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Networks and efficient policy implementation: insights from Cohesion policy

Abstract

Network-based arrangements are increasingly used for policy implementation. Arguments are made for the potential benefits of this approach but evidence of their efficiency is inconclusive. Recent methodological innovations, incorporating Social Network Analysis, are building the evidence base. This paper contributes to a growing area of study by exploring the relationship between the efficient implementation of European Union Cohesion policy projects, and the characteristics of the networks involved in the implementation process. The research combined quantitative analysis of implementation of projects in Scotland in 2007-2013 and semi-structured interviews. The research finds that the involvement of many partners can have a negative impact on implementation. Rather, the strategic position of key actors in the network is important for efficient implementation. The results stress the importance of network governance and the role of key agents as nodes that bridge structural gaps and facilitate exchange of knowledge and resources.

Keywords: Cohesion policy, implementation networks, network analysis, Scotland, structural funds, performance

Introduction

Despite increasing attention in academic research and policy practice, there is limited evidence of the effects on efficient policy implementation of inter-organisational delivery networks. This paper analyses this relationship, taking Cohesion policy (CP) implementation in Scotland as a case. Over the past two decades, study of networks has become an important

field of public policy and administration research (Isett, Mergel, LeRoux, Mischen, and Rethemeyer, 2011; Lecy, Mergel, and Schmitz, 2012). The use of networks of organisations and actors surrounding a specific policy, to provide a structure in which public, private, and third sector interests can deliberate, design and implement policy, is widespread (Park and Rethemeyer, 2014). In public policy and administration literatures, the benefits this approach provides, through the sharing of information, resources, tasks and administrative costs among policy stakeholders are weighed against increased complexity, coordination challenges and potential for duplication of responsibilities that impact on efficient policy implementation (Blair, 2002). Some research suggests that having more network partners improves implementation efficiency by increasing access to valued resources and more ideas. Other research argues that when the number of partners is high, lack of cohesion results in implementation inefficiencies (Burt, 2001).

There has been considerable methodological advancement in network research and analysis in public policy and administration studies. This includes use of Social Network Analysis (SNA) to explore structural and relational aspects of networks in public policy administration. SNA has been used to examine a wide range of management and policy fields, including: emergency management, (Kapucu, 2006), transportation policy (Henry, Lubell, and McCoy, 2011), environmental management, health and social service delivery (Provan and Huang, 2012; Valente, 2010).

However, evidence on the role of networks in policy design and delivery is still developing and significant gaps remain. Much of the emphasis has been descriptive: identifying and visually mapping policy networks and setting out relational data. Recent statistical advancements in

network analysis increase the scope for researchers to address complex explanatory questions, including assessments of the influence of networks on policy implementation (Kapucu, Hu, and Khosa, 2014). The literature indicates the value of combining quantitative results that SNA research can produce with qualitative research that provides information on informal processes in network-based policy implementation (Provan and Lemaire, 2012).

This paper contributes to this literature by exploring the relationship between network-based implementation approaches and efficient implementation of CP projects, the European Union's regional policy instrument. CP is implemented in co-operation between the European Commission, Member States, regional and local authorities, social organisations and private actors. This multi–level governance (MLG) approach, alongside the prominence of the 'partnership' and 'subsidiarity' principles, makes CP a rich case for analysis.[1] Collaborative network structures are prominent in the implementation of contemporary regional economic development policies, including CP, and advocates make several arguments on the basis of increased implementation efficiency (Marks and Hooghe, 2004). Dispersion of governance across networks in multiple jurisdictions is argued to be more efficient than and normatively superior to centralised, hierarchical approaches: this model can respond to specific challenges at various territorial scales, accessing new information that informs policy design and implementation. Including a range of stakeholders in the process creates a stronger sense of accountability and commitment (Reckhow, 2013). However, these views are contested. Some

[1] The CP 'partnership principle' stresses that each programme is developed through a collective process involving authorities at European, regional and local level, social partners and organisations from civil society. This applies to design, management and implementation stages. It is linked to the principle of subsidiarity which implies that decisions should be made at the level most competent to carry them out, within a broader cooperative network.

research emphasises the resilience and continued dominance of the state as the key actor in regional policy implementation, regardless of perceived shifts to network-based approaches (Lovering, 1999). The controlling role of the state in guarding against policy drift, fragmentation, and other implementation inefficiencies is noted (Christensen and Lægreid, 2007), an argument given weight in the current context of constrained regional policy budgets (Bachtler, Mendez, and Wishlade, 2010). There are efficiency concerns with network-based approaches to regional policy, related to competition over limited resources, duplication and administrative complexity and risk of decision-making paralysis (Cooley and Ron, 2002; Grant and Keohane, 2005). It should be noted that efficient implementation, which focuses on the timely and cost-efficient implementation of projects that are compliant with the relevant regulations, is just one measure of CP performance. The 'effectiveness' of EU cohesion policy. Effective implementation focuses on the success of EU action in achieving or progressing towards its objectives. Efficient implementation may not always result in effective implementation: the role of networks may support longer-term effectiveness while presenting challenges for efficient implementation. However, by focusing on efficiency, this research addresses important critiques in the literature on network-based approaches to implementation.

Regional policy research has recently started to draw on network analysis to inform this debate, particularly in the United States (Feiock, Lee, and Park, 2012; Oh, Lee, and Bush, 2014). These studies focus mainly on explaining the emergence of policy networks for economic development: when and how public authorities cooperate with each other and with private sector partners, civil society etc. However, analyses have not yet linked these structures to the efficient implementation of policies (Kim, Song, and Park, 2018; Lee, Feiock,

and Lee, 2012). Based on access to Scottish Government's database of CP projects (EUROSYS) and a series of interviews with practitioners and beneficiaries, this research integrates quantitative and qualitative analysis of the relationship between network-based delivery structures and implementation efficiency for CP in Scotland during the 2007-2013 programming period. The paper is structured in four further sections. Section 1 sets the analytical framework, grounded in policy network analysis, incorporating SNA to strengthen explanatory power and applying this to CP. Section 2 sets out the research design, operationalising definitions of dependent (efficiency of CP project implementation) and independent (network-related) variables. It also presents the case study context of CP in Scotland and describing quantitative and qualitative dimensions of the empirical analysis. Section 3 presents key findings from the research. The final section draws conclusions within the broader theoretical and policy literature.

1. Analytical framework

Policy network analysis (PNA) is based on institutionalist strands of political science: policy networks are perceived as structural arrangements between sets of public and private players with communication channels for exchange of information, expertise, trust and other policy resources (Kenis and Schneider, 1991, pp. 40–43). Public policy research has begun to use SNA to explore links between efficient policy implementation and those features of network-based implementation approaches that the literature highlights as particularly influential (Akkerman, Torenvlied, and Schalk, 2012; O'Toole and Meier, 2011). For network analysis, the crucial structural dimensions are the size of networks and the structure of network ties, especially the extent of network centralisation and the degree of cohesion (Granovetter, 1994).

According to some CP research, the involvement of partners of different types (e.g. regional development agencies, chambers of commerce, clusters, etc.) and with different roles (e.g. implementing agency, fund manager, service provider, etc.) is decisive in accelerating funds absorption and in reducing the time and administrative costs involved in accessing funds (Dotti, 2016). Also in CP literature, network based policy implementation is not without critique. Research has noted that involvement of networks facilitated knowledge exchange and articulated the preferences of regional and local actors which, in turn, made policy implementation more efficient (Polverari and Michie, 2009) On the other hand, a prominent critique of network-based CP models is that they create a complex delivery system and increase the costs of policy administration (European Commission, 2011). Analysis of CP implementation in 2007-2013 highlighted the danger that an over-representation of actors can be counter-productive: the involvement of more partners of different types increases the administrative burden and bureaucratic complexity of policy-making (European Policies Research Centre and Metis, 2014). Moreover, some studies have raised concerns about the increased scope for policy drift, slippage or conflict in CP where authority is diffused among networks of different actors (Ferry and Bachtler, 2013). Second, there are arguments in CP research that although the operation of networks leads to a combination of knowledge, information and skills, the exchange of these resources should be managed by key agents (Kickert, Klijn, and Koppenjan, 1997; Sørensen and Torfing, 2009). Even if EU-supported networks have a bottom-up approach, they require some form of facilitation to function efficiently (Klijn and Edelenbos, 2007). This network guidance is generally referred to as 'meta-governance' (Sørensen and Torfing, 2009) and a key role is often attributed to national or regional government authorities that may relinquish some direct authority over implementation while retaining important coordination functions (Marinetto, 2003).

However, practical knowledge on what makes 'meta-governance' efficient is fragmentary (Haarich, 2018). Research indicates a positive relationship between the networking capacity and experience of partners in implementation of shared projects and the design and delivery of more complex and high-quality projects. The identification and implementation of projects with better foresight and a longer-term, strategic aim as well as an improved ability to take an integrated approach and overcome rivalries is enhanced through **embedded relations** between implementing partners (Bachtler et al., 2009). Within CP, it is important that actors involved in implementation restrain from opportunistic behaviour, and focus on project goals. Trust between organisations will develop when they gain experience of successfully working together. However, other research has questioned the embeddedness or depth of CP networks, raising questions about the quality and sustainability of policy interventions (Dąbrowski, 2012). In part, this is argued to be caused by lack of consensus about 'rules of the game', the exact purpose (and usefulness) of network-based approaches in CP implementation, and uncertainties over which roles network partners should play in implementation. European Commission regulations are vague in this respect, allowing flexibility to incorporate different national traditions, but also for ambiguity (Polverari and Michie, 2009). This encourages superficial and unstable network arrangements to secure EU funding that can impact on efficient implementation (Milio, 2007).

Most studies exploring CP networks have taken a descriptive, rather than an explanatory approach: identifying and comparing the scale and composition of networks of actors involved in different CP contexts. SNA has been used to analyse the extent to which regional structures drawn non- governmental actors into CP policy-making processes (Paraskevopoulos and Leonardi, 2004). Studies have used SNA to compare network

arrangements in CP operational programmes, highlighting differences in the size of partnerships, the level of cooperation and the vertical or horizontal orientation of networks (Jordana, Mota, and Noferini, 2012). Lahdelma and Laakso (2016) use network analysis to evaluate the impact of ERDF enterprise networking projects on the performance of supported firms. These studies provide useful insights into variations in the operation of CP networks. However, they do not directly link the structural properties or relational dimensions of networks to the efficient implementation of CP. Are there significant relationships between the extent of networking, the management of networks, or their 'embeddedness' and efficient implementation of CP? Questions concerning the size and structure of networks are relevant: the global financial and economic crisis has led most Western governments to introduce efficiency measures and organisational change in public administration that include the 'streamlining' of policy implementation models (Randma-Liiv and Kickert, 2017). Moreover, the future of CP, including its implementation model, is being debated.

Scotland provides a case study for exploring networks in CP implementation. Socio-economic trends, political and institutional processes and the evolution of policy instruments have emphasised the value of network-based approaches to supporting development in Scotland. Keating, Cairney and Hepburn (2009) use the term 'territorial policy communities' to describe the development of networks in the country, prompted by the devolution of policy responsibilities from the United Kingdom level from the 1980s on. The relatively small size of the 'policy community' in Scotland can also be argued to facilitate this type of networking, allowing closer personal relationships to develop between key actors (Cairney and McGarvey, 2013). A wide range of partnership initiatives have given officials, politicians and their organisations considerable experience of collaborative working, including Community

Planning Partnerships (CPPs) based around local authorities, which are tasked, under legislation, with delivering public policy objectives at a local level. CP has been an important part of this evolution (Danson, Fairley, Lloyd, and Turok, 1997). A distinctive approach to CP management and implementation emerged in Scotland with the creation of large, inclusive partnership structures at regional level and establishment of independent secretariats (Programme Management Executives - PMEs) to administer programmes within the regions. Research has concluded that PMEs played an important role in facilitating the role of local networks in decision-making on policy issues as well as project applications (Davies et al., 2007).

Scotland's CP implementation model continues to evolve. For the 2007-13 period, Scotland's allocation of CP funding declined by almost half in comparison to 2000-2006, prompting significant changes. During 2007-2013, Scotland was covered by four programmes: the Highlands & Islands (H&I) European Regional Development Fund (ERDF) and European Social Fund (ESF) programmes, and the Lowlands and Uplands Scotland (LUPS) ESF and ERDF programmes. Substantial changes were made to CP implementation in Scotland for the period, notably the reduction of the previous five PMEs to two Intermediary Administrative Bodies (IABs). These IABs allocated funding to projects through competitive calls. For the 2007-13 period, the IAB for the Highlands & Islands area was Highlands & Islands Structural Funds Partnership Ltd (HIPP). For the Lowlands & Uplands area it was ESEP Ltd. In addition, Strategic Delivery Bodies were contracted. These were experienced organisations and development agencies and they received commissioned funding for the delivery of key strategic projects. In the Highlands & Islands area the designated Strategic Delivery Bodies were Highlands & Islands Enterprise and the University of Highlands & Islands (UHI). In the

Lowlands and Uplands area the Strategic Delivery Bodies or Intermediate Delivery Bodies were: Scottish Enterprise and the South of Scotland Alliance. It can thus be argued that Scotland's implementation system has undergone a process of rationalisation and centralisation. The number of programme management bodies has been reduced and there is increased emphasis on the commissioning of projects rather than open, competitive calls. Given its distinctive approach to CP implementation and the current challenges this model faces, Scotland provides a relevant case for analysis of the relationship between the involvement of networks in policy and efficient implementation.

2. Research Design

The network analysis was based on information from Scottish Government's monitoring database for the 2007-2013 period. Both the Highlands and Islands and the Lowlands and Uplands as well as the two CP ESF and ERDF funds were included. 521 projects across 13 priorities were incorporated in the analysis, as some projects were not finalised. The monitoring system gathered specific data on the involvement of partners in implementation of the projects. Based on the data, a network for the implementation of CP in Scotland was visualised using Pajek (Nooy, Mrvar, and Batagelj, 2011). There are two distinct groups (or modes) of nodes in this network. As projects are implemented by organisations that are also a partner on other projects, projects do not directly connect to projects, instead an organisation connects two projects. Hence, in SNA terms, data for the Scottish CP implementation network are collected as a two-mode network.

As Figure 1 and 2 illustrate, connections between organisations and projects cut across CP funds and programme areas. Organisations that are active in one area are also important

actors in another. This highlights the role of networks in implementation. In these projects, there is always a Lead partner (in yellow in Figure 1 and 2) who has full financial responsibility for the project and is tasked with monitoring and reporting implementation progress to the programme's managing authority. For analysis of networks, it is important to distinguish these actors from 'ordinary' project partners who may be important for the successful implementation of a project but who do not have these responsibilities. Thus, the three network characteristics identified as potentially influential for efficient policy implementation are measured both for projects and Lead partners.

- insert Figure 1 and Figure 2 -

2.1 Operationalising the dependent variable: efficient implementation

Financial execution, (i.e. pace of spending) provides a basic measure of efficiency of Structural Funds management and implementation (Bubbico, 2013). CP projects risk losing part of the grant if spending targets are not met. This is because CP programmes are subject to the so called 'auto decommitment rule' (the N+2 rule), which means that, if the programme does not spend the money it receives each year within two years, it must pay unspent money back to the European Commission. CP programme authorities are, thus, incentivised to ensure that projects are implemented efficiently in a timely manner. Of course, looking at absorption of the allocated funding alone does not tell us everything about the policy implementation process. However, it is a solid measure of efficient implementation: for CP implementation to be efficient, the funding allocated to projects must be spent in line with target dates. CP follows a seven-year programming period. Within a programming period, projects with

different lifespans can be initiated. To ensure a consistent measure of financial performance among projects, the research included only projects with an end date of 2013. Each project, in its application form, indicated by which year they expect to finish their project, i.e. absorb the allocated funding on project activities. From this, an implementation efficiency measure for each project was created, based on the percentage of allocated funding they absorbed according to their target. This operationalisation creates a limited dependent variable that is a continuous variable between 0 and 100, measuring the percentage of money spent. A project has a 100 score when it successfully spent its allocated funding in the time period that was agreed.

2.2 Operationalising the independent variables: network characteristics

Number of partners involved in a project network.

A fundamental feature of network-based implementation for policy implementation relates to the number of partners in a policy network: the presence of sufficient network linkages bringing together the relevant resources to strengthen policy implementation. CP is implemented through projects in which several partner organisations are typically involved. In turn, these organisations frequently participate in multiple CP projects, thereby creating a network-like structure for implementation (see Figure 1). Under SNA, the size of a network in CP can be operationalised using degree centrality, (DC) which is a count of the connections a node, in this case a Lead partner or a project, has to the rest of the network (Wasserman and Faust, 1994). For CP, three components can be identified: project DC (a count of all partners involved in each project); Lead partner DC (a count of all connections a Lead partner of a given project has with other projects, either as a Lead partner or as a partner); and Lead partner

DC2 (a count of the times a Lead partner in each project is also a Lead partner in other projects).

The role of key agents in networks

Degree centrality only considers the number of direct relations involved in networks but SNA offers two methods to capture network position and explore indirect connections. The first is 'eigenvector centrality' (EC), which measures the centrality of an actor within the whole network: to what extent is a project or a Lead partner connected to the overall network through indirect connections? For CP, a high eigenvector score means the ability to gain access to information from the complete network, not just from direct connections to partners in a given project. Projects or Lead partners with a lower eigenvector centrality need more direct connections to reach the whole network, which increases risk of loss of information (Wasserman and Faust, 1994). The second method is 'betweenness centrality' (BTC). This method measures the extent to which a project or a Lead partner lies between sections of the network that otherwise would not be connected, e.g. overcoming structural holes. It explores capacity to connect different parts of the network, and therefore manage the flow of resources. This produces four variables: Project EC and Lead Partner EC, Project BTC and Lead partner BTC.

Embeddedness of network relations

Besides access to information and other resources, either through direct or indirect connections, the dynamics between partners of a project are important factors for efficient CP implementation. Is it not enough to focus exclusively on whom one knows, without considering how well one knows them..

Here, the SNA measure of 'embeddedness' provides a method for exploring the relative merits of strongly integrated networks, where all of an individual actor's or project's important contacts know each other. A k-core is a maximal group of actors, all of whom are connected to some number (k) of other members of the group (Nooy et al., 2011). Multiple connections between projects and organisations are used to operationalise the variables that measure embedded relations between projects. Project embeddedness assesses the extent to which projects are connected to other projects, when they share the same partner organisations. Lead partner embeddedness assesses the extent to which these organisations are connected to other organisations when they are active in the same multiple projects. To operationalise the extent to which projects and Lead partners share the same connections, in other words the embeddedness of their relations, two variables are operationalised: Project Embeddedness and Lead partner embeddedness.

2.3 incorporating the interview data

Network analysis measures network position through the absence or presence of connections but it provides limited insights on the quality of these for informal relationships. Qualitative data can, therefore, complement network position. The interviews were conducted from March till November 2013 and were targeted to provide in-depth insights into network relationships within each project as well as to get the perceptions of how the projects and partners fitted within the overall CP network. In addition, 31 interviews were conducted with key policy makers and stakeholders in the Scottish Government, covering projects worth £121 million of funding (17% of total funding allocated to Scotland in 2007 -2013). Interviews

included Lead partners (the bodies that received a block of funding in order to implement projects): the Community Planning Partnerships (CPPs) in the Lowlands and Uplands (LUPS) area, Scottish Enterprise, Highlands and Islands Enterprise, and University of the Highlands and Islands. In addition to these organisations, 'ordinary' partners from individual projects were selected to strengthen insights into the implementation of CP in Scotland in 2007-2013. These projects varied in funding levels from those that received £90,000 up to those that received £12million of CP support.

3. Results

A tobit regression was used to assess the relationship between network characteristics; 'size of the project-network', the ability to 'manage the network' and the 'embeddedness of its partners' and efficient project implementation. To test network characteristics and their influence on efficient implementation the analysis controlled for different variables (see Table 1).

-insert Table 1 here –

The region covered by the programme area and type of European funding (ERDF or ESF) were taken into consideration, as both could influence the likelihood of efficient implementation. Also, the type of Lead partner could have an influence on implementation, as certain types of organisations have more administrative capacity to deal with administrative burdens associated with implementation of EU projects. Type of expenditure is also included. Projects are either revenue or capital projects and have a diverging aims and influence implementation. In addition, the percentage of EU funding is included as an indicator for the extent of funding that comes from the EU rather than own partners resources. Table 1 sets out the descriptive statistics of the project, Lead partner and control variables. Table 2 shows

the results of the Tobit regression. Following a two-mode approach, the analysis is carried out both for project networks and for Lead partner networks.

-Insert Table 2 here-

3.1 Size of the network

The research tested network size in three dimensions: direct connections of a project to different partners (i.e. size of the project network); the direct involvement of a project's Lead partner in other projects; and, the direct connections of the Lead partner to projects in which that organisation was also the Lead partner. The regression results of Table 3 show that the size of the network of a project is negatively associated with implementation efficiency. Although the significance of this variable disappears when including the Lead partner variables, the direction in both models is negative. The number of organisations participating in a project is negatively associated with efficient implementation. The size of a Lead partner's network where it is an 'ordinary' partner is also negatively associated to efficient project implementation. Thus, the existence of many connections between partners does not automatically lead to more efficient project implementation, an argument echoed in other policy network research, parts of CP literature and in interviews.

Several interviewees noted the coordination challenges of including a wide range of partners in project implementation. This tension increased where the relevance of some partners to project activities was limited and Lead partners struggled to keep them engaged. Interviews indicated that the resources expended by Lead partners in mobilising some partners did not ensure ongoing participation in the network: varying participation created efficiency issues (Interview, Lead partner, Highlands and Islands, 2013). For instance, in CPP projects focusing

on increasing employability for long-term unemployed, trade union partners were more focused on the rights of those already in work. As a result, Lead partners found it difficult to establish beneficial links between partners (Interview, ESF Coordinator, 2016). This indicates that there is a threshold beyond which the benefits of partnership for implementation are outweighed by the coordination costs. Administrative costs were incurred in incorporating additional and arguably unnecessary partners at the early stage of a project. On the other hand, direct connections of a Lead partner to projects on which it is also a Lead partner show a positive and significant relationship with implementation efficiency. This emphasizes the role of leadership or governance in networks, a key finding of this research that is assessed in more detail below. Lead partners have a greater financial and reputational stake in project implementation than other partners and commit more financial and administrative resources that do not guarantee the creation of efficient links with all partners. In return, they gain valuable experience of the implementation process that is transferrable to other projects where they play a leading role.

3.2 Role of key agents in the network

In contrast to the negative findings for network size, the analysis identified a generally positive relationship between network governance (and the role of Lead partners in this), and efficient implementation. Both Project eigenvector centrality and Lead partner betweenness centrality are positive and significant for efficient project implementation (see Table 3). This finding supports policy network literature arguments that a centrally positioned actor can 'manage' interactions between network partners, steering and adapting the network and its partners to ensure efficient implementation. Lead partners, when acting as a 'broker' (e.g. a position in the network that connects different sections), can influence the composition of

the network surrounding their project and increase access to information, know-how and resources that actors in peripheral parts of the network would not otherwise have access to.

Interview evidence supports the argument that involvement of the Lead partner in governing networks has a positive impact on project implementation. One interviewee emphasised the influence of the Lead partner in efficient division of project implementation tasks. Often, Lead partners are responsible for financial management and administrative duties, utilizing their capacity and experience of implementing projects and easing the burden on smaller project partners (Interview, Commercial and Administrative Manager, 2013). One interviewee noted that a local council, acting as Lead partner, took on responsibility for project applications and claims processes on behalf of partners from the third sector so as not to burden them, ensuring the participation of smaller organisations (Interview, CPP Manager, 2016). Interviewees also highlighted the role of Lead partners in brokering exchange of information and resources between partners in a project network. This applied to both technical and strategic knowledge. As Lead partners often implemented several projects at once, they were in a position to disseminate experience across networks of projects, addressing common technical implementation challenges and raising awareness of possible solutions. In one case, a project partner at a university noted that a Lead partner also involved in other projects recommended that evaluation of project performance should take place at a relatively early stage to allocate any remaining funding or plan for future projects (Interview, Challenge Fund project partner, university sector, 2016). Due to the strategic position of Lead partners in networks, project partners gained technical information on how to improve implementation. Moreover, according to interview evidence, the position of a Lead partner implementing several projects strengthened strategic overview across different projects and sectors, for

instance between scientific and business communities (Interview, European Programme Manager, 2016). Thus, increased access to information and resources present in other parts of the CP network supports efficient implementation. Projects closely connected to central organisations benefit in their implementation from strong governance. In turn, the ability of a Lead partner to be a connecting actor between different sections of a network was beneficial in terms of efficient project implementation.

3.3 Embeddedness of connections

The 'embeddedness of connections' variable assessed how well partners know each other, rather than how many other organisations they know, and if this impacted on implementation efficiency. Analysis revealed a clear distinction between networks of Lead partners involved in multiple projects and networks of projects which share the same partners. The embeddedness of connections of Lead partners was positively related to efficient implementation (see Table 3), providing further evidence of their importance in brokering knowledge, particularly on regulatory compliance and technical issues associated with CP implementation. Interview evidence supports this view for Lead partners, providing examples of projects that have benefited from close, established connections. For instance, a Lead partner noted that one project was bringing together two previously successful projects funded through ERDF, in which the interviewee's organisation had also been Lead partner. The new project mobilised the networks of partners already established, focussed on addressing the challenges that remained within the sector (Interview, Scottish Government Official, 2016).

However, an important result of the analysis is that this positive relationship between efficient implementation and partners being part of a cohesive subgroup in the network did not hold for projects. When a project had partners that worked together on other projects, the influence on implementation was negative. Implementation seems to benefit from network ties based on looser interaction. Some possible explanations emerge from the literature and from the qualitative research. In CP literature, there is a critique that the institutional framework for partnership may be in place, but is in reality superficial: hierarchical principles persist and input from potentially valuable actors is constrained (Yesilkagit and Blom-Hansen, 2007). Despite the presence of network structures, there is an embedded set of actors who control the implementation process in a 'top down' way. In other words, leadership is not based on 'bridging' or 'brokering' functions but is vertically structured: central actors dominate and input from peripheral or marginal partners is limited by structural holes or weak horizontal linkages in the policy network. Decisions are taken by key players (EU, government authorities at national and/or regional levels) and are merely informed by the sub-national level with uneven and often limited involvement of private sector, civil society actors and NGOs (European Policies Research Centre and Metis, 2014). Interview evidence indicated that embedded connections among groups of partners in projects created issues that could have a negative influence on project implementation. In some contexts, the embeddedness of a group of organisations around a project led to the exclusion of others. Rather than gaining the benefits of connections across the broader network, groups of projects are implemented by the same sub-groups of network partners. Some private sector project partners among interviewees felt that they were being treated as outsiders, seeing public sector bodies as being on the 'inside track' (Representative, Challenge Fund project partner, Lowlands & Uplands Area, private sector, 2013). Thus,

networks based on close-knit, embedded relationships are sometimes less open to new organisations, producing more exclusive and hierarchical structures and blocking exchange of new ideas and resources from other organisations that could be important for project implementation. This can be particularly the case in projects attempting to span public, private and voluntary sectors.

4. Conclusions and recommendations

This paper investigated the relationship between network-based approaches to policy delivery and efficient policy implementation. It developed and tested three hypotheses, related to the size, the role of key agents and embeddedness of policy networks. This produced important insights that inform ongoing debates in the literature on the role of networks in policy. A fundamental conclusion is that network size and structure has an impact on the efficiency of policy implementation. More specifically, the research found that the size of the network of actors around a project had a negative effect on its implementation: the involvement of many partners of different types with varying commitment to the project increased the administrative burden and bureaucratic complexity of policy-making. This was echoed in the interview results where coordination challenges emerged when more partners were included in project implementation. Interview evidence indicated the importance of targeting the potential partners to be involved: the investment of resources in strengthening networks is likely to be inefficient if it is focused on partners for whom the project is of limited relevance. With increasing number of partners, engagement in project implementation became more difficult. This led to increasing administrative costs for the inclusion of unnecessary partners.

Crucially, however, the research found that the implementation of projects was more efficient where their Lead partners were indirectly connected to larger networks of actors. The strategic position of key nodes in the network, rather than the quantity of relationships is what matters. By strategically connecting to specific organisations through working on different projects, Lead partners positively influenced the implementation of projects. This finding is in keeping with network theories that emphasise the importance of bridging relationships in explanations of the operation of networks.

This research result was confirmed by analysis of the role of key agents in networks. The position of a project or a Lead partner in the broader network - the existence of indirect connections with other actors in networks around other projects - was beneficial for implementation. This supports arguments in the literature that stress the role of key actors in 'brokering' knowledge between different parts of a network, filling structural gaps and facilitate the exchange of knowledge and resources. In this way, a network actor can learn from the experiences in other parts of the network through indirect connections. Insights from the interviews give a more qualitative understanding of why key actors can have a positive on policy implementation. This qualitative evidence indicated the role of Lead partners in connecting the agendas of different parts of the network (e.g. from different but related policy fields such as poverty, social inclusion and regeneration or public and private spheres) and in building overall capacity to implement integrated projects (Interview, CPP Manager, 2016. More practically, participants in these networks noted noted that Lead partners were able to take a more managing role in implementation. In doing so interviewees mentioned the efficient division of implementation tasks, as well as taking responsibility for key technical aspects, notably financial management and control duties. At the same time,

the position of a Lead partners also meant that could communicate information and technical resources between different projects, again building the network's awareness of capacity shared technical problems and the capacity to respond to these.

Finally, the research assessed the embeddedness of connections. The argument is that overlapping and strong relations facilitate resource information exchange, boost the understanding of mutual needs and interests and improve implementation. In this respect, the research findings are nuanced. The relationship between embedded connections and efficient implementation held positive but only for Lead partner connections to other organisations when they are active in the same multiple projects. The negative impact on implementation for embedded connections between 'ordinary' project partners is somewhat surprising but can be explained by considering the scope for close-knit network connections to produce exclusive arrangements that restrict access for potentially valuable partners. The interview data gives examples where this was the case. For instance, differences between the organisational characteristics, interests and objectives of the public and private sectors can impede the efficient operation of networks. According to interview evidence, some private sector partners felt excluded from relationships dominated by public sector organisations.

For CP, the results indicate that its support for partnership and network-based approaches, in keeping with a policy that draws in multiple administrative tiers, policy fields and actor-types, has benefits in terms of efficient implementation but only if network governance is strong. Unnecessary administrative costs can build through incorporating additional and ultimately superfluous partners at a project's early stage, ultimately producing a negative impact on implementation. The negative influence on implementation of having too many partners or including partners with a limited stake in projects is clear. Moreover, given the

importance of network governance or leadership, it is important to identify and support key agents within the network for implementation. The research results highlight the benefits of having a, well-resourced, experienced Lead partner. In some cases, this organisation acts as a gatekeeper, ensuring that only those actors relevant to project aims become part of the network, in other cases it acts as a broker or coordinator within subsets of the network around projects and across the network, facilitating the exchange of resources and bridging network gaps. Thus, putting incentives and structures in place to encourage a brokering or bridging role for a Lead partner will benefit implementation efficiency.

More generally, the research indicates that it is crucial to differentiate between different network actors (noting particularly the influence of network leaders) and between different dimensions of networks (size, role of key agents and embeddedness). Actors have different roles in implementation and networks have different attributes and there is a need to disaggregate between different types of actors and their network position. Beyond this, SNA produces quantifiable measures for assessments of the relationship between network-based approaches and efficient implementation. This is especially important in policies such as CP where collaborative implementation is formalised but where evidence of benefits of this principle is limited and largely based on qualitative evidence. The value of combining this quantitative approach with qualitative research is also apparent, providing insights and explanations for the relationships identified. Within CP, a strong evaluation culture already exists, however network relations are not included in these studies. CP evaluations could gather information on policy networks and their role on the implementation process, a recommendation made in other recent research (Lahdelma and Laakso, 2016). In addition, as relationships are dynamic and evolve over time, data with a temporal dimension would

strengthen longitudinal network analysis.

There are some caveats and gaps in the research that could be addressed in future work. This research uses a single case study and there is scope to develop broader comparative frameworks across policy systems and/or countries. Moreover, policy implementation is measured only in terms of financial absorption. More sophisticated conceptualisations of implementation could incorporate physical outputs or strategic impacts. Nevertheless, this research provides a valuable framework for further development to explore these prominent issues in contemporary public policy studies.

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Table 1: descriptive statistics of the project, Lead partner and control variables

Descriptive statistics

Variables	Min	1st Qu.	Mean	3rd Qu.	Max	SD
1. Project DC	1	5	9	11	38	5.4
2. Lead Partner DC	1	3	7	9	27	6.7
3. Lead Partner DC2	3	44	96	128	512	74
4. Project EC	0	0.0018	0.011	0.014	0.1	0.0015
5. Lead Partner	0	0.002	0.012	0.015	1	0.004

BTC						
6. Project embeddedness	0	3	8	13	32	7.8
7. Lead Partner Embeddedness	3	19	23	27	37	6.7
8. Intervention Rate	9.03	39.2	41.59	45.0	70.0	
Categorical variables						
9. Programme	H&I ERDF (51)	H&I ESF (102)	L&U ERDF (91)	L&U ESF (227)		
10. Type of organisation	Economic development body (74)	Further Education (106)	Government department/ Agencies (44)	Higher education (40)	Local Authority (111)	Voluntary Sector (146)
11. Type of project	Capital (433)	Revenue (88)				

Table 2: results of the Tobit regression

Tobit regression of factors influencing project implementation

	Project	**Lead partner**	**Complete**
(Intercept)	**101.96** (13.37)***	**93.59** (14.17)***	**91.33** (13.93)***
Size of network			
Project DC	-0.60 (0.36)x		-0.50 (0.35)
Lead Partner DC		0.07 (0.32)	**1.14** (0.37)**
Lead Partner DC 2		**-0.33** (0.07)***	**-0.41** (0.07)***
Role of key agents in network			
Project eigenvector	247.22 (140.32)x		**438.05** (143.82)**
Lead Partner BTC		**1271.91** (295.58)***	**1622.73** (295.77)***
Embedded in network			
Project embeddedness	**-1.20**(0.27)***		**-1.95** (0.32)***
Lead partner embeddedness		0.69 (0.37)x	**1.02** (0.36)**
Control Variables			
Programme	Yes	Yes	Yes
Type of Organisation	Yes	Yes	Yes
Type of Expenditure	yes	Yes	Yes
Approved Intervention Rate	Yes	Yes	Yes

Log(scale)	**3.66** (0.04)***	**3.65** (0.04)***	**3.62** (0.04)***
AIC	4469.46	4468.44	4434.69
BIC	4533.30	4536.53	4515.55
Log Likelihood	-2219.73	-2218.22	-2198.34
Deviance	647.72	649.36	
Total	521	521	521
Left-censored	86	86	86
Uncensored	414	414	414
Right-censored	21	21	21
Wald Test	95.79	95.47	138.14

XP<_ 0,1; ** P<_0,01;***P>_0,001

Figure 1: Programme Networks of ESF and ERDF in the Lowlands and Uplands.

Figure 2: Programme Networks of ESF and ERDF in the Highlands and Islands.