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Additional Information

Informal collaborations between Social Sciences and Humanities researchers and non-academic partners

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Abstract

The analysis of how research contributes to society typically focuses on the study of those transactions that are mediated through formal legal instruments (research contracts, patent licensing and creation of companies). Research has shown, however, that informal means of technology transfer are also important. This paper explores the importance of informal collaborations and provides evidence of the extent to which informal collaborations between researchers and non-academic partners' take place informally in the Social Sciences and Humanities (SSH). Data is obtained from two studies on knowledge exchange involving researchers working in the SSH area of the Spanish Council for Scientific Research (CSIC). We show that informal collaborations not officially recorded by the organisation are much more common than formal agreements and that many collaborations stay informal over time. We explore the causes of such prevalence of informality and discuss its policy implications.

Keywords: informality, collaborations, knowledge exchange, social sciences, humanities, public research organisation.

1. Introduction

Knowledge generated in academic contexts can be applied to the solution of technical or social problems in many different ways. Typically, such application will not be carried out by the academics themselves and will therefore require some collaboration between academics and other societal groups. These collaborations often leave a trail in the form of official documents, when this happens we can say the collaboration has been formalised. For instance, contracts may be written to frame the terms of a research collaboration, academics may protect their IP through patenting and then license the use of such patents, and academics may participate in the creation of firms to exploit the knowledge they have generated. These activities generate documentary evidence that can then be used to generate data. As monitoring and evaluation of the use of research results is becoming widespread, these data are increasingly important: the extent to which they provide a fair reflection of the collaborations that academics establish with potential non-academic beneficiaries of their research becomes an important question both from a policy and analytical perspective.

The literature on the use and impact of academic research has traditionally focused on a limited range of these documented or formal activities; this is explained by their higher visibility and traceability compared to other activities that do not embody a legal contractual instrument. This is problematic since those studies that have addressed informal collaborations have found that both firms and researchers rank them highly among the wide range of knowledge exchange and transfer activities (Abreu et al. 2009; Agrawal and Henderson 2002; Cohen et al. 2002; Meyer-Krahmer and Schmoch 1998). Therefore, ignoring informal links and focusing only on formal mechanisms could be too narrow an approach to provide a balanced and comprehensive perspective on knowledge exchange processes. Yet, informal collaborations are hard to capture and quantify, and careful field research needs to be conducted to generate data (Amara et al. 2013; Grimpe and Fier 2010; Link et al. 2007).

Our interest in informality was triggered when, during a project to assist in the development of CSIC's social scientists collaborative links with non-academic users and beneficiaries of its research, we realized that many existing collaborations were not reported in the organisation's database of contracts and collaboration agreements. This

moved us to analyse the issue in more detail and to study the nature of such informal collaborations.

The purpose of this paper is to contribute to the literature on knowledge exchange by exploring the extent of informal collaborations in the Social Sciences and Humanities (SSH), and the context in which informality emerges. To this aim, we will first identify all the non-academic partners with whom SSH scientists in a large research organisation (the Spanish Council for Scientific Research – CSIC) collaborate. We will then quantify the presence of informal collaborations in this population, and finally we will assess qualitatively the conditions under which such informal collaborations have emerged.

The remainder of the paper is structured as follows. The next section reviews the literature on University-Industry relations focusing on studies addressing informality whether directly as the main concern of the work, or only as an issue that emerged among others. Section 3 provides a description of the context of the study. Section 4 uses two complementary studies to develop empirical evidence on the extent and nature of the informal collaborations between CSIC's SSH researchers and non-academic parties. Finally, section 5 draws conclusions and policy implications.

2. Literature Review

Much of the extant literature in the broad fields of research impact, University-Industry relations, and technology transfer usually relies on the analysis of data derived from the formal documents underpinning the relationships across institutional boundaries. For instance, an abundant body of research on University-Industry relations draws on the analysis of patent licenses, spin-off companies, and research contract revenues. The focus on documented evidence is often justifiable: the transfer to *industry* of research results for their further development and application typically entails a commercial transaction revolving around the purchase of rights to the use of Intellectual Property (IP). In this context, technology commercialization becomes a cornerstone of the efforts to apply the knowledge generated in academic environments.

Yet, the relations between academia and other societal partners involve other activities like collaborative research, conferences, informal contacts or the temporary exchange of researchers, which are not necessarily reflected in written documents or legal agreements (Meyer-Krahmer and Schmoch 1998: 52). With the growth of interest in the

variety of knowledge exchange processes, a problem has, however, emerged: their visibility is variable. An exchange of knowledge conducted through a series of informal conversations cannot easily be identified, monitored and “counted”; in comparison the techniques to use patents and patent licensing data to analyse technology transfer are increasingly sophisticated and the quality, coverage and availability of the data sets is improving. Therefore, while the interest in the variety of “knowledge exchange” processes has increased, quantitative analysis has naturally revolved around activities that can be more easily quantified.

The activities that leave traces that can be aggregated in large databases are typically linked to commercial transactions: licenses and royalty agreements, research contracts, and the property rights on which these need to be based. Analysts have made a distinction between such “formal technology transfer mechanisms” embodying or directly resulting “in a legal instrumentality” revolving around the allocation of property rights and obligations, and informal means of transfer and exchange “facilitating the flow of technological knowledge through informal communication processes, such as technical assistance, consulting, and collaborative research” (Link et al. 2007: 642). Examples of informal transfer include “sending technical reports to knowledge users outside the scholarly milieu, giving presentations in a technical seminar organised by firms or other types of organisations, participating in industry expert groups or expert committees that are involved in efforts to directly apply research knowledge, etc.” (Landry et al. 2010: 1389). A broader definition of, in this case, informal University-Industry relations extends to “exchanges between firms and individuals inside the university, without any formal agreement involving the university itself. Typical examples are consultancy contracts with professors or information exchange meetings organised in an informal way.” (Bonaccorsi and Piccaluga 1994: 239).¹ Note that Bonaccorsi and Piccaluga’s definition of informality does not exclude all exchanges using a “legal instrumentality”: a university lecturer can sign a contract with a firm as an individual without informing the university, such collaboration will not however be visible to the university and it is therefore classed as informal. From this perspective informal collaborations can also be understood as those taking place “under the radar” of the university or research centre: they are not directly visible to management.

¹ We can easily broaden this definition to include all academic research organisations.

This is not an isolated event; several studies have observed that academics do not disclose all their knowledge transfer and exchange activities to administrators (Landry et al. 2010), and that, even when inventions are formally disclosed, firms will try to conclude informal arrangements with the scientists instead of going through the formal organisational channels (Siegel et al. 2003: 43). In fact, some evidence has been obtained suggesting that university scientists bypass their institutions to sell or license their discoveries privately (Markman et al. 2008). Individual academics may not inform their employers when they enter into individual contracts with clients and partners and, naturally, they are not required to inform their administrators every time they engage in a conversation with individuals from outside academia.

While commercialization activities formalised in legal documents leave clear traces that can be used as indicators of activity, performance and economic impact, academics trying to analyse knowledge exchange between researchers and other non-academic partners will find informal collaborations more difficult to identify and track (Hagedoorn et al. 2000). Indeed, most of these informal collaborations will not necessarily appear “on the books” of university administration (Boardman and Ponomariov 2009: 142). Is this a serious problem? Is it possible that an analysis focusing on formal collaborations may not present a fair view of the collaborations between academia and industry and society? This remains a debated matter.

Based on an analysis of 2000 German manufacturing firms, Grimpe and Hussinger conclude that formal and informal means of technology transfer are complementary (Grimpe and Hussinger 2008). Amara and his colleagues reach a compatible conclusion when they show that academics tend to engage simultaneously in paid and unpaid consulting (Amara et al. 2013), and argue that informal transfer activities are key in the establishment of a “virtuous circle among the different knowledge transfer activities” (Landry et al. 2010: 1399). This should not come as a surprise: research suggests that formal collaborations are typically built on initially informal contacts, which improve the quality of a formal relationship (Grimpe and Hussinger 2008). Once a contract has been fulfilled it is likely to be followed by further informal exchanges; that is, relations that do not take place within the provisions of the legal agreement. Formal and informal collaborations are thus complementary and can even be difficult to tell apart.

However, we cannot assume that this complementarity will exist under all conditions. A recent study covering more than 22,000 UK researchers across disciplines found that “academics tend to use either formal or informal channels for engagement, but rarely both” (Abreu and Grinevich 2013: 8). This result suggests that collaborations between researchers and non-academic partners may be conducted exclusively through informal channels without recourse to any legal instrument. If this were the case, recorded collaborations would hardly represent the actual extent of the collaboration between researchers and non-academic partners. The possibility that the variety of linkages may be such that it may not be adequately conveyed by data derived from formal agreements has analytical implications. Quantitative analyses addressing aspects of informality have had to collect data through questionnaires trying to approximate informal transfer activities and collaborations that are not gathered through official data (Link et al. 2007; Grimpe and Fier 2010; Amara et al. 2013). We follow on this literature strand by examining the extent to which the collaborations between academics and non-academic partners have remained exclusively informal and the conditions under which this occurs in a field, the SSH, where informal activities are particularly common (Abreu and Grinevich 2013; Castro-Martínez et al. 2008; Hughes et al. 2011).

For the purpose of this study, similarly to Bonaccorsi and Piccaluga (1994), we characterize informality by the absence of any legal agreement of any form underpinning a collaboration between an academic institution (public research organisation or university) and a non-academic partner (firms, government agencies, non-profit organisations, etc.). In contrast with previous studies, however, we establish a mutually exclusive differentiation between formal and informal collaborations: we define a collaboration between a researcher and a partner as informal when this has not been formalised at all through any legal instrument of any type or form involving the academic organisation. In other words no aspect of the collaboration is or has been visible to the administrators in the academic organisation. The very demanding conditions that this definition imposes can help us identify a type of collaboration that has not been emphasized in the literature. Research has so far suggested that informal activities can be a precursor to more formal engagement (Abreu et al. 2009; Druilhe and Garnsey 2004), or that there is complementarity between formal and informal transfer activities (Grimpe and Hussinger 2008), with academics engaging simultaneously in both of them (Amara et al. 2013). In contrast, by defining a collaboration as informal

only when it has not been formalised at all, in the cases of informality we identify there is no evidence of complementarity with formal mechanisms, or of an evolution towards formality as the collaboration matures.

3. The context: Social Sciences and Humanities at CSIC

The Spanish Council for Scientific Research (CSIC) is the largest public research organisation in Spain employing more than 7,000 researchers. The studies that provide the empirical basis for this paper were conducted between 2007 and 2010 and Table 1 presents some general data for the organisation in this period. It is a large public research establishment with a staff of over 12,000 arranged into research institutes, and characterised by the important role of core public funding and a large number of tenured researchers who constitute the core of the organisation. At the time the study was carried out, CSIC research activities were conducted by a large number of research groups (some formally established, others operating *de facto* without formal recognition) organised in research institutes, which constituted the administrative units.

Table 1: CSIC in figures

	2007	2010
Total number of CSIC Institutes	125	128
Total staff	12,885	14,144
Tenured researchers and technicians (civil servants)	4,541 (35%)	5,111 (36%)
Contracted researchers, technicians and grant holders	6,750 (53%)	7,508 (53%)
Administration and other	1,594 (12%)	1,525 (11%)
Sources of funding		
Core funding from Government	68%	54%
External Resources ^{***}	32%	46%
Contracts and agreements with private and public sector organisations and firms		
Number	1,314	3,099
Funding (k€)	63,149	78,600

Own elaboration based on CSIC annual reports of 2008 and 2011 (CSIC 2008; 2011).

^{***}External resources include funds from regional, national and international competitive R&D programmes, contracts with companies and organisations and funds from the European Social Fund and the European Regional Development Fund.

CSIC is organised into eight “scientific areas”, one of which is “Humanities and Social Sciences”.² Humanities and Social Sciences was one of the three original areas established when CSIC was created in 1939 and the support that some fields like American history received at this early stage still explains today the weight of the humanities within the area. Later, during the Spanish democratic transition, new social science institutes were created, slightly increasing the weight of the social sciences, although the humanities continued to dominate (Fernández-Esquinas et al. 2009).

The SSH area is composed of 17 research institutes: 6 in social sciences and 11 in humanities. Three of these institutes are joint research institutes of CSIC and universities (IEIOP, IHCD, INGENIO), and a further three belong to CSIC and regional governments (IEGPS, IAM, IESA). In the case of joint CSIC-University institutes, contracts and agreements can be channelled either through the university or through the CSIC³ (see Table A on the Appendix for further details on the SSH institutes).

They are several legal ways through which CSIC researchers can establish informal collaborations; that is, without a contract between the partner and CSIC. These include paid teaching or lecturing assignments, up to a limit of 75 hours per year, remunerated contributions to examination and evaluation boards, and, under certain conditions, they can also receive income derived from copyrights. Also, it should be noted that CSIC tenured researchers’ salaries are covered by the organisation’s operational budget and, besides, they enjoy substantial latitude in the definition of their research activities. They are therefore, in principle, free to enter any advisory or research activity requiring no other resources than their own work without charging the user of the results and without any formal contract.

4. Informal collaborations in the SSH: an analysis

4.1. Introduction

The empirical evidence we present here is structured into two main complementary studies. The first, conducted in 2007, is a quantitative analysis of CSIC research groups

² The remaining areas are biology and biomedicine; food science and technology; materials science and technology; physical sciences and technology; chemical sciences and technology; agricultural sciences; and natural resources.

³ This has implications for our analysis since we have had to consider contracts channelled through the relevant universities in addition to those channelled through CSIC.

in the SSH institutes focusing on the extent to which they engage in formal or informal collaborations with non-academic partners.⁴ The second is a qualitative analysis of a selected sample of SSH researchers and their partners to study in detail the characteristics of the collaborations they have undertaken overtime. This qualitative analysis allows us to enquire into the factors that can help explain the preeminence of informal collaborations found in the first part of the study.

4.2. Quantitative study

4.2.1 Data and methodology

Our study population is constituted by all the 97 SSH research groups at CSIC. Data were collected from:

- CSIC and university databases⁵ listing collaborations established through formal agreements (including contracts and other legal forms) between CSIC institutes and partners. We considered all the agreements in force at some point during the period 2002-2007 and we built a list of all the external partners with at least one formal agreement with a SSH research institute during that period.
- Semi-structured face-to-face interviews with representatives from all 97 research groups in all the SSH institutes. Groups were identified through institutes' web pages and the institute directors identified contact people in the groups. Groups were mainly small: more than half of them had less than 5 researchers holding a PhD degree. Interviews were held in 2007. The interviews established the groups' research activities and priorities and analyzed their collaborations with partners. We built lists of all partners identified by interviewees, with whom the groups had established collaborations in the period 2002 to 2007. Interview transcripts were sent to interviewees for validation. Group information was aggregated by institute to make it comparable with the data from the CSIC and university databases.

Therefore, the outputs of this process included two lists of non-academic organisations and a few non-affiliated individuals with whom researchers had established

⁴ In the following, we use the term 'partners' as shorthand for non-academic partners collaborating with researchers.

⁵ Relevant university databases were analysed for the three joint CSIC-University institutes, for which we will also considered the contracts and agreements channelled through the universities.

collaborations: one, derived from CSIC and university databases, included all partners who had entered contracts or other legal agreements, and the other, included *all* the organisations and individuals that researchers mentioned as partners during the interviews.

We found a broad variety of individuals or organisations outside the academia with an interest in SSH research: CSIC SSH research groups had established collaborations with 574 different partners during the 2002-2007 period. We then checked whether the partner identified during the interviews also appeared in the CSIC and University databases: if they did not, that specific partner was classed as having an exclusively “informal collaboration” with the CSIC institute; that is, the connection was taking place without any type of formal agreement. Therefore, for each institute the partners fell into two groups:

1. *Formal collaborations* which included all partners with at least one legal agreement with CSIC or relevant University during the 2002-2007 period.
2. *Informal collaborations* which included partners with relationships with CSIC researchers but who had not entered into any legal agreement of any sort during the period 2002-2007 with the researchers’ organisations.

Therefore, we are neither analysing patterns of formal and informal collaborations nor their intensity or frequency. Our focus is only on those collaborations that remain *exclusively* informal and we have used a very restrictive definition of “informal collaboration” to identify them. If a researcher and a partner had entered at least one agreement (a contract, a Memorandum of Understanding...) during that period, the collaboration was classed as formalised even if most of the collaborations were still being carried informally. We are interested in the “partner-institute” binomial regardless of the number of collaborations undertaken. Note that since we are comparing data at the institute level, a determined partner could collaborate with different SSH institutes leading to different “partner-institute” binomials; therefore, the number of total collaborations can be higher than the number of total partners identified over the period 2002-2007.

Finally, we considered the types of partners with whom collaborations had been established: 1) government organisations; 2) non-profit organisations, including

foundations, NGOs, industry and commercial associations, and technology centres; 3) public and private firms; and 4) individuals entering relationships on their own behalf (see Table 2 for further details).

4.2.2. Results

During the 2002-2007 period, CSIC researchers in the SSH area established collaborations with 574 different partners. More than three quarters of these partners were government (39.3%) and non-profit organisations (36.2%). This figure is completed by public and private firms (23.5%) and a few individuals (1%) usually owners of properties with historical or cultural interest, who required specialist services and advice for their upkeep and preservation. A detail of the different groups of partners is presented in Table 2 below. We observe a broad diversity of activities among partners but a dominance of public sector and non-profit organisations.

Table 2: Partners collaborating with SSH institutes during the period 2002-2007

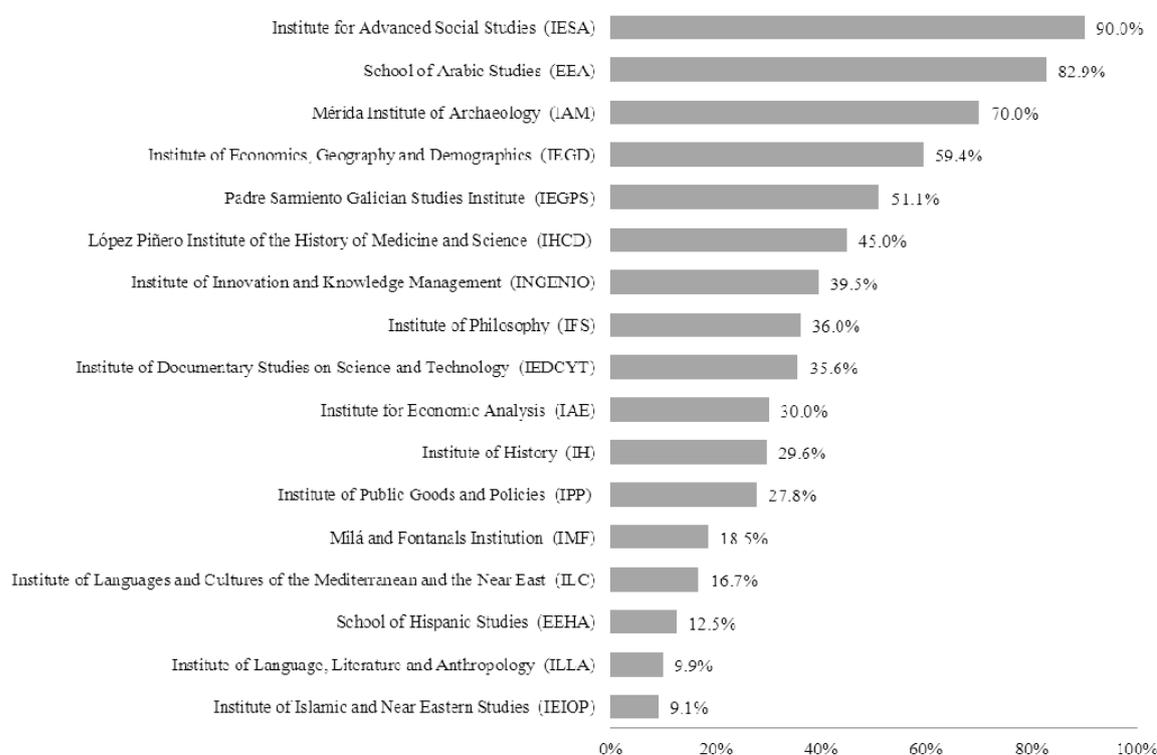
Type of partner	N (%)	Examples
Government organisations	226 (39.3%)	
• International organisations and foreign governments	37 (6.4%)	Foreign museums, embassies, international organisations in areas of culture and education (e.g. European Commission, United Nations).
• Central	57 (9.9%)	National museums, archives and libraries. Government departments in the areas of economic affairs and treasury, social affairs, culture, fine arts and heritage, tourism, education, health, migration, foreign affairs, labour affairs, justice, security, science and technology, environment, rural and marine affairs, agriculture, fisheries and food.
• Regional	76 (13.2%)	Libraries, regional museums and regional government departments responsible for social affairs and welfare, culture, economy and finance, tourism, education, sports, health, governance, public works and transport, science and technology, industry, environment, regional land planning and public works, agriculture and fisheries.
• Local	56 (9.8%)	Local museums, local government departments responsible for economy and local development, social affairs, and culture.
Non-profit organisations	208 (36.2%)	Private and public foundations and associations, trade unions, museums and churches.
Firms	135 (23.5%)	Firms operating in the following sectors: publishing and media, cinema, tourism, culture, management consulting, communication and information technologies, archaeology, architecture, public works and building, gas and electricity suppliers, mining.
Individual	5 (1.0%)	Owners of heritage buildings and sites.

Most of the collaborations with these partners are exclusively informal: from 662 collaborations identified between 2002-2007, 402 (61%) were classified as informal. Conversely, we labelled 260 collaborations (39%) as formal since we find traces of these relationships in the corporate databases. The percentage of informal collaborations we have found is very high, particularly if we take into account that, according to our definition, once a group has formalised a collaboration with a partner through, for instance, a contract or a Memorandum of Understanding, all the collaborations between any researcher in that group and the partner organisation, preceding or following such formalisation, are no longer considered informal.

Disaggregating this information by research institutes, we found a slightly higher percentage of informal collaborations for the institutes working in the humanities: informal collaborations amounted to 65% of the total collaborations for the humanities institutes and to 53% for the social sciences.⁶ Exclusively informal collaborations are predominant for 12 out of 17 SSH institutes; that is, for 12 institutes, more than half the partners that had established collaborations with members of the institute had not entered into any sort of legal agreement. Exclusively informal collaborations were particularly dominant at Institute of Islamic and Near Eastern Studies (IEIOP) and the Institute of Language, Literature and Anthropology (ILLA), where more than 90% were classed as informal collaborations. For a few institutes, however, most collaborations were classed as formal: Institute for Advanced Social Studies (IESA) (90%) and the School of Arabic Studies (EEA) (82.9%), (see Figure 1).

⁶ If we had considered the CSIC SSH institutes to be a sample of a broader population, this difference would not have been considered statistically significant. The Student's t-test indicates that the mean of the percentage of partners with informal collaborations is not significantly different between social science and humanities institutes (*p-value*= 0.339).

Figure 1: Percentage of “formal collaborations” over total number of partners involved in collaborations with each SSH institute over the period 2002-2007



Some telling differences emerge when we compare informal and formal collaborations according to the types of partners with which researchers established collaborations. Although in aggregate terms, government organisations (39.3%) are the most common partners and firms account only for 23.5%, this difference is even more marked if we restrict our analysis to formal collaborations. Almost 50% of formal collaborations are established with government organisations, while 31% are with non-profits organisations, and only 19% are with firms. Conversely, if we focus on informal collaborations, non-profit organisations emerge as the most frequent type of partner, accounting for almost 40% of all the agents with whom the CSIC SSH institutes established informally collaborations, followed by government agencies (35%) and firms (25%).

To summarize, the quantitative study highlights a prevalence of informal collaborations and a marked variety in their prevalence across institutes and across the type of partners. This suggests that a more detailed analysis is required to understand the way in which

these collaborations (formal and informal) emerge, the reasons why and the contexts where informality persists. The following section addresses these issues by analysing a sample of cases illustrating collaborations between SSH researchers and its partners.

4.3. Exploring informality: a qualitative study

4.3.1. Data and methodology

The second stage of this analysis consists of an in-depth study of examples of collaboration between selected CSIC SSH research groups and non-academic partners. The data was gathered as part of a large project funded by the European Commission under the 7th Framework Programme to develop methodologies to assess the socio-economic impact of research (www.siampi.eu). The method revolved around the identification of “productive interactions” (Spaapen and van Drooge 2011) between researchers and research stakeholders. The aim of the method was to trace in detail the type of collaborations that researchers and their partners established, their context, how they developed overtime and what did they entail in terms of knowledge exchanges and eventual social impact. Here we focus on how the collaborations were organised and how they were affected by market and other contextual conditions. Our goal is to explore the conditions under which collaboration are formalised as well as the reasons underlying the prevalence of informal collaborations in the SSH.

Using information on partners obtained through the first phase of the study, we selected 12 cases intended to be illustrative of the variety of collaborative situations and partners we had identified. The cases selected covered instances of formal and informal collaborations across all main SSH research fields, with partners from very different social spheres and in different geographical locations. Therefore, the selection was not random but rather intended to provide a window on the wide variety of collaborations established with partners and to illustrate in this way the different contexts within which collaborations emerged.

For all the cases analysed we interviewed the group leader (typically an experienced, tenured researcher) and, for ten of the cases, at least one non-academic partner involved in the collaboration under study (see Table 3 below). We conducted a total of 24 in-depth interviews. The programme of interviews was conducted during 2010 using a semi-structured questionnaire organised into three sections: the context of the research

and its application environment; the direct contacts established between researchers and partners (the “productive interactions”),⁷ and their outcomes.

4.3.2. The cases: the nature of the collaborations

The cases analysed provide evidence on the varied nature of the collaborations established and the conditions underlying them. Table 3 provides a summary of the groups interviewed and the collaborations analysed; these include both collaborations underpinned by contracts and agreements and those that were not. The table is arranged listing first those collaborations that were not covered by formal agreements.

⁷ Note that we address direct collaborations – in which the researcher can easily identify the partner and user of its research – and we do not consider indirect and diffuse ways of knowledge exchange such as publications or exhibitions.

Table 3: Cases analysed

SSH institutes and research groups	Partners	Nature of the collaboration and aim
ILLA: Linguistic geography and sociology (<i>Linguistics</i>)	Scientific Police- forensic laboratory (national government)	Informal and personal collaborations to support specific analysis or voice recordings. The research group provided advice about the creation of the acoustic forensic laboratory.
ILC: Iberian Jewish culture (<i>Jewish Culture</i>)	Association Casa Sefard-Israel (non-profit organisation)	Personal and occasional assistance in dissemination events on the history of Spanish Jews.
IMF: Musicology (<i>Music</i>)	Record Producer (small firm)	Informal and personal collaborations aimed to recover music scores from the XVIth Century and transcribe them into modern notation to be played and recorded.
ILLA: Spanish theatre (<i>Theatre</i>)	National Classical Theatre Company (public theatre company)	Informal and personal collaborations with researchers advising a theatre company on the performance of baroque theatre.
ILLA: Heritage, memory and identity (<i>Identity</i>)	Association of Aluche-Carabanchel prison ^a (non-profit organisation)	Informal and personal collaboration with a neighbourhood association dealing with problems associated with the management of large derelict former prison (Carabanchel) in the neighbourhood.
IFS: Philosophy after the Holocaust (<i>Philosophy</i>)	Road safety prosecutor (national government)	Informal and personal collaborations to analyse the attitudes of road users towards road safety.
IEGPS: Archaeology and heritage (<i>Archaeology</i>)	Galician government (regional government)	Formal agreement to provide advice and technical support on archaeological sites valorisation.
	Wind Energy company (large firm)	Contracts to carry out archaeological impact studies previous to engineering and construction works.
	Archaeology company (small firm)	Contracts to carry out archaeological impact studies previous to engineering and construction works.
IEDCYT: Scientometrics, knowledge production and transfer in health and biotechnology (<i>Scientometrics</i>)	Genoma España (non-profit organisation)	R&D contracts to produce bibliometric analysis of Spanish biotechnology research.
IH: Contemporary international relations (<i>International Relations</i>)	Casa Asia (non-profit organisation)	Annual formal agreements for the organisation of bilateral Spain-Philippines fora and the organisation of seminars, courses and research project on the Philippines.
IESA: Social studies on immigration (<i>Immigration</i>)	Directorate General for immigration (regional government)	Formal agreements to build and manage a Permanent Andalusian Observatory of Migrations. The collaboration includes the elaboration of reports.
IEGD: Economic geography and urban development (<i>Geography</i>)	Madrid City Hall ^a (local government)	Formal agreement for the development of the Industrial Observatory of Madrid. The collaboration includes the elaboration of annual reports and monographies.
ILC: Written heritage of the Ancient Near East (<i>Manuscripts</i>)	Foundation Montserrat Abbey and Compañía de Jesús (non-profit organisation)	Formal agreement (without commitment of financial resources) to allow researchers' access to Coptic manuscript collections held at the Monastery of Montserrat. Researchers contribute to the identification and conservation of the manuscript collection.

^a Partners not interviewed

A first observation is that our interviews with partners tended to be more emphatic about the contribution of the researchers than the views offered by the researchers themselves. The researchers were not able to appreciate fully the impact of their contributions.

Informal collaborations revolved around personal contacts and were open-ended: the partner would draw on the help and assistance of the researchers as needs emerged and usually for very specific and recurrent tasks: several lectures, a string of queries. These requests for help were underpinned by long-term personal acquaintance and bonds of trust; the partner would typically call the researchers with a specific request (for a lecture, a query or request for help) and the researcher would agree to provide help. The small magnitude of each specific request and the economic context of the relationship obviated the need for any contractual agreement and economic compensation. For instance, a linguist⁸ would give, from time to time, his opinion on forensic work; a historian was available to participate in conferences and lectures to promote the awareness of the Sephardic legacy and the reality of Jewish communities in Spain and Israel. These collaborations were occasional, recursive and did not require additional research exploiting, instead, the accumulated expertise of the researchers.

Informal collaborations could also be more structured. The poetic music research group has developed a long-term collaboration with a specialised record producer company with the objective of recovering and recording music scores from the Spanish XVth Century.⁹ Part of this task involves transcribing the old music score into modern notation and to work with performing musicians; in so doing, the research have adapted their research objectives to the need of this specific community of research users. Overtime they have developed strong personal links, and the collaboration has evolved and strengthened without any formal agreement.¹⁰ In this case, the interviewees (both the researcher and the partner) reported that one reason for the absence of formal contracts is the limited monetary worth of the outcomes of this collaboration: Spanish XVIth Century music has a very small audience and therefore the potential income that

⁸ The linguistic group also helped in the consolidation of the laboratory at the time of its creation, in the design of the techniques and methodologies used in the laboratory and in the professionalization of its technicians (without any agreement).

⁹ See Castro-Martínez et al. (2013) for more details on the musicology case.

¹⁰ There is an agreement between the CSIC and the record producer for the edition of each music CD but not for the collaborative activity between the research group and the record producer.

can be derived from this activity is very small.¹¹ The need for additional resources to carry out the research and collaborative work, in addition to the time of the individuals involved, is also very small. No economic exchange is required and, under these circumstances, there is no need to formalise the collaboration. The collaboration has proved to be open-ended, but more intense than in the case of recurrent small collaborations.

A similar relationship has been developed between researchers in classic Spanish theatre and the National Classical Theatre Company. Again, over the years, the Director has drawn on the advice of the researchers, but such collaboration has not required additional financial commitments by both parties. The advice provided has helped changing the way Spanish Classical theatre is performed, changing all aspects of the performance, from props to diction. The collaboration is more involved than the mere provision of arms-length advice, but has also remained open-ended and based on personal links.

Sometimes the collaboration revolved around a specific, sizeable problem. A group of anthropologists working in a group researching “heritage, memory and identity” at the Institute of Language, Literature and Anthropology (ILLA) helped a neighbourhood association to deal with a large, iconic, abandoned prison in their neighbourhood. The anthropologists reported that, although the work required research, the neighbours did not have economic resources to contribute to it, and the researchers used their core funding and capabilities to work with the association, again without any formal agreement. The researchers designed a programme of action research and help the neighbourhood to deal with the variety of problems caused by having an “undesired” heritage like a large abandoned prison in their midst. Therefore, the researchers benefitted by obtaining access to a study case: pecuniary compensation was not an important consideration in their view. A similar case, where researchers obtained access to research subjects or situations, can be found in the collaboration between a group of philosophers and the road safety prosecutor; the problems the prosecutor brought to the table influenced the research strategy of the group: the road safety prosecutor contacted the group to work together in the study of driver behaviour leading to road accidents. Both parties have been working together and have organised joint seminars, workshops

¹¹ Indeed, the production of a music CD would not possible without the sponsorship of private and public entities (Castro-Martínez et al. 2013).

and other events involving additional stakeholders. Outputs of this collaboration include scientific publications and prosecutor reports to Congress on road safety campaigns and school. Again, the collaboration did not involve any financial exchange and was conducted without any formal agreement or contract. In these cases, researchers reported during the interviews that they typically did not require resources other than their own work to provide the services involved in the collaboration and that they were moved by an interest to see their research applied (*Linguistics, Jewish Culture, Music, Theatre, Identity, and Philosophy* cases in Table 3).

Formal contracts were present when the exchange was mainly driven by pecuniary objectives (like in the *Archaeology* group provision of consultancy services) or when additional resources were needed to carry out the work. The latter cases called for formal contracts and agreements to channel the funds and establish the basis on which an exchange of money for services is conducted. Markets for research services are better established in some areas than others. A perhaps surprising area where a large commercial market exists is archaeology: in Spain archaeological audits are required by law before starting any major civil engineering or building project. This has opened a market for specialised audits, where CSIC archaeologists have been active. The *archaeology* research group¹² we studied carried out archaeological impact assessment audits for wind energy companies, civil engineering and construction firms, and naturally all this work was carried out under contract.

Contractual research had also been carried out, among others, in the field of scientometrics with the foundation “Genoma España”. The goal here is the production of bibliometric studies on Spanish biotechnology. This is a continuous collaboration (7 years working together) based on a string successive R&D contracts. The work here requires the access to data that is typically generated by commercial organisations and is, therefore, costly to access.

Other formal agreements (“*convenios*”) are signed with government departments and other public sector organisations to frame research collaborations involving a transfer of economic resources to the research group. We identified several of these formal collaborations: archaeologists working with the Galician regional government in a variety of projects, *international relations* scholars working with a public sector

¹² See Parga-Dans et al. (2012) for more details on the archeological case.

consortium (“Casa Asia”) to organise activities to promote links between Spain and the Philippines, *immigration* researchers establishing an Andalusian Observatory of Migration for the regional Directorate for Immigration Policy, and the *geography* group establishing the Industrial Observatory of Madrid for the Madrid City Hall.

In all these cases the researchers are moved, at least in part, by a need for resources or pecuniary interest and deal with an organisation with the capacity to make an economic contribution. Yet, agreements can also be signed in situations where there are no monetary exchanges but there are aspects of the relationship that recommend the use of some sort of legal document. An example is provided by the agreements between the Written Heritage of the Ancient Near East group at CSIC, a Catalan university, with the Montserrat Benedictine Abbey and the Jesuit order (“Compañía de Jesús”) to catalogue old manuscript collections held by both religious organisations. Both agreements were signed to establish the conditions under which the researchers gained access to the unique Greek and Coptic manuscript collections in exchange for help in cataloguing and maintaining them, and to establish the responsibilities of the researchers in relation to the handling of the collection. Additionally, in the case of the Montserrat Abbey, the researchers were sometimes offered free lodging at the monastery holding the collection.

Formalisation has therefore emerged when there is a financial exchange involving both, researcher organisation and partner, and when there is a need to formalise the conditions under which a specific work is carried out, because, for instance, access is being granted to valuable collections. This naturally occurs in the SSHs, but what the study above shows is that there is a wide set of situations under which it does not. These are discussed in the following section.

5. Discussion and conclusions

Despite using a very stringent definition of informality, we have found that informal collaborations with partners are very common among CSIC SSH research groups. This differs from a finding stressed in much of the literature that sees informal and formal links as complementary. This makes intuitive sense: the application of knowledge generated in academia calls for an understanding of both the context of knowledge generation and the context of application. In this situation it is normal for a formal

collaboration (covered by a “legal instrumentality”) to follow initial informal exchanges in which the parties to the transaction learn about each other and their contexts. The use of a formal instrument (for instance, a research contract) will typically be agreed upon when a collaboration requires the use of resources that both sides consider significant. Yet, once a formal instrument has been established, it is not necessarily the case that all collaborative activities between the partners take place under such agreement. On the contrary, the partners can take advantage of the possibilities open through the new formalised collaboration to explore new ideas and themes for further work. Formal and informal collaborations can co-exist and strengthen each other.

There are contexts, however, in which such complementarities do not appear. First, it is not always the case that the existence of a formal agreement encourages further informal collaborations: legal and commercial departments in firms and research centres linked through research and IP exploitation contracts are often concerned about the implications of loose talk among scientists and engineers (Tang and Molas-Gallart 2009). When the economic stakes are high, the boundaries set up by the legal instruments may define the limits of the collaboration in its entirety. If important investments in equipment are required and the technologies or services under development have substantial commercial potential, firms seeking research collaboration will be looking for exclusivity in the use of the research results and will aim to impose confidentiality and other conditions on the researchers. Academic organisations and individuals will also seek commercial agreements that will allow them to capture part of this value. In these situations the degree of complementarity between informal and formal collaboration could depend on the maturity of a collaborative link. Some sort of informal collaboration may be needed to establish the elements of trust required to develop a deeper formalised relationship, but once this is established the collaboration is channelled through the formal instruments that have been set up. Our study has not addressed this situation, but suggests that the dynamic relationship between formal and informal collaboration requires more attention. Be that as it may, in a situation where informal links lead to formal collaboration, the documents underpinning it can still provide good indicators of the extent of the collaboration. This is not the situation we have found in our study.

Our results suggest that there are situations in which informal and formal collaboration may not be complementary at any point in the life of the relationship: that instead of

informal contacts leading to formal agreements and living alongside them, collaborations may persist in their original informality for long periods of time. This has implications for our understanding of the nature of the relationships between academia and society, for our approaches to data collection, and for policy. We will address them in turn.

Our main conclusion is that there are contexts in which informality is persistent. Our qualitative analysis suggests that informal collaborations are maintained overtime under conditions related to the characteristics of the partners, the researchers, the type of collaborative activity, and its expected results. Informality, in the narrow sense we have defined it here, can emerge when the researcher is not moved by pecuniary motives and is able to collaborate with partners who have no economic resources to contribute towards the costs of his or her work. Two economic conditions have to be fulfilled for this to happen: (1) the activity must not involve substantial additional costs above the direct costs of the work of the researchers' involved; and (2) the work must be covered by "core" research funding or other projects. Additional costs will be low or non-existent when collaborations are based on the accumulated knowledge of the researcher (like in the cases of *theatre*, *Jewish culture*, *linguistic* in Table 3); in other words, when original research is not involved. In our cases, however, there were situations where informality existed in collaborations involving research activities. In these cases, for resources to be invested informally in these research activities, there is a need for core research funding and for researchers to have the freedom to apply such core funding to the activities they choose (see *music*, *identity*, *philosophy* in Table 3). In contexts where research is funded mainly through projects rather than core funding, resources are usually linked directly with paying projects and informality is unlikely to emerge with the regularity we have seen in our study. If the conditions for persistently informal collaboration are fulfilled, we find a variety of non-pecuniary reasons that explain the involvement of researchers in informal collaboration: the opportunities it offers to access data and information, to apply knowledge in areas the researcher finds interesting and valuable, and to make valuable contributions to society. As Schiller argues (Schiller 2010), one of the dimensions of informality is the existence of a set of intangible rewards.

Therefore, when non-pecuniary motivations exist, and the economic conditions allow it, it is not unusual to find collaborations that remain informal overtime. Formalising a

research activity could still have some advantages, even under these conditions: it could help determine the responsibilities of the partners (e.g. confidentiality, deliverables), and could give legal cover in case disputes arise about the nature of the advice given or the use of partner resources. We can hypothesize that partners who fulfil the conditions to enter an informal collaboration will gauge the costs and advantages of formalisation. The higher the costs of a formal engagement the more likely it is that the collaboration will remain informal. In a system like the Spanish that is highly bureaucratic and where administrative conditions and practices are very burdensome, we should expect informality to appear more frequently. Further, when collaboration revolves around a string of small engagements (like recurrent consultations) related to a specific question or problem, and when the needs emerge suddenly, formalisation is likely to be too slow and afford few, if any, benefits to the collaboration partners (like in the case of *linguistics*).

This paper has focused on a specific field (the social sciences and humanities) within a very specific institutional context (a large Spanish research organisation). It has proposed a way to analyse informal collaborations and pointed out a specific context in which persistent informality occurs. The conditions that enable and facilitate the emergence of collaborations that remain informal overtime are not unique to our context, but obviously they are not reproduced everywhere. Further researcher is needed to provide a systematic, general view of the conditions under which informality persists and to be able to establish different propensities to formalise collaborations across institutional settings and fields of knowledge.

Our results have also implications for the kinds of indicators that should be used in analytical work. If informal collaborations thrive under specific contextual conditions, indicators based on formal legal documents (like, for instance, research or license contracts) will capture a varying proportion of the collaborations established between academics and non-academics depending on their contextual conditions. Therefore, the use of these indicators cannot be indiscriminate; in particular, care should be exercised when using them for comparative purposes or for the aggregate analysis of areas of knowledge where the propensity to formalise collaborations may be different. This is not to mean that indicators cannot be developed to analyse informal collaborations; they do leave trails: partners linked through an informal collaboration will still exchange emails, may co-author articles and reports, and their participation in the organisation of,

for instance, cultural events and exhibitions is likely to be acknowledged. But such indicators of collaboration are difficult to assemble, and even more difficult to be constructed in such a way that could enable the researcher to use them as aggregate measurements. This is an area where further work is needed. Typically, scholars have developed and implemented bespoke questionnaires to capture informal collaborations, but these can also face problems. Written questionnaires might not be able to capture the extent of informal collaborations. Researchers could be reluctant to compromising on paper collaborations not officially entered, or may think that small collaborations are irrelevant. If informal links are important, responses to questionnaires will be very sensitive to the ways questions are posed and the forms in which the research design tries to capture informality.

From a policy perspective, informal collaborations remain invisible to the management processes of the research organisations within which they take place. Again, any data derived from such management sources is likely to be incomplete and biased (since the situations that lead to informality do not appear equally in all research disciplines and research management contexts). This has to be taken into account when considering the management of science and technology policies: the lack of visibility of many instances of collaboration in the SSHs has important implications for policy implementation. First, informal activities are difficult to include in institutional and individual assessments. In the Spanish context, where assessments are based exclusively on activities that can be audited, informal collaborations are not, for instance, taken into account when considering individual academics for promotion. This is likely to have been a disincentive to the development of these forms of interaction; finding that there is no reward or recognition for these activities some researchers may try to avoid them. Yet, trying to recognize them for evaluation and assessment purposes is not a straightforward endeavour. Attempts to identify and “count” them may lead to increased bureaucratization and the feeling among researchers of a growth in the “audit culture” and to react against it, either by keeping the activities “underground” or by ceasing to engage in them. Attempts at formally recognizing more forms of collaboration in, say, promotion decisions, may lead researchers to focus only on those activities that are “counted”. How to develop management and incentive systems that cover formal as well as informal means of collaboration remains an open challenge for research policy.

As research organisations and their funding departments accept the need to increase the value academic researchers provide directly to society, policies to develop technology transfer, knowledge exchange and research impact are becoming more widespread. Yet, many of them still focus on the commercialization of research outputs and the management of IP for the generation of commercial gains, and leave unaddressed the forms of knowledge exchange in the SSH we have identified in this paper. Support to knowledge exchange in these fields requires a broader set of instruments that should go beyond commercialization support. The need to facilitate social engagement and to build social networks between academic researchers and potential partners of their research should be included in the mix of policy instruments if the objective is to improve the contribution of SSH researchers to societal development. Such policies are, however, unlikely to generate economic returns and should, besides, stay clear from attempts at formalising the collaborations that have been established, lest this attempt become a disincentive for the same activities they aim to promote. Under these conditions assessing the effectiveness of such broadly-based knowledge-exchange support activities becomes particularly difficult.

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Appendix

Table A: Social sciences and humanities institutes of the CSIC

Area	Nature of the institute	Acronym	Name of the institute
H	C	IH	Institute of History
H	C	IMF	Milá and Fontanals Institution
H	C	ILLA	Institute of Language, Literature and Anthropology
H	C	ILC	Institute of Languages and Cultures of the Mediterranean and the Near East
H	C	IFS	Institute of Philosophy
H	C	EEHA	School of Hispanic Studies
H	C	EEA	School of Arabic Studies
H	J	IEIOP	Institute of Islamic and Near Eastern Studies
H	J	IHCD	López Piñero Institute of the History of Medicine and Science
H	J	IEGPS	Padre Sarmiento Galician Studies Institute
H	J	IAM	Mérida Institute of Archaeology
SS	C	IEGD	Institute of Economics, Geography and Demographics
SS	C	IEDCYT	Institute of Documentary Studies on Science and Technology
SS	C	IPP	Institute of Public Goods and Policies
SS	C	IAE	Institute for Economic Analysis
SS	J	IESA	Institute for Advanced Social Studies
SS	J	INGENIO	Institute of Innovation and Knowledge Management

H: Humanities; SS: Social Sciences

C: CSIC institute; J: Joint institute