the software sector, whilst F/OSS advocates' embeddedness within the government and incumbent political forces

remained weak. Aggregation of software sector interests largely beneath a single business association facilitated sectoral organisation, enabling the sector to coordinate common positions that strengthened its bargaining position vis-à-vis the government. Concentration of sectoral interests also boosted PS advocates' capacity to coordinate sectoral representation and present their narrow interests as coherent with the wider interests of the sector as a whole. The relatively strong lobbying position of sectoral actors, together with the presentation of sectoral interests as coherent with PS, meant sectoral actors came to play an important role in policymaking and that politicians were persuaded to adopt policies that favoured PS. Whilst PS advocates' lobbying power increased, F/OSS advocates' influence within the government was weak. Generally shunning association with mainstream political parties and the government, F/OSS advocates were remote from political decision makers and possessed few opportunities to lobby those responsible for policy directly. F/OSS advocates' ability to mobilise resources was also limited, disinterest in politics in the wider F/OSS community and differences between the groups that sought F/OSS promotion resulting in competition for scarce resources. Amongst F/OSS advocates, leftists alienated business actors whilst liberals, wary of the leftist government, undermined possibilities to forge bonds with incumbent political forces and government affiliated social movements. With F/OSS advocates unable to mobilise support in the wider population, politicians faced few incentives for promoting F/OSS and low tradeoffs for maintaining policies which favoured PS.

I have asserted that F/OSS came to be promoted by the Lula governments as a result of a strengthening of F/OSS advocates' embeddedness within the government whilst cohesion in the software sector remained weak. In contrast to their counterparts in Argentina, Brazilian F/OSS advocates were able to gain appointments high up in the government due to their affiliation with the incumbent *PT*. Partisan ties and proximity to political leaders allowed Brazilian F/OSS advocates to persuade leading members of the executive to back the promotion of F/OSS. Having secured this backing, F/OSS advocates were able to mobilise support for F/OSS throughout the government, precipitating F/OSS initiatives across a range of policy areas. Embeddedness within the incumbent *PT* also facilitated F/OSS advocates' ability to mobilise wider support by securing access to resources. By mobilising a broad coalition encompassing the private sector, social movements, universities and other societal actors, F/OSS advocates

signalled to politicians that there existed interest in F/OSS in the wider population, raising politicians' incentives to promote F/OSS. At the same time, fragmentation in the software sector reduced the capacity of PS advocates to stymie the uptake of F/OSS promotion. With several representatives, the voice of the sector was generally incoherent, reducing the capacity of sectoral actors to lobby the government. Representation of sectoral interests by several actors also left PS advocates relatively isolated within the sector as PS marked a priority for only one business association. Isolation reduced PS advocates' capacity to present their narrow interests as coherent with those of the sector overall as well as mobilise and coordinate the wider sector.

Research Contributions

In this thesis, I have made two principle contributions to academic knowledge. The first has been to demonstrate through comparative analysis the importance of configurations of interests and institutions in explaining software licensing policy. This has allowed me to address a gap in understanding of why software licensing policies vary across developing countries in the way that they do. Existing scholarship has tended to emphasise the role of agency and ideas in explaining these policies. Such an emphasis is implicit in Schoonmaker's (2007; 2009) analyses of the politics surrounding the Brazilian government's promotion of F/OSS, which focus upon rationale and goals in explaining F/OSS promotion. Shaw (2008; 2011) in explanations of F/OSS advocates' ability to precipitate F/OSS promotion in Brazil on the basis of framing, these actors' technical, managerial and political expertise and their ties to politicians and other actors, similarly stresses the role of agency and ideas. The same emphasis is present in Kapczynski's (2008) explanation of mobilisation around F/OSS more generally on the basis of framing. Although insightful, these explanations leave questions unanswered as to why policymakers were persuaded to act upon certain ideas over alternatives when making policy choices, or, why certain actors prevailed over others in translating their ideas into policy. Privileging the role of agency and ideas, these explanations omit mention of other factors that may be equally, if not more important in shaping policy outcomes. By identifying associations between policy outcomes and conditions relating to institutions and the organisation of interests I have shown how these factors may be more important in driving policy outcomes than ideas and agency alone.

The second contribution I have made has been to explicate the *mechanisms* by which interests and institutions may affect policy. Through within-case process tracing, which complements comparative analysis by offering an independent means of establishing causal inference, I have provided evidence to show *how* these causal factors operate and interact with one another, allowing me to demonstrate the ways in which *both* interests and institutions may affect policy simultaneously. In identifying and explicating how causal factors operate, I have provided insights that may be tested or inform hypotheses in analyses of policy more broadly.

In addition to contributing to understanding of variation in software licensing policies across developing countries, I have also addressed the paucity of information surrounding the realities of policies by providing empirical evidence collected through extensive fieldwork. Where software licensing policies are discussed in academic writing generally, there is a heavy reliance upon online and journalistic sources that may be inaccurate or misleading (see Lerner and Schankerman, 2010: 157; Weber and Bussell, 2005: 76).

Although the software licensing policies of Brazil have received scholarly attention, those of Argentina feature little in academic discourse. The picture painted of Argentinean policies by the media has often been misleading and confusing. At the end of the 2000s, the technology Web site CNET, published a story suggesting the Argentinean government was considering promoting F/OSS (see Asay, 2008). From local reporting, it was unclear whether the government favoured such a policy or not, as official statements often appeared inconsistent with government actions. Perhaps the starker reflection of these inconsistencies was the Cabinet Chief's assurances that free software constituted a state policy (CanalAR, 2010), shortly after president Cristina Fernandez signalled government enthusiasm for working with PS by receiving Microsoft CEO Steve Ballmer in a highly publicised meeting in the Casa Rosada (Cortina and Torres, 2010). In contrast to reports that purported the Kirchner governments were seriously considering promoting F/OSS, I have found that these governments instead resisted such promotion, instead adopting policies that favoured PS.

The rest of this chapter is devoted to discussing in greater detail the principle contributions, observations and ramifications of this research.

The Importance of Interests and Institutions

Through spatial and longitudinal comparisons of Argentina and Brazil, I have provided findings to suggest that outcomes in software licensing policy may be driven by F/OSS advocates' institutional embeddedness and software sector cohesion. Moreover, my findings suggest that different combinations of these causal factors are associated with particular policy outcomes. Although the research findings are specific to the cases that have been studied, they permit contingent generalisations. From the insights that within-case analysis has offered into the operation of causal factors, it is possible to comment upon how different combinations of these factors affect policy whilst discussing covariation.

It will be noted that pre-existing conditions may play an important role in shaping policy outcomes in view of the way policy choices in Argentina were conditioned through path dependency. In focusing upon cases where both F/OSS advocates' institutional embeddedness and software sector cohesion start off weak in T1 and where one of these factors subsequently becomes stronger in T2, the research offers limited insight into how different configurations of these variables in T1 might affect the way in which later changes to configurations affect policy outcomes, if at all. Moreover, the possibility for the dynamics surrounding software licensing and the relevance of the issue to change at an international level over time, suggests that policies may vary through time even where the combinations of factors investigated in this research remain constant at the national level.

Figure 6-1 shows covariation between the two explanatory factors and policy outcomes in both cases over two time periods. In T1, weakness on both causal factors co-varied with a policy that was favourable to PS. This combination makes it more likely that policy will favour PS as it neither diminishes nor accentuates the power asymmetries that ordinarily favour PS advocates over F/OSS advocates. In T2 Argentina, a combination of strong software sector cohesion and weak embeddedness of F/OSS advocates within institutions resulted in the same policy outcome as in T1. This

configuration makes it more likely that policy will favour PS because strong software sector cohesion strengthens the lobbying power of PS advocates, accentuating the power asymmetries between them and F/OSS advocates and reinforcing policy bias in favour of PS. In T2 Brazil, a combination of strong embeddedness of F/OSS advocates within institutions and weak software sector cohesion co-varied with a policy outcome that was favourable to F/OSS. Here, the combination makes it more likely policy will favour F/OSS because by strengthening the lobbying power of F/OSS advocates – for whom such power is generally weak – whilst limiting that of PS advocates, it may be sufficient to reverse the balance of power that typically exists between PS advocates and F/OSS advocates.

Figure 6-1 – Covariation between Configurations of Causal Factors and Outcomes in Software Licensing Policy in Argentina and Brazil between 1999 and 2010

	T1 (1999-2002)	T2 (2003-2010)	
	Argentina/Brazil	Argentina	Brazil
F/OSS advocates' institutional embeddedness	Weak	Weak	Strong
Software sector cohesion	Weak	Strong	Weak
Policy outcome	Favourable to use of PS	Favourable to use of PS	Favourable to use of F/OSS

Insights into How Interests and Institutions Shape Policy

Further to identifying associations between policy and configurations of interests and institutions, the research has shown *how* these factors affect policy by explicating the mechanisms by which they operate, interact with other variables and work in parallel to yield policy outcomes. Through within-case process tracing, I have provided evidence to delineate the causal pathways that link independent variables and policy outcomes. This evidence has not only corroborated the associations suggested by the comparative analysis but also allowed me to show how *both* F/OSS advocates' institutional

embeddedness and software sector cohesion matter to policy outcomes. Below I summarize the contributions the research has made to understanding of the ways in which interests and institutions influence policy and how these factors may interact with ideas.

The Role of Interests

The research has emphasised the role that surrounding configurations of interests may play in shaping actors' ability to influence policy by explaining how fragmentation in the software sector may limit PS advocates' capacity to mobilise and coordinate sectoral interests. The business interests that PS advocates encompass – including amongst the largest corporations in the world – possess a formidable capacity to influence policy, yet it has been shown that their power may be attenuated by weak cohesion in the organisation of the software sector. Moreover, as discussed above, the research suggests that where weak sectoral cohesion coincides with F/OSS advocates' strong participation within the state, it may be sufficient to offer F/OSS advocates the upper hand in shaping policy.

This finding underlines the importance of interest related factors in explaining business' influence over policy. Due to market concentration, downstream linkages and heavy dependence on imported PS in developing countries, it might be expected that ordinarily, multinational PS firms would be able to mobilise software sectors in developing countries through their economic position. These firms might also be expected to exert a powerful influence over policymaking because of their structural position as leaders of the global industry in knowledge goods. I have presented evidence to show that by conditioning these firms' ability to coordinate sectoral interests, shape their presentation and capture political benefit from economic activity linked to software albeit unassociated with PS, the organisation of the sector may play a more important role than economic or structural power in conditioning their lobbying power.

The Role of Institutions

My research has contributed to understanding of the role institutions may play in shaping policy choice by mediating the aggregation of interests. The heterogeneous and diffuse interests that surround F/OSS together with low awareness of F/OSS in the wider public suggest that F/OSS advocates are ordinarily likely to possess little influence over policy for their limited ability to mobilise resources and support. The findings of this thesis suggest that through institutions, ordinarily weak actors such as F/OSS advocates may overcome the costs of collective action and transform their strength through institutional resources. Institutions have also been found to shape actors' capacities to lobby policymakers as a source of ties that might provide access to those that decide policy. Institutions may also influence PS advocates' lobbying power by affecting cohesion within the software sector. I have shown that by involving business associations in policymaking and offering these actors access to politicians, the state may foster greater sectoral cohesion by allowing these associations to provide selective benefits, in turn bolstering PS advocates' capacity to mobilise and coordinate sectoral interests.

I have contributed to discussion in the field of comparative political economy of how institutions may affect policy choice and politics more broadly by elucidating the ways in which collective action may emerge *out of* the state. In the comparative political economy literature, the state and its institutions are recognised as important in conditioning patterns of association and actors' abilities to translate their preferences into policy (Gourevitch, 1986; Haggard, 1990; Hall, 1997; Schmitter and Streeck, 1999; Schneider, 2004; Streeck and Schmitter, 1985). Yet despite acknowledgement that actors within the state may instigate collective action of their own accord (Schmitter and Streeck, 1999: 31) and seek to influence policy independently of wider societal interests (Weir and Skocpol, 1985), the actors that form the focus of discussion tend to be distinct from the state and attempt to influence policy from outside it. I have highlighted the role that actors situated within the state may play in mobilising interests autonomously and shaping policy to match preferences held independently of groups in wider society. This finding calls for greater attention to be paid towards state actors as

independent drivers of association and policy choice and the ways in which their institutional settings enable or curtail their abilities to achieve objectives.

The research has provided new perspective on the state's motivations for shaping patterns of societal association. In existing discussion of state mediation of interest representation in comparative political economy – discussion which stems from the literature on corporatism – mediation tends to be motivated by political concerns of reducing opposition, securing support or ameliorating social conflict (Wilson, 1983), management and regulation of the market (Streeck and Schmitter, 1985; Wilson, 1983) and goals more narrowly associated with policymaking, such as attaining information, improving policy implementation or compliance (Schmitter and Streeck, 1999; Schneider, 2004). Recent study has found that the national state might even mobilise societal interests with a view to ensuring sub-national levels of the state implement national policies where political authority has been decentralized (Rich, 2013). I have found the state might mobilise societal interests with a view to harnessing their productive capacity as a source of knowledge and labour – a motive that starkly contrasts those discussed in the existing literature on comparative political economy. In Brazil, government sought to mobilise the F/OSS community, private sector and society more widely with a view to tapping the benefits of knowledge sharing and peer production. Such mobilisation might be conceived as a form of public good provision. Besides reducing the costs of adopting and developing F/OSS within the state – itself a public benefit – this mobilisation reduced the costs to the wider population of adopting and using F/OSS by removing obstacles to collective action and coordination, thus facilitating access to knowledge. Whilst state mediation of interests around F/OSS in Brazil reflects a symbiosis between state and society to be found in forms of such mediation that have previously been discussed, it represents a radical departure from previously discussed forms in terms of the character this symbiosis takes. Reflecting the logic of peer production, this 'new' symbiosis lacks emphasis upon controlling or extracting political support from society on the part of the state. The object of the exchange is to obtain an economic benefit, yet due to the emergent properties of peer production, each side stands to gain more than they put in. Bearing important development ramifications and embodying an innovative alternative to neoliberal prescriptions on how developing countries might capture the benefits of ICT, state

mobilisation around F/OSS in Brazil deserves further investigation to better understand its dynamics and benefits.

In the case of both F/OSS advocates and PS advocates, where institutions facilitate mobilisation by providing resources, it has been found that they might activate positive feedback. By aggregating interests and fostering unity through the resources they provide, the state may strengthen actors' capacity to mobilise and coordinate interests. This in turn may facilitate actors' capacity to obtain additional resources from the state, further strengthening mobilisation. The positive feedback that can occur where mobilisation is strengthened by the state may result in path dependency by entrenching the power of particular interests, thereby increasing their power to block policies they oppose. In Argentina, by involving the software sector in policymaking and offering political access, the government activated a feedback loop that strengthened sectoral cohesion and in turn, PS advocates' lobbying power. By strengthening a pro-PS constituency, the government constrained future policy choices. Whilst official statements suggested the government might have liked to promote F/OSS, the strength of PS advocates prevented this.

The research has demonstrated that actors' capacities are conditioned by the topography of institutional structures and actors' situation in relation to this topography – either outside of or inside institutional structures. The way policy towards software was handled by the state, the way responsibility for software was distributed across areas within the state, the resources and faculties these areas possessed and the character of the institutional links between state actors and the software sector – all these factors mediated the capacities of sectoral actors to influence policy in both Argentina and Brazil. In Argentina between 1999 and 2002, and in Brazil both prior to and after 2003, PS advocates' influence over policy was impeded either by the absence of institutional ties to the state or ties that linked these actors to the state, yet linked them to areas that either lacked sympathy for PS advocates' interests or possessed limited power to determine policy. In Brazil, F/OSS advocates' capacity to translate their preferences into policy was facilitated by their situation or ties to the highest levels of political authority and areas of the state possessing levers over policy connecting to software licensing. Where figures of political authority helped legitimise and mobilise support for F/OSS promotion, areas of the state responsible for administering or formulating

policy towards IT ensured the policy was viable, by carrying it out. The distribution of support for F/OSS and F/OSS initiatives across the Brazilian government together with support from the highest levels of the executive also impeded the capacity of government actors opposed to F/OSS promotion to reverse this policy.

The Role of Ideas

The research contributes to understanding of the way ideas matter to policy choice by explicating the interrelationships between ideational factors on the one hand, and interest and institutional factors on the other, and showing how the impact that ideas might have upon policy is contingent upon surrounding interests and institutions.

I have presented findings that show how interests may condition the effect that ideas might have upon policy by mediating the availability of ideas. In the cases studied, it was the ideas of those actors most successful in mobilising a wider constituency and forging ties with political decision-makers that came to influence policy. In Argentina, where strong cohesion in the software sector facilitated sectoral mobilisation and sectoral representatives forged close ties with politicians, the ideas of sectoral representatives informed policy toward IT generally as well as software licensing. In Brazil, where F/OSS advocates were successful in mobilising the wider public and enjoyed the confidence of senior politicians, F/OSS advocates' ideas influenced policy debate with relation to technology, IP and society generally in addition to software licensing policy.

The research has shown how, as with actors' capacities, the availability of ideas in informing policy decisions is also conditioned by institutional structures and actors' situation in relation to them, or inside them. For F/OSS promotion to emerge, there not only needs to exist support from political leaders but also buy-in from technical personnel to make the policy viable. It has been found that institutional configurations may facilitate or inhibit possibilities for F/OSS promotion to emerge by separating or uniting the necessary desire for such a policy, technical expertise to carry out and implement it and political authority to push its adoption through.

In Argentina, mutual separation of the motivation to promote F/OSS, technical knowledge in IT and political authority reduced politicians' access to ideas and knowledge concerning the political ramifications of software licensing. At the same time, PS advocates' strong participation in policymaking privileged awareness and understanding of software licensing in terms of the financial costs associated with adopting and using software. This imbalance in the supply of ideas privileged a framing of F/OSS as 'free beer', in which F/OSS was understood as little more than a means to avoid paying license fees for PS.

In Brazil, the motivation to promote F/OSS, technical knowledge in IT and political authority were unified, providing politicians access to ideas and knowledge relating to the political ramifications of software licensing. At the same time, PS advocates' relatively weak influence over policy diminished the prevalence of their presentation of the software licensing debate. The balance in the supply of ideas in Brazil privileged a framing of F/OSS as 'free speech', in which F/OSS was understood as a means to promote democracy and autonomy.

The research has presented findings to suggest that institutions influence opportunities for political mobilisation through the ideas that are embedded within them. In Brazil, F/OSS advocates were able to mobilise support for F/OSS promotion within the state by framing F/OSS in the context of the ideas, values and goals of an incumbent political party. It has also been found that the ideas embedded within institutions influence policy choices by conditioning which choices are viewed as attractive. In Brazil, politicians viewed F/OSS promotion as desirable because of the perceived coherence between the philosophy of free software and partisan ideas and goals.

As well as showing how interests and institutions may affect the *propensity* of ideas to influence policy choices and mobilisation, the research has also demonstrated *how* ideas may shape opportunities for mobilisation. Through framing, ideas influenced the success of wider societal mobilisation around F/OSS promotion in both cases examined. Through framing, Brazilian F/OSS advocates exploited ideas to overcome the informational asymmetries that militate against the recognition of interests in F/OSS within the wider public. By framing F/OSS in the context of values and ideas such as democracy and empowerment, F/OSS advocates were able to garner the support of the

wider public, including poorer sections of society that represented important constituencies for their size. In Argentina, F/OSS advocates' association with conservative political forces linked with the country's economic woes at a time of crisis, served to reduce the likelihood of wider support for F/OSS promotion. By coming to be associated with political forces widely viewed as inimical to democracy and social mobility, F/OSS was framed in a way that served to alienate wider public support, especially amongst poorer sections of the population that represented an important constituency.

The research has provided insight into the way in which ideas themselves might affect policy choice. In Argentina, the apparent utility of promoting F/OSS was low in the context of a presentation of the software licensing debate as one about the financial costs of using software and a framing of F/OSS as 'free beer'. Where software was socially accessible due to the prevalence of pirate PS and PS vendors had the capacity and faced incentives to lower their prices where software was used within the state, viewing software licensing through the prism of financial costs meant there was little apparent utility in promoting F/OSS.

In Brazil, the apparent utility of promoting F/OSS was high in the context of a presentation of the software licensing debate as one about the political dimensions of software as well as the wider economic benefits of peer production and a framing of F/OSS as 'free speech'. With cognisance of the way in which software intersected democracy and autonomy, F/OSS was recognised as offering clear benefits over PS. In this context, PS advocates' arguments, based around the financial costs of using software, possessed little purchase.

Insight into How Interests and Institutions may affect Software Licensing Policy in Combination with Political Bias

The insight the research provides into how different combinations of F/OSS advocates' institutional embeddedness and software sector cohesion affect policy informs hypotheses as to the way in which these factors might interact with political bias. From policy outcomes in wider Latin America, it appears that the importance of political bias as a driver of policy outcomes tends to increase where political bias is more pronounced

either towards the left or the right. Where political bias is less pronounced in either direction, the factor appears less important in driving policy outcomes. It would seem that where political bias is strong, ideas and agency are maybe the primary factors in explaining policy outcomes and that where it is weak, configurations of interests and institutions replace ideas and agency as the main explanatory factors.

If such an interaction exists between ideas and agency on the one hand and interest and institutional factors on the other, it is possible that the configurations of F/OSS advocates' institutional embeddedness and software sector cohesion that existed in Argentina and Brazil post 2003, in both countries militated against the policy outcomes that political bias in these countries may have otherwise yielded.

Under the Kirchners, it could be said that a strengthening of software sector cohesion countered the effects of a 'wrong left' political bias that might have otherwise precipitated F/OSS promotion, even in the absence of F/OSS advocates' strong institutional embeddedness. The instigation of F/OSS initiatives by government IT administrators and official declarations in favour of F/OSS suggest that had PS advocates' lobbying power not risen in T2, F/OSS might well have been promoted by the Kirchner governments.

If the balance of power between PS and F/OSS advocates meant F/OSS promotion was resisted under the Kirchner governments in spite of a leftist political bias that suggested F/OSS would be promoted, the balance of power between these two sets of actor during the Lula governments meant F/OSS *was* promoted in spite of a more market-orientated political bias that suggested the policy would be resisted. Under the Lula governments, it could be said that a strengthening in F/OSS advocate's institutional embeddedness countered the effects of a 'right left' political bias that might otherwise have resulted in the maintenance of policies favourable to PS. Had F/OSS advocates not enjoyed strong ties to leading members of the executive, there is little to suggest that F/OSS promotion would have been taken up as a policy.

If ideas and agency appear to take on greater importance in driving policy outcomes where political bias is more pronounced, they are likely to matter to policy under such circumstances for different reasons, depending upon whether such bias is to the left or

the right. Where governments reflect a strong orientation to the left, F/OSS promotion may be more likely because such governments find (or at least perceive) themselves to be in a stronger position politically vis-à-vis business actors than those that reflect a more moderate leftwing bias. To win and maintain power in the face of opposition from pro-market sectors, such governments may be expected to possess a stronger capacity to resist opposition from PS advocates – or else care less about doing so – than those that are more moderate. The radical leftist governments of Hugo Chávez in Venezuela and Rafael Correa in Ecuador – those that went furthest in South America in forcing the adoption of F/OSS – governed from positions of strength. Both presidents enjoyed popular mandates, winning elections by significant margins, and benefited from the disarray that characterised party systems in their respective countries (Conaghan, 2011; López Maya, 2011). Moreover, they also benefited, albeit to a lesser degree in the case of Correa in Ecuador, from oil revenues at a time when oil prices were high (Panizza and Philip, 2014; Weyland, 2011), strengthening their capacity to ward off opposition both at home and abroad. Governments with a strong leftist bias may therefore reflect a higher propensity to promote F/OSS not just because of consistency between partisan ideas and the benefits that F/OSS might provide. Perhaps a more important factor in driving policy outcomes in such contexts concerns these governments' political strength, such that governments promote F/OSS 'because they can'.

Where governments reflect a strong orientation to the right, the logic contained within ideas themselves is likely to be the principle driver of policy choices. Even where the political ramifications of software licensing are recognised by politicians of a more liberal or conservative disposition, these ramifications may be of less concern for the values and ideas that these politicians hold. Conservative politicians are more likely to subscribe to a narrower, institutional definition of democracy such that there exists little appreciation for the notion of expanding democracy to software. Politicians on the right are also more likely to be closely aligned to the US, such that independence from US interests does not represent a priority. Although right of centre legislators submitted F/OSS related legislative proposals at the national level in both Argentina and Brazil – none of which were approved – these projects offer little indication as to whether a right of centre executive would have backed them. Whilst right of centre politicians sitting in legislatures have interests in submitting legislative proposals that raise their political

profile, these politicians are unlikely to support policies that upset constituencies that typically support right of centre political forces, such as the business constituency, when in power. As the politicians that submitted F/OSS related legislative proposals in Argentina and Brazil were sitting in legislatures at the time and their projects failed to gain approval, it remains untested as to whether they would have pushed these proposals through had they been in power. Over and above whether rightist politicians see merits in F/OSS, their ideas on the role of the state suggest they are unlikely to advocate market interference on behalf of promoting F/OSS. Furthermore, as has been touched upon in Chapter 2, on the basis of free market arguments to which liberals are likely to adhere, F/OSS should require no assistance from the state if it is cheaper and technically superior to PS.

Insight into How Policy May be Affected Where Both F/OSS Advocates' Institutional Embeddedness and Software Sector Cohesion are Strong

Due to the power asymmetries between PS and F/OSS advocates, it may be speculated that as in the case where both F/OSS advocates' institutional embeddedness and software sector cohesion are weak, policy is also more likely to favour PS where both these factors are strong. However, unlike the scenario where both factors are weak – a scenario in which there is a lower likelihood that politicians will appreciate benefits in promoting F/OSS due to informational asymmetries – where both factors are strong, politicians are more likely to be savvy of the possibilities F/OSS offers because there is a greater likelihood that they will have been in contact with and exposed to the ideas of F/OSS advocates. In considering how such a configuration might affect policy outcomes, it may be instructive to consider the case of Peru.

Whilst detailed empirical knowledge of the Peruvian case has not been gathered, from academic discussion (Chan, 2004), an interview with a Peruvian F/OSS advocate (Yucra, 2011) and informal discussions with several other participants in the Peruvian F/OSS community, it is known that F/OSS advocates actively engaged with the drafting of legislative proposals for F/OSS to be promoted in the early 2000s. These proposals prompted opposition from the US ambassador to Peru as well as from Microsoft (Chan, 2004). Yet rather than failing to reach a vote – as occurred with projects in Brazil as well as in Argentina – the Peruvian project was eventually approved and signed into law

(Congreso de la República del Perú, 2005; Presidencia de la República del Perú, 2006), albeit after significant revision. Instead of promoting F/OSS, the eventual law instead demanded observation of neutrality where software was procured or adopted by government, including consideration of licensing. Intriguingly, the law was applauded by both the F/OSS community (APESOL, 2005) – which described it as “favourable to F/OSS” – and IT industry associations responsible for representing PS firms (Katopis and Galan, 2009), suggesting both F/OSS and PS advocates regarded the law as coherent with their interests. As argued in Chapter 1, a neutral policy is unlikely to make a significant difference to the prevalence of different licensing schemes. By definition, such a policy seeks to ensure decisions are based on the market and as PS firms generally dominate the market, they would appear to be the primary beneficiaries. The practical upshot of an explicitly neutral policy is likely to be equivalent to a policy characterised by non-action – an implicit neutral stance – or one which actively promotes PS albeit without expressing the fact. An explicitly neutral policy does however differ to these other policies in that it acknowledges software licensing as an issue.

Wider Application of Explanatory Framework

Although the theoretical framework adopted in this research has been used to explain outcomes in software licensing policy, it may be used as a basis for analysing policy choices more widely. Whilst power asymmetries between activists and business interests may be particularly pronounced in the case of software licensing because of the high levels of concentration that tend to characterise markets in information goods, the balance of power between these two sets of actor – and, likewise, between consumers and producers (Gourevitch, 1996) – typically tends to be asymmetrical because of the costs of collective action as well as informational asymmetries. In view of the impact that surrounding configurations of interests and institutions might have upon these dynamics, my theoretical framework is suited to analysing policy in other areas that exhibit struggle between activists or consumers and business interests.

With regard to software licensing policy specifically, the relationships between policy and explanatory factors uncovered in this study, together with those hypothesised to

exist between interest and intuition based factors and political bias, may be tested in a large-N cross-case study.

Research Implications

The power asymmetries to be found between activists and business actors more widely mean the research findings also bear relevance for activism in general as well as that relating to F/OSS and related issues at the juncture of informational goods, technology and society. The role that institutions have been shown to play in bolstering F/OSS advocates' ability to influence policy suggests activists' generally stand to gain from participating within them.

With regard to F/OSS specifically, although partisan bias may affect choices in software licensing policy by influencing whether the opportunities F/OSS provides are deemed valuable and whether or not the state should intervene in promoting F/OSS and if so, how, F/OSS advocates' institutional embeddedness is likely to play a key role in deciding whether politicians recognise opportunities in F/OSS in the first place.

It is implicit in emphasising the importance of institutional embeddedness to F/OSS advocates' chances of translating preferences into policy that winning over the executive branch of government largely determines whether these actors will be successful in achieving their goals. The executive appears all the more important in this respect in light of the research findings that F/OSS advocates were unable to advance their policy goals through the legislative branch in either Argentina or Brazil. The failure of F/OSS related legislative projects to gain approval at the national level in Argentina and Brazil reflects the odds against F/OSS promotion emerging from the legislative branch. The institutional checks and balances that exist within legislatures and between the legislative and executive branch, together with multinational PS vendors' ability to influence legislative actors through lobbying, suggest that without the backing of the executive and strong support within the legislature, congressional projects have little hope of succeeding. Outside the executive's capacity to veto legislation, its role in implementing policy mean its support is essential if F/OSS is to be promoted.

My findings suggest that political parties are likely to represent especial opportunities for actors seeking F/OSS promotion because they might raise the likelihood that politicians will reciprocate on the basis of partisan trust. The extent to which F/OSS advocates will be able to realise their goals through political parties is contingent on many factors, not least their situation within parties and the way in which the party itself operates. Yet if political parties present opportunities for F/OSS advocates to advance their aims, they may also present threats. In Argentina, association with political forces that were unpopular only served to undermine wider mobilisation of support for F/OSS. There is a possibility where F/OSS promotion comes to be identified as a partisan project, that F/OSS promotion is resisted or dropped where opposing political forces hold or take power.

Policy Implications

The research findings suggest that whilst stronger state capacity in the area of IT administration might enhance governments' ability to adopt F/OSS autonomously (i.e. without the need to buying in IT solutions from the private sector), weak capacity in this area does not preclude the state's capability to do so. Although state capacity contributed to the emergence of F/OSS promotion in Brazil – institutions with technical personnel increasing the potential for F/OSS to be developed and deployed in-house – promotion was facilitated by organisational innovation in the guise of the *PSL* rather than state capacity *per se*.

In RS, despite the state capacity that existed, the *PSL* was launched to facilitate the adoption and development of F/OSS by harnessing the benefits of knowledge sharing and peer production. The initial objectives of the *PSL* were comparable to those of the *FRI* in Argentina, which played a similar role, albeit restricting the pooling of knowledge and peer production to the confines of the state. The fact that both these initiatives were conceived in response to resource shortages suggests they were motivated out of weak rather than strong institutional capacity. In the case of the *FRI*, which was instigated in a context of massive cuts to state spending in the lead up to one of the worst economic crises of recent times, F/OSS was viewed as an opportunity to overcome acute resource shortages. The examples of the *PSL* and *FRI* and the setting of these initiatives in contexts in which state capacity was relatively weak signals that even

governments with weak institutional capacity might extract benefits from F/OSS through organisational initiatives to promote knowledge sharing and tap peer production.

As already touched upon above, the case of Brazil is also informative in demonstrating how the state might utilise F/OSS to garner wider development benefits. The example of the *FISL* shows how the state might encourage synergies between promoting economic activity, stimulating research and development, advancing education more widely and improving the efficiency and effectiveness of the state.

Software Licensing and Development

At the time of writing, in the second decade of the twenty-first century, F/OSS no longer captures the headlines in the way that it did in the 2000s. Yet, the bearing software licensing holds for development is greater than ever. As ICTs continue to be promoted as a source of empowerment and welfare in developing countries, the degree to which ICTs actually bring about empowerment and improve welfare will hinge upon the way in which software is licensed. As software ever increasingly underpins the operation and functions of the state, productivity of the economy, technological and scientific advancement and social interaction, the rules inscribed within software are coming to embody programmes for development itself. By controlling access to these rules and by extension the ability to formulate them, software licensing determines whether the shape and meaning of development is determined by developing countries themselves or imposed from outside.

The centrality of software to the operation of technology generally means that software licensing determines whether those who use and who are subject to technology may mould it to their own design or work within the parameters set by someone else; it determines whether users of technology take an active role in mastering, inventing and producing technology for themselves or remain automaton consumers. Ultimately, it determines whether people control technology or technology controls them.

In the wake of Stuxnet²⁶ and the Snowden revelations, the ramifications that software licensing holds for sovereignty have never been more apparent. Snowden's revelations have also highlighted the implications software licensing bears for human rights, civil liberties and democracy. As software comes to pervade more and more areas of daily life, the possibilities that software offers to monitor, track and regulate populations mean opportunities for social surveillance and control have never been greater. Where software is used by organisations and institutions – not least the state – and underlying source code is licensed in a way that prevents public oversight, there is no way of holding organisations and institutions to account. When populations and social behaviour may be more effectively controlled through software code than through any legal institution, if software code is not subject to public scrutiny then democratic institutions are meaningless. With software increasingly undergirding social activity and the state's capacity to govern, freedom and democracy hinges upon the way in which software is licensed.

Whilst proprietary licensing schemes present a fundamental threat to autonomy, freedom and democracy, possibilities for users of software to move away from PS have never been greater. As the range of software licensed under free/open source terms constantly widens and the quality and usability of this software perpetually improves, the costs of switching to F/OSS are lower than ever. Whilst for end users these switching costs were sometimes significant at the beginning of the 2000s, in the mid 2010s it is possible to perform all general computing tasks using F/OSS that supplies the same functionality and ease of usability to be found in equivalent PS. For institutional users of IT, as demonstrated by the examples of the *PSL* and *FRI*, knowledge sharing and peer production offer opportunities to adopt and develop F/OSS even where technical knowledge and resources are scarce.

²⁶ A piece of software allegedly developed by the US and Israel to disrupt Iran's nuclear programme (Sanger, 2012; Times of Israel, 2013; The Guardian, 2013).

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8 Appendix 1 – Software licensing policies and initiatives in Latin America

Note: All policies and initiatives listed are national government level.

Dagger indicates a *de facto* policy, where a statement of intent, action or inaction raises clear and direct implications for the way in which software is licensed yet where acknowledgement of these implications may be absent.

Italics denote Spanish or Portuguese language.

ID	Country	Institution / Agency	Name	Type	Description	Date
1	Argentina	<i>Secretaría para la Tecnología, la Ciencia y la Innovación Productiva/Secretaría de Comunicaciones</i>	<i>argentin@internet.todos</i> [†] (subsequently <i>Programa Nacional para la Sociedad de la Información</i>); <i>Centros Tecnológicos Comunitarios</i>	Social access to ICTs	Telecentre project involving PCs with Microsoft Windows installed. 1,350 centres were planned throughout Argentina. ¹	1999 – 2010
2	Argentina	<i>Secretaría de Ciencia, Tecnología e Innovación Productiva, Banco de la Nación</i>	<i>Argentina Digital</i> [†]	Social access to ICTs	Scheme to offer PCs on preferential rates of credit to facilitate social access to ICTs. The PCs came with Microsoft Windows 98 installed. ²	2000
3	Argentina	<i>Ministerio de Trabajo, Empleo y Seguridad Social</i>	<i>Plan Mas+</i> [†] (2006-7); <i>Plan Entertech</i> [†] (2006-7); <i>Plan InverTI en Vos</i> [†] (2007); <i>Plan Entertech II</i> [†] (2008); <i>Plan Becas CTRL-F</i> [†] (2009-11); <i>laboratorios informáticos</i> [†] (2010)	Economic	Several initiatives in which the MTEySS worked with CESSI, Cisco, IBM, Microsoft, Oracle and Sun Microsystems to offer training courses in programming and software development. The courses encompassed training in the proprietary technologies of the firms listed. Through the ‘ <i>laboratorios informáticos</i> ’ initiative, the MTEySS offered training in IT skills to facilitate IT literacy in the general workforce. The training offered was based on Microsoft’s proprietary software. ³	2006 – 2010

ID	Country	Institution / Agency	Name	Type	Description	Date
4	Argentina	<i>Ministerio de Educación, Ciencia y Tecnología</i>	<i>Alianza por la Educación</i> [†]	Education	Agreement signed with Microsoft to train teaching staff in IT literacy and use of IT for pedagogic purposes, using Microsoft software. This agreement was signed in relation to a computers for schools initiative. The computers were dual boot, with both Microsoft Windows and Linux installed. ⁴	2004
5	Argentina	<i>Presidencia de la Nación, Jefatura de Gabinete de Ministros, Ministerio de Educación, Administración Nacional de la Seguridad Social</i>	<i>ConectarIgualdad</i>	Education	Computers for schools initiative (Intel Classmate netbooks). The netbooks were dual boot, with Microsoft Windows XP and Linux Ubuntu installed. ⁵	2010
6	Argentina	Executive	Technological neutrality	Government software use	Whilst the executive has not issued an official statement, there is consensus amongst actors surrounding the issue of software licensing, including actors situated within the government, that the government favours a policy of neutrality towards the way software is licensed. Debate over the licensing of software used within the national government commenced in 2000, with the submission of a legislative proposal to mandate the use of F/OSS in the public sector (5613-D-00). In light of this debate, it may be assumed that from the beginning of the 2000s, the government has adopted a neutral stance consciously. This stance was enunciated in a 2007 legislative project submitted by a ruling party legislator (5043-D-2007). ⁶	2000 – 2010
7	Argentina	<i>Ministerio de Relaciones Exteriores</i>	WSIS declaration	Foreign policy	The Argentine delegation to the World Summit on the Information Society opposed mention of free software in summit declarations. ⁷	2003/2005
8	Argentina	<i>Banco de la Nación (and other Banks), Ministerio de Economía</i>	<i>Programa Mi PC</i> [†]	Social access to ICTs / Economic	Scheme to offer PCs on preferential rates of credit to facilitate social access to ICTs. Initiative also involved the local assembly of hardware with a view to stimulating local economic activity. The initiative involved Microsoft and Intel. ⁸	2005

ID	Country	Institution / Agency	Name	Type	Description	Date
9	Brazil	<i>Ministério da Educação</i>	<i>ProInfo</i>	Education	<i>ProInfo</i> , a federal government funded computers for schools initiative, was initiated in 1997 under the government of Fernando Henrique Cardoso. In 2004, under the first Lula government, the PCs were supplied with F/OSS installed. ⁹	2004
10	Brazil	Executive	N/A [†]	Government software use / Economic	Official statements on position unknown; apparently no intervention.	1999 – 2002
11	Brazil	<i>Instituto Nacional de Tecnologia da Informação, Casa Civil</i>	Recommended use of free software	Government software use	A 2003 decree on electronic governance instituted a committee for the implementation of free software within the federal government. An internal memo from the cabinet chief recommending the use of free software was circulated in 2003. ¹⁰	2003 – 2010
12	Brazil	<i>Casa Civil</i>	<i>PC Conectado</i> (later <i>Computador para Todos</i>)	Social access to ICTs / Economic	Scheme to offer computers on preferential credit to facilitate social access to ICTs. The initiative also sought to stimulate economic activity through local hardware assembly. Computers with F/OSS installed were available on cheaper finance than available for computers with PS installed. ¹¹	2005
13	Brazil	<i>Ministério do Planejamento, Orçamento e Gestão (SLTI)</i>	<i>Software Público</i>	Government software use / Economic	Initiative to license software developed on behalf of government available under F/OSS terms with view to harnessing the benefits of peer production and increasing public sector efficiency through software re-use. ¹²	2007
14	Brazil	<i>Casa Civil, Ministério da Cultura, Ministério das Comunicações, Ministério da Ciência e Tecnologia</i> and others	Digital inclusion telecentre projects	Social access to ICTs	Multiple telecentre projects including <i>Casa Brasil</i> (Casa Civil), <i>Pontos da Cultura</i> (MinC), <i>GESAC</i> (MC) and others. The computers in these projects used F/OSS. ¹³	2003
15	Brazil	<i>Ministério da Ciência e Tecnologia (SEPIN, CNPq, FINEP)</i>	<i>Programa de Apoio à Pesquisa e Desenvolvimento Tecnológico em Software Livre</i>	Economic	4 million reales allocated to fund private sector software projects licensed under F/OSS terms. ¹⁴	2003

ID	Country	Institution / Agency	Name	Type	Description	Date
16	Brazil	<i>Ministério das Relações Exteriores</i>	WSIS declaration	Foreign policy	The Brazilian delegation to the World Summit on the Information Society pushed for mention of free software and the opportunities it offers for development to be included in summit declarations. ¹⁵	2003/2005
17	Chile	Executive	Technological neutrality	Government software use	In 2007, the lower chamber of the Chilean legislature issued a statement calling upon the executive to observe principles of “technological neutrality”. Microsoft and international IT trade body, CompTIA, have reported that the Chilean government observes technological neutrality with regard to IT policy generally. Chile has also agreed to observe “technology neutral” principles in policies and regulations under a 2006 declaration made by the APEC Committee on Trade and Investment. ¹⁶	1999 – 2010
18	Chile	<i>Ministerio de Educación de Chile and Fundación Chile</i>	<i>Educarchile</i> [†]	Education	Ministry of Education Web portal partnered with Microsoft to train teaching staff IT literacy and pedagogic use of IT. ¹⁷	2006
19	Colombia	Executive	Technological neutrality [†]	Government software use	Official statements on position unknown; apparently no intervention. International IT trade body, CompTIA, has reported that the Colombian government observes technological neutrality with regard to government IT acquisition. ¹⁸	1999 – 2010
20	Colombia	<i>Ministerio de Educación Nacional</i>	<i>Computadores para Educar</i> [†]	Education	Computers for schools initiative. Ministry of Education partners with Microsoft via its <i>Alianza por la Educación</i> initiative to train teaching staff in IT literacy and use of IT for pedagogic purposes. ¹⁹	2001
21	Cuba	Executive	N/A	Government software use	Cuba appears to have been amongst the first countries in Latin America to express interest in adopting F/OSS, with a workshop on F/OSS adoption involving representatives from other Latin American countries being staged in Havana in 2001. During this event, the Cuban government stated a preference for the use of F/OSS and announced planned migrations. Government launched a free software Web portal in 2006. ²⁰	2001 – 2010
22	Ecuador	Presidency	<i>Decreto 1014</i>	Government software use	Mandate to use F/OSS in public sector. ²¹	2008

ID	Country	Institution / Agency	Name	Type	Description	Date
23	Mexico	<i>Secretaría de Comunicaciones y Transportes</i>	<i>e-Mexico</i>	Social access to ICTs	E-government programme created with a view to coordinating e-government initiatives throughout the federal government. This initiative included promoting social access to ICTs through telecentres (Digital Community Centres). Microsoft provided free or discounted PS for use in these telecentres. ²²	2000
24	Mexico	Executive	Technological neutrality	Government software use	The Mexican government has issued public statements declaring that it favours technological neutrality in the adoption of software. Microsoft and international IT trade body, CompTIA, have reported that the Mexican government observes technological neutrality with regard to government IT acquisition. Mexico has also agreed to observe “technology neutral” principles in policies and regulations under a 2006 declaration made by the APEC Committee on Trade and Investment. ²³	1999 – 2010
25	Mexico	<i>Secretaría de Economía</i>	<i>PROSOFT</i>	Economic	Programme for the development of the software sector. Advocates technological neutrality. ²⁴	Mid 2000s
26	Mexico	<i>Secretario de Educación Pública/Instituto Latinoamericano de la Comunicación Educativa</i>	<i>Red Escolar[†]</i>	Education	Initiative to informatize schools instigated in 1998 under the administration of Ernesto Zedillo. The initiative originally deployed GNU/Linux to school computers to save on PS licensing fees. Under President Vincente Fox, who came to power in 2000, an agreement was signed with Microsoft to supply the software used in this initiative. ²⁵	1998
27	Mexico	<i>Secretaría de Relaciones Exteriores/Secretaría de Comunicaciones y Transportes</i>	WSIS declaration	Foreign policy	The Mexican delegation to the World Summit on the Information Society opposed mention of free software in summit declarations. ²⁶	2003/2005
28	Paraguay	<i>Ministerio de Educación y Cultura</i>	OLPC	Education	Computers for schools initiative involving partnership with the OLPC programme. OLPC laptops run F/OSS. Ministry of Education also works in partnership with local NGO in implementation of the initiative. ²⁷	2008

ID	Country	Institution / Agency	Name	Type	Description	Date
29	Peru	<i>Dirección General de Tecnologías Educativas, Ministerio de Educación</i>	<i>Proyecto Huascarán[†]</i>	Education	Computers for schools initiative launched by President Alejandro Toledo. In relation to the initiative, Microsoft offered assistance in training of teaching staff in IT literacy and use of IT for pedagogic purposes. ²⁸	2001
30	Peru	Presidency	<i>Ley No 28612 (Decreto Supremo N° 024-2006-PCM)</i>	Government software use	Law obliging government entities to observe neutrality in procurement of software and IT goods and services. Peru has also agreed to observe “technology neutral” principles in policies and regulations under a 2006 declaration made by the APEC Committee on Trade and Investment. ²⁹	2005/2006
31	Peru	<i>Ministerio de Educación</i>	OLPC	Education	Computers for schools initiative launched under the term of President Alan Garcia involving partnership with the OLPC programme. OLPC laptops run F/OSS. ³⁰	2007 – 2010
32	Uruguay	Executive	<i>Mi PC Uruguay[†]</i>	Social access to ICTs	Scheme to offer PCs on preferential rates of credit to facilitate social access to ICTs. The initiative involved the participation of Microsoft, which supplied the systems software utilised in the initiative. ³¹	2006
33	Uruguay	<i>Laboratorio Tecnológico de Uruguay</i>	<i>Plan Ceibal</i>	Education	Computers for schools initiative launched under the term of Tabaré Vázquez involving partnership with the OLPC programme. OLPC laptops run F/OSS. ³²	2008 – 2010
34	Uruguay	Executive	Technological neutrality [†]	Government software use	In 2007, international IT trade body, CompTIA, reported that the Uruguayan government observed technological neutrality with regard to government IT acquisition. ³³	2007
35	Venezuela	Presidency	<i>Decreto N° 3.390</i>	Government software use	Mandate to use F/OSS in public sector. ³⁴	2004

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³⁰ Artopoulos and Kozak, *Topografías de La Integración de TICs En Latinoamérica: Hacia La Interpretación de Los Estilos de Adopción de Tecnología En Educación*.

³¹ LaRed21.com, “‘Mi PC Uruguay’ Lleva Colocadas Casi 3.000 Unidades Y Equipa a Centros Educativos de Primaria,” *LaRed21*, May 15, 2006, <http://www.lr21.com.uy/economia/210857-mi-pc-uruguay-lleva-colocadas-casi-3000-unidades-y-equipa-a-centros-educativos-de-primaria>; Microsoft, “Con El Apoyo Del Gobierno Y Con El Objetivo de Llegar Al Millón de Internautas,” *Microsoft.com*, December 15, 2005, <http://www.microsoft.com/uruguay/prensa/2005/dic/mipcuy/>.

³² Fontdevila, *Inclusión digital y calidad educativa El programa conectar igualdad entre 2010 y 2011*, 72; Tabaré Vázquez, “Digital Democracy,” *Americas Quarterly* 3, no. 1 (2009): 50–54.

³³ CompTIA, *Fichas de Reporte Digital (Los Beneficios Económicos Y Sociales Del Uso de Las TIC)*.

³⁴ Presidente de la República Bolivariana de Venezuela, *Decreto N° 3.390, República Bolivariana de Venezuela*, 2004.