TOO MANY COOKS SPOIL THE BROTH? GEOGRAPHIC CONCENTRATION, SOCIAL NORMS, AND KNOWLEDGE TRANSFER

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ABSTRACT

A long tradition in social science research emphasizes the potential for knowledge to flow among firms colocated in dense areas. Scholars have suggested numerous modes for these flows, including the voluntary transfer of private knowledge from one firm to another. Why would the holder of valuable private knowledge willingly transfer it to a potential and closely proximate competitor? In this paper, we argue that geographic concentration has an effect on the expected compliance with norms governing the use of transferred knowledge. The increased expected compliance favors trust and initiates a process of reciprocal exchange. To test our theory, we use a scenario-based field experiment in gourmet cuisine, an industry in which property rights do not effectively protect knowledge

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and geographic concentration is common. Our results confirm our conjecture by showing that the expectation that a potential colocated firm will abide by norms mediates the relationship between geographic concentration and the willingness to transfer private knowledge.

Keywords: Geographic concentration; density; knowledge transfer; social norms; field experiment; hospitality industry

INTRODUCTION

A long tradition in social science research emphasizes the potential for knowledge to flow among firms colocated in dense areas. Scholars have suggested numerous modes for these flows: attention to local patents (Jaffe, Trajtenberg, & Henderson, 1993); employee mobility (Zucker, Darby, & Brewer, 1998); spinoff companies (Klepper, 2007); and the direct voluntary exchange of knowledge between colocated firms (Singh, 2005). This latter mechanism contains a puzzle: why would a firm voluntarily transfer valuable know-how, information, or creative ideas to a potential competitor? Property rights (such as patents) can resolve this problem by protecting transferred knowledge from competitive use. But what happens in a setting where such protection is either unavailable or intractable?

Previous attempts to answer this riddle have focused on the role of social networks in facilitating repeated exchange. Social networks are "a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (Bourdieu, 1986, p. 248). In such a durable relationship, good treatment is likely to be reciprocated in the future (Larson, 1992; Uzzi & Gillespie, 2002).[1] These durable reciprocal arrangements arise, Larson (1992) argues, following initial bilateral exchanges and the subsequent iterative development of reciprocity and trust.

The potential role of social networks in supporting information transfer within clusters is an intriguing idea, but it implies a further puzzle. When colocated firms compete for customers, how is the resistance to an initial risky exchange overcome? Indeed, given the additional competition

[1]Thus by favoring such repeated exchange, local social networks allow privileged access to knowledge and information (Burt, 1992; Coleman, 1988).

inherent in co-location (Sorenson & Audia, 2000), some scholars have predicted that knowledge exchange actually will arise more easily among *distant* parties. How then does geographic concentration facilitate voluntary transfer? In this paper, we evaluate a potential explanation: the milieu of dense areas, we conjecture, directly changes expectations that colocated firms will abide by norms regulating the use of transferred knowledge. This expectation of norm conformance increases the potential for an actor to willingly transfer private knowledge to a notional[2] cluster member, thereby easing the development of a reciprocal exchange.

We conduct our research in the context of the gourmet cuisine industry. This is an ideal setting for our study, because patents, copyrights, or trade secrets usually cannot protect relevant knowledge in this industry, such as recipes or techniques (Fauchart & von Hippel, 2008). Instead, according to previous research, norms of knowledge use substitute for missing legal rights by restricting the manner in which transferred knowledge can be utilized by the receiver (Di Stefano, King, & Verona, 2014; Fauchart & von Hippel, 2008; Loshin, 2008; Oliar & Sprigman, 2008).

In conducting our research, we first engaged in detailed interviews with numerous chefs and industry experts to better understand operating norms (Di Stefano, King, & Verona, 2015). Based on these interviews, we developed a theory of transfer and tested it using a scenario-based experiment (Florey & Harrison, 2000; Gomez, Kirkman, & Shapiro, 2000; Schminke, Ambrose, & Noel, 1997) that we administered to an extensive sample of Italian gourmet chefs.

The remainder of this paper is organized as follows: We first review extant literature and discuss the relationship among geographic concentration, social norms, and knowledge transfer. The empirical approach is presented next, followed by results and robustness tests. We conclude by discussing the implications of our findings and acknowledging the limitations of our study.

THEORY AND HYPOTHESES

Social Norms and Knowledge Transfer

Knowledge transfer is essential to the continued development of society, but once revealed knowledge becomes a public good (Arrow, 1962). As a

[2]We assume the common meaning of notional: existing only in theory or as a suggestion or idea – speculative, conjectural, or suppositional.

result, individual actors could have a reduced incentive to invent and reveal their private knowledge to others (Anton & Yao, 1994). To overcome these misaligned incentives and encourage innovation and knowledge transfer, governments often create legal protection for intellectual property, such as patents or copyrights (Gans, Hsu, & Stern, 2008; Pisano & Teece, 2007; Zhao, 2006). Empirical evidence suggests that when these rights are missing many actors choose to keep their ideas secret (Cohen, Nelson, & Walsh, 2000), or transfer them only when they possess complementary assets that impede others from putting them to use (Gans & Stern, 2003; Teece, 1986). Still, if legal protection mechanisms are not all available, why would competing firms exchange unprotected private knowledge?

Recently, scholars have proposed that informal institutions such as social norms may provide an answer. These norms, scholars argue, substitute for legal protection by restricting the use of transferred knowledge and thereby allow the originator to retain some of its private value (Fauchart & von Hippel, 2008). Social norms are "the informal rules that groups adopt to regulate and regularize group members' behavior" (Feldman, 1984, p. 47). They constitute a system of social control that acts without a central rule maker or enforcer (Ingram & Clay, 2000), but is instead created and maintained by the members of the social group (Greif, 1993). Scholarly attention has been long devoted to the role that social norms play in governing interpersonal relationships (Coleman, 1990; North, 1990; Ostrom, 1990). In the context of knowledge transfer, scholars have recently proposed that norms may govern the acceptable use of knowledge obtained from other parties (Di Stefano et al., 2014; Fauchart & von Hippel, 2008; Loshin, 2008; Oliar & Sprigman, 2008). According to these scholars, by protecting transferred knowledge, these norms (hereafter "norms of knowledge use") allow some creative industries (e.g., cuisine, entertainment, and fashion) to retain high levels of creativity and innovation even though legal protection of intellectual capital is lacking.

To date, research has not thoroughly examined how the strength of these norms may vary with the context in which the actors reside. In this paper, we begin to close this gap in the literature by exploring how expectations of norm compliance will vary with the geographical concentration of competing firms. Evidence with respect to this issue is needed to explain how competition in dense areas is overcome (Mesquita, 2007) so that benefits of co-location can be garnered (Saxenian, 1994). This is consistent with work suggesting that the choice of knowledge protection mechanisms is influenced not only by a firm's ability to use one mechanism instead of the other, but also by the surrounding institutional environment (Liebeskind, 1996). In the remainder of this paper, we develop predictions for how one particular feature of the surrounding environment, that is, geographic concentration, influences the strength of norms of knowledge use, and hence the choice of this particular knowledge protection mechanism. We then propose a means for evaluating whether variance in the expected strength of norms mediates the relationship between geographic concentration and voluntary knowledge transfer. Finally, we describe the method and results of a field experiment we used to test our hypotheses.

Geographic Concentration and Social Norms

Physical proximity is thought to help with the formation of interpersonal interactions which then lead to network ties and the exchange of knowledge. For example, Camagni (1995) claims that proximity helps in the creation of a local network through which knowledge can flow. These networks then facilitate knowledge inventiveness, shared knowledge, and competitive advantage (Davenport, 2005; Giuliani, 2007; Iyer, Kitson, & Toh, 2005; Pittaway, Robertson, Munir, Denyer, & Neely, 2004).

But through what mechanism does proximity lead to effective networks of knowledge exchange? Shouldn't proximity also increase competitive pressures and thereby reduce the incentives to share private knowledge? One explanation for how competing pressures are overcome is that proximity increases the frequency of exchange between nodes in a network and thereby allows the development of reciprocity.

Ekeh (1974) builds on Levi-Strauss to propose that direct exchange initially involves "high emotional tension, a 'quid pro quo' mentality and strict accounting" and "low levels of trust and solidarity" (Molm, Collett, & Schaefer, 2007, p. 208). This distrust can be overcome over time, however, among closely spaced actors. Bathelt, Malmberg, and Maskell (2002, p. 12) argue that proximity-driven repeated exchanges "stimulate fine-grained information transfer, joint problem-solving arrangements and the development of trust and reciprocity." Uzzi (1997, p. 43) concurs that trust is a bi-lateral construct that develops through reciprocal exchange, and reports that many industry players perceive it that way: "Trust is the distinguishing characteristic of a personal relationship"; "It's a personal feeling"; and "Trust means he's not going to find a way to take advantage of me. You are not selfish for your own self. The partnership [between firms] comes first."

Larson (1992) proposes a sequential three-stage process that leads to exchange and trust. In the first stage, actors recognize the potential for mutual benefit; in the second, they engage in a sequence of reciprocal exchanges and build mutual trust. In her own words, "control in the nascent exchange structure was the result of the incremental growth of trust and the evolution of reciprocity norms during a trial period, in which one of the partnered firms took the role of initiator as rules and procedures and expectations were established" (Larson, 1992, p. 84). In the third stage, actors engage in more and tighter exchange and cooperation.

The notion of a staged development of recognition of mutual benefit and then increasing exchange and trust synthesizes an important tradition in the development of exchange. Yet, it does not seem sufficient to some scholars. As Yamagishi and Cook (1993) and Takahashi (2000) note, emphasis on the benefits of mutual exchange and the potential for reciprocity to build trust ignores the "difficulty of establishing a structure of stable giving without initial levels of high trust or established norms" (Molm et al., 2007, p. 209). As it has been long demonstrated, repeated exchange can also lead to mutual defection and distrust. Indeed, one might expect that trust would be slow to develop in geographically concentrated areas (Mesquita, 2007). Close proximity can lead to battles over local markets and resources (Florida & Kenney, 1990) and thereby degenerate into a spiral of distrust (Zand, 1972), hampering the area's long-term prosperity (Schmitz & Nadvi, 1999).

To resolve this conundrum, Maskell, Eskelinen, Hannibalsson, Malmberg, and Vatne (1998) and others have argued that dense areas, despite the inherent increase in competitive risk, might actually support initial trust levels. "Trust exists in local milieus as something inherited, that any 'insider' will benefit from by default" (Bathelt et al., 2002, p. 12). Huggins and Johnston (2010, p. 466) argue: "social norms and customs are embedded in the social environment, with the trustworthiness of any environment often tacit and specific to each community." They argue that these norms are part of the "place-based nature of social capital […] influencing the connection of knowledge across organizations through the generation of localized trust by individuals" (Huggins & Johnston, 2010, p. 466).

How might geographically concentrated areas provide "an initial level of trust" that will be "naturally" granted to any member? One possibility is that shared membership in a dense area can lead to the expectation that another member will possess a dense network of common ties and relationships (Camagni, 1995). These dense connections will then increase expectations of norm conformance by raising the likelihood of monitoring of a neighbor's actions and the administration of sanctions. Coleman (1990) argues that when a social network displays great density, the presence of common ties between actors increases the ability to monitor and sanction deviations from community norms. The presence of common ties makes it difficult to escape the notice of others and increases the potential that independent third parties will sanction deviations from appropriate behavior. Higher monitoring ability and a greater potential for social sanctioning in turn favor the development of trust and cooperation (Allcott, Karlan, Möbius, Rosenblat, & Szeidl, 2007). These multiple connections lead to "social capital" that facilitate adherence to governance rules, reduce market inefficiencies, and facilitate economic development.

Scholars from other disciplines have reached similar conclusions about the effect of density. Ostrom (1990, pp. 183–184), for instance, notes that when individuals live in close proximity "for a substantial time and have developed shared norms and patterns of reciprocity, they possess social capital with which they can build institutional arrangements for resolving [common pool resource] dilemmas." These "institutional arrangements" are more effective when participants are able to negotiate rules, observe compliance, and sanction non-adherence. Physical proximity and multiple contact points, such as those that exist in dense areas, are critical parts of all three conditions (Ostrom, 1990; Poteete, Janssen, & Ostrom, 2010).

If the close proximity inherent in geographic concentration leads to a higher expectation of conformity to social norms, we should observe this with respect to expectations about whether a notional colocated firm will follow social norms. By "notional" we mean a conjectural actor that is not currently in an exchange. In our case, the social norms of interest govern the use of transferred knowledge. Among chefs in gourmet cuisine, these norms protect the source of the knowledge by stipulating that knowledge may not be further passed on or used to make an exact copy. If used to make a derivative product, the source of the knowledge must be publically acknowledged. If close proximity among actors facilitates expectations that these norms will be followed, we can form the following testable hypothesis:

> **Hypothesis 1.** The density of the area in which a firm is located will be associated with a higher expectation that a notional colocated firm will conform to social norms of knowledge use.

For this hypothesis to have an effect on the transfer of valuable private knowledge to a colocated firm, we must further stipulate that the expectation of conformance to norms actually encourages knowledge transfer. Previous research has shown that social norms play a fundamental role in the creation, prospering, and survival of interpersonal relationships, through the creation of trust among participants in the normative institution (Robson, Katsikeas, & Bello, 2008). Agents are biased toward interaction with nearby agents because local understanding of rules and norms promotes cooperation (Riolo, Cohen, & Axelrod, 2001; Sigmund & Nowak, 2001).

In our qualitative research, we received numerous reports that confirmed these insights. For example, when we asked a chef in an area with few restaurants about her interaction with local chefs, she reported only speaking routinely to other chefs when, in a previous location, she had been part of a dense area. We also observed that interviewees located in geographically concentrated areas reported greater expectation that their local competitors would adhere to behavioral norms. Thus, based on theory and qualitative evidence, we can hypothesize a link between expectations between norm conformance and knowledge transfer.

> **Hypothesis 2.** The expectation that a notional colocated firm will conform to social norms of knowledge use mediates the relationship between the density of the area and the likelihood of knowledge transfer to that firm.

METHOD

To test our hypotheses, we sought a method that would allow us to show how the expectation that a notional colocated knowledge recipient would abide by norms of knowledge use is affected by the location of the knowledge holder, and to test the effect of this expectation on planned behavior. To this end, we carried out a scenario-based field experiment, which allows us to combine the inference power of a randomized experiment with the reach and relevance of a field study (Florey & Harrison, 2000; Gomez et al., 2000; Schminke et al., 1997). In a scenario-based experiment, each scenario consists of a random combination of treatments that are meant to manipulate the variables of interest. By asking questions following each scenario, we can observe how the dependent variables change with the treatments included in the scenario. Our experiment was carried out in the field, in the gourmet cuisine industry. This industry is the ideal setting for our study given the importance of norms of knowledge use, the existence of a large pool of industry players, as well as variance in geographic concentration.

We conducted our research by first engaging in detailed interviews with chefs throughout Italy. Our interviews confirmed the existence of knowledge transfer among chefs. All our informants reported transferring knowledge to other chefs and initiating these transfers with others. According to our informants, knowledge transfer usually involves recipes, as well as how to apply a certain technique. Our informants verified the existence of three norms governing the use of knowledge, as per Fauchart and von Hippel (2008). Accordingly, when a chef receives culinary knowledge from another chef, they (1) must not copy it exactly (we refer to this norm as "don't copy exactly"), (2) must credit the author when significantly relying on it (i.e., "cite the source"), and (3) must not pass it to third parties without asking for the author's permission (i.e., "don't pass on").

Empirical Design

Participants

To identify participants for our experiment, we turned to the Michelin Guide, which is reputed as the most prestigious and reliable opinion leader in this context (Ferguson, 1998), as testified also by the numerous studies based on it (Di Stefano et al., 2014; Durand, Rao, & Monin, 2007; Fauchart & von Hippel, 2008; Rao, Monin, & Durand, 2003, 2005). The Michelin Guide includes only restaurants that satisfy a minimum quality standard at different price points. Once a restaurant enters the guide, it is evaluated based on a system of "forks" and "stars." Forks indicate a restaurant's "décor, ambience, and service" and restaurants are awarded stars based on their culinary excellence. Being awarded Michelin stars (from 1 to 3) represents one of the top achievements a chef can reach in his or her career. Stars range from one star (i.e., "a very good restaurant in its category") to three stars (i.e., "exceptional cuisine, worth a special journey").

We administered our experiment to the chefs at 2,529 restaurants listed in the 2009 Italian edition of the Michelin Guide. Our response rate was equal to 21.1 percent, with 534 responses returned. Our respondents were mainly male (82 percent) and chef owners[3] (78 percent). They were aged between 23 and 80 years, with 46 being the average. In some cases, their restaurants had been awarded stars (respectively, 74, 16, and 2 for each category from one to

[3]This means that the respondent is both the head chef and the owner of the restaurant in which he works.

three stars). Compared to the average restaurant included in the 2009 Italian Michelin Guide, our sample is slightly more expensive and better rated. Compared to non-respondents, restaurants in our sample have a slightly higher price ($M =$ €48.52, SD = 21.89 vs. $M =$ €43.54, SD = 16.00; $t = -5.87$, $p = .00$), number of stars ($M = .22$, SD = .38 vs. $M = .09$, SD = .33; $t = -6.95$, $p = .00$), and number of forks ($M = 1.95$, SD = .76 vs. $M = 1.77$, SD = .68; $t = -5.36$, $p = .00$). In order to better assess whether these differences are worrisome, we calculated the effect sizes by means of the Cohen's d (Cohen, 1988). Results from this analysis show that, despite being statistically significant, the differences between respondents and non-respondents across these three characteristics are trivial in size. Cohen's d is respectively .26, .36, and .25 − which is interpreted as a small-sized effect (below the threshold of .5). We also compared the location of respondents and non-respondents based on contextual characteristics, such as number of residents (year 2010, millions) ($M = 145.24$, SD = 441.91 vs. $M = 176.77$, SD = 482.21; $t = 1.36$, $p = .17$), disposable income (year 2007, thousand Euros) ($M = 17.10$, SD = 4.09 vs. $M = 16.91$, SD = 4.21; $t = -.93$, $p = .35$), and density ($M = 3.90$, SD = 3.11 vs. $M = 3.92$, SD = 3.22; $t = .16$, $p = .88$). The two groups were not significantly different when compared on the basis of these characteristics, alleviating concerns about non-respondent bias. Finally, we compared the attributes of the restaurants receiving each treatment and found no significant differences, suggesting that the ex-ante randomization was actually preserved ex-post.

Procedure

We mailed our scenario-based experiment to the head of each restaurant. In the cover letter, we briefly explained the purpose of the study and gave chefs the option to respond by either using the enclosed paper form or the online website.[4] The instrument we mailed included three parts: (1) a randomly assigned scenario describing a notional chef, followed by questions about the expectation that the chef described in the scenario would have conformed to norms of knowledge use and about the respondent's propensity to transfer knowledge to this chef; (2) a second randomly assigned scenario describing a different notional chef, followed by identical questions; and (3) a set of questions about the respondent. We randomly assigned two scenarios to each respondent by generating two random numbers included between 1 and 32

[4]Note that 94 percent of respondents returned two scenarios and the remaining 6 percent returned from one to six scenarios (having responded both off-line and online).

using the RAND() function in Excel. Note that the assignment of treatments was randomized both between-subjects (each scenario included a random combination of the treatments) and within-subjects (the assignment of the second scenario was random and independent of the assignment of the first). To identify the mediation of expected norm conformity, we follow the "measurement of mediation" approach, a method that is referred to as the "gold standard" for mediation studies (Spencer, Zhanna, & Fong, 2005). To correctly estimate our mediating relationship, we need to be confident that no unobserved, subject-level attribute could explain both conformance assessment and the intention to knowledge transfer. To remove this potentially confounding factor, we administer to each respondent two separate and randomly assigned scenarios, and use subject-level "fixed effects."[5] This approach also removes any common-method bias caused by the survey design because (other than the differing treatments) the survey is constant across the two treatments (see also Di Stefano, King, & Verona, 2013).

Experimental Design

We developed the scenarios through direct interaction with a selected set of informants. To this end, we interviewed all Michelin-starred chefs working in one major Italian city (Milan), for a total of eight informants. The interviews covered a variety of topics, ranging from training and cuisine style to social norms, knowledge transfer, and relationships with colleagues and intermediaries. The interviews, which lasted from 45 minutes to 1 hour, were held at the firm location and were tape-recorded, transcribed, and coded. Four of the informants were interviewed a second time to assess the face validity of the instrument used to administer the experiment. As a final step, we pretested our experiment on a sample of 224 restaurants not included in the final sample. The scenarios described a notional chef based on five characteristics, which constitute our experimental manipulations. In particular, our experimental design is a 2 (geographical proximity) $\times$ 2 (similarity of positioning) $\times$ 2 (reputation) $\times$ 2 (experience) $\times$ 2 (frequency of review).[6] Fig. 1 shows a sample scenario.

[5]Our use of an experimental design and fixed-effects avoids the need for instrumental variables (Shaver, 2005) because the remaining disturbance terms in our two regression equations are uncorrelated by construction.

[6] The number of alternative scenarios was hence 32, as we manipulated five different treatments (geographical proximity, similarity of positioning, reputation, experience, and frequency of review) at two different levels (high vs. low).

Characteristics of restaurant:	– Zagalin: cuisine rating 28*. Comments: "creative," "innovative," "unique style" – Geographically very close to your restaurant – Cuisine Style and Ambience similar to your restaurant – Frequently reviewed by local media and customers (among the restaurants with more reviews)
Chef:	– Chef has 20 years of experience in the industry

** This rating is equivalent to a rating from Zagat™. It ranges from 0 to 30.*

Fig. 1. Sample Scenario.

Variables

Dependent Variables

We argue that the density of the area in which a firm is located will be associated with a higher expectation that a notional colocated firm will conform to social norms of knowledge use (H1), and that this increased expectation of conformity will mediate the relationship between density of the area and the likelihood of knowledge transfer to that firm (H2).

Our ultimate dependent variable, *knowledge transfer likelihood*, is the likelihood that, if asked, the respondent would transfer culinary knowledge to the chef described in the scenario. To measure this variable, we asked chefs (in Italian): "*If the chef in the scenario asked you for it, how likely is it that you would provide [X]?*" The question was asked three times, substituting X with tree types of information: *the recipe for a dish/the recipe for one of your signature dishes/information about a cooking technique*. We measured the variable after each of the two scenarios on a 7-point Likert scale ranging from 1 (very unlikely), to 4 (neutral), to 7 (very likely). It is also measured separately for three types of knowledge: recipes for dishes, recipes for signature dishes[7], and cooking techniques. We isolated the effect of knowledge type by marking responses with dummies (*recipe*, *signature recipe*, and *cooking technique*).

[7]A signature dish is a dish that uniquely identifies a chef and is constantly present on the menu, as it represents a chef's artistry, style, and approach to cuisine.

Our mediating variable, *expected norm conformity*, is the expectation that the notional chef will comply with the three social norms regulating knowledge transfer among chefs. To measure this variable, we asked chefs (in Italian): *"If you provided [the recipe of a dish/the recipe of one of your signature dishes/information about a cooking technique], how likely is it that this chef would (a) modify it rather than copy it exactly, (b) credit you as its creator, (c) ask permission before passing it to others?"* We measured the variable after each scenario on a 7-point Likert scale ranging from 1 (very unlikely), to 4 (neutral), to 7 (very likely). As in the case of *knowledge transfer likelihood*, we measured the variable separately for the three types of knowledge and marked responses with dummies.[8] Within each knowledge type, we aggregated responses for the three norms to a single measure ($\alpha = .73$).[9]

Independent Variables

Our hypotheses are based on two independent variables, namely the density of the area in which the respondent is located, and the colocation of a notional firm. We measured the first variable, and manipulated the second in our experiment.

Based on our interviews, we concluded it would not be realistic to manipulate the degree to which our respondents felt they were located in a dense area. This means this variable is endogenously determined, an issue we discuss in the section "Robustness Tests." Because we could not manipulate density, we used the differences that existed. We measure *density* based on the measure for geographic concentration suggested by Sorenson and Audia (2000), but computed only for the 20 nearest neighbors. Our measure is

$$\text{Density} = \sum_{j=1}^{20} \frac{1}{D_{ij}} \tag{1}$$

[8]This implies that for both *knowledge transfer likelihood* and *expected norm conformity*, we have six observations per respondent (three knowledge types for two scenarios). The scenario treatments are random and thus the errors are independent identically distributed (i.i.d.) at the scenario/respondent level, but they are clearly related for the three observations within each scenario. We discuss how we address this interdependence when presenting our econometric approach.

[9]We also conducted analyses using each of the three measures as a dependent variable (Table A1). We comment on the results of these analyses in the section dedicated to results.

where D_{ij} is the great circle distance between firms i and j, and the sum is computed for the j nearest 20 neighbors. The reason we restricted the measure to the nearest 20 neighbors is that the geographical shape of the Italian peninsula caused statistical artifacts that distorted the density measure. Measures using all subjects underestimate the density of areas located next to the sea (see Fig. 2 for a visual representation of the original vis-à-vis the adjusted measures).[10]

We manipulated the fact that the notional firm was colocated, by characterizing it as either "geographically very close to your restaurant" (high) or "geographically very distant from your restaurant" (low). Following Perdue and Summers (1986), we did not include a manipulation check, since our treatment is a concrete statement of fact.

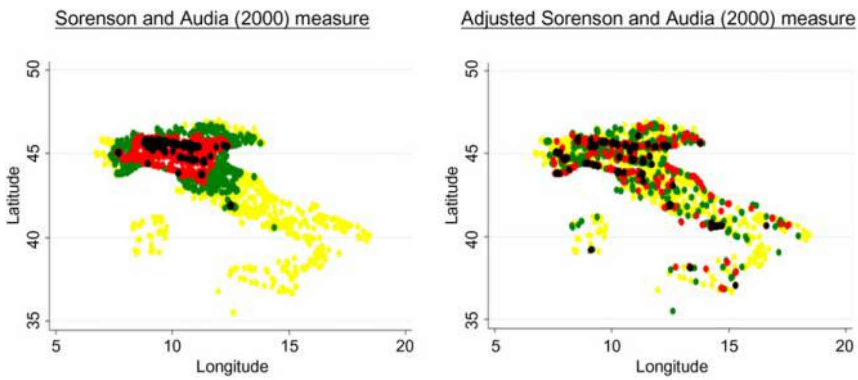

Fig. 2. A Visualization of Density. *Notes*: The color of dots indicates increasing density of the area in which each dot (restaurant) is located, with darkening shades of grey for increasing levels of density.

[10]We performed a series of successful robustness checks on this measure. First, we restricted it to the nearest 10 neighbors or enlarged it to the nearest 40 neighbors. We chose to report results at the intermediate level to balance the trade-off between fidelity to our sample's characteristics (decreasing with the number of nearest neighbors) and estimation precision (increasing with the number of nearest neighbors). Second, we also distinguished the calculation of density for starred and non-starred restaurant to address potential concerns about the level of competition between these different types of establishments. To this end, we restricted the measure of density to starred restaurants only when examining the case of starred respondents. Results are robust to all alternative specifications.

Control Variables

In our analysis, we include control variables at four levels: notional chef/firm (i.e., that described in the scenario), respondent, transferred knowledge, and context.

We control for characteristics of the chef described in the scenario by means of the four variables manipulated in the scenario and not used among our dependent variables, that is, similarity of positioning, reputation, experience, and frequency of review (see also Di Stefano et al. 2014, 2015). Similarity of positioning was manipulated by describing the restaurant as either "cuisine style and ambience similar to your restaurant" (high) or "cuisine style and ambience different from your restaurant" (low). The manipulation check was successful ($F(1,1065) = 8.43$, $p < .01$). Reputation was manipulated by describing the restaurant as either "Zagalin cuisine rating: 28. Comments: creative, innovative, unique style" (high) or "Zagalin cuisine rating: 20. Comments: lacks imagination, unoriginal, ordinary style" (low). The manipulation check was successful ($F(1,1061) = 57.00$, $p < .01$).[11] Experience was manipulated by describing the restaurant as either "Chef has 20 years of industry experience" (high) or "Chef has one year of industry experience" (low). Following Perdue and Summers (1986), we did not include a manipulation check, since our treatment is a concrete statement of fact. Finally, frequency of review was manipulated by describing the restaurant as either "frequently reviewed by local media and customers (among restaurants with more reviews)" (high) or "rarely reviewed by local media and customers (among restaurants with fewer reviews)" (low). We did not include a manipulation check.

At the respondent level, we control for position in the organization (*owner*), gender (*male*), years of experience in the industry (*tenure*), affiliation to a chain (*chain*), and reputation as measured by presence of Michelin stars (*stars*).

The third set of controls we introduce in our analysis is related to characteristics of the transferred knowledge. In the derivation of our hypotheses, we did not hypothesize any difference in expected norm conformity or knowledge transfer likelihood related to the type of knowledge disclosed.

[11]A potential concern with this manipulation is related to the fact that our respondents interpreted it differently based on their own level of reputation. To rule out this concern, we compared starred and non-starred respondents based on their response to the manipulation check. Results suggest no concern about the interpretation of the manipulation.

In other words, we focused on the level of disclosure, without taking into consideration the nature of the knowledge disclosed. Still, we chose to distinguish among three types of knowledge that could be shared – specifically, recipes, recipes of signature dishes, and cooking techniques. These three types of knowledge present different characteristics. Recipes and recipes of signature dishes represent a more explicit type of knowledge, compared to the more tacit knowledge required for a cooking technique. Moreover, recipes, and in particular recipes of signature dishes, can more easily be traced to the original source, thus making copying easier to detect. We marked the three different types of information with dummy variables (*recipe*, *signature recipe*, and *cooking technique*) and combined the three reports into one database. By construction, this raised the number of observations threefold. In the next section, we discuss how we address the interdependence this created among observations by grouping observations at the respondent level. Note that in our regressions, we use *recipe* as the baseline and examine the effect of *signature* and *technique* against it.

The final set of control variables is related to characteristics of the context in which our respondents are located. The insertion of these controls in the analysis is motivated by our need to control for contextual characteristics that are deeply connected to geographical concentration but not captured by our measure of density. In particular, we control for the *number of competitors* in the area within 10 km of distance. Also, we control for characteristics of the demand. In particular, we include controls for population (*residents_m*) and disposable income (*income_m*) at the municipality level. Since more aggregated measures may matter more for highly rated restaurants, we also include the same variables at the province level (*residents_p, income_p*) and interact them with our *stars* dummy. At the province level, we also have data about the number of tourists (*tourists_p*) as well as expenditure for food (*food expenditure_p*), which we insert in the regression as control both by itself and interacted with the *stars* dummy.

A comprehensive list of the variables, together with their measures and operationalization, is shown in Table 1. Descriptive statistics and correlations are shown in Table 2.

Econometric Approach

To test our hypotheses, we need to be able to identify accurate coefficients for our dependent and mediating variables. The random administration of treatments to the different subjects causes the treatments to be uncorrelated

Table 1. Variables and Measures.

Variable	Measure	Source
Dependent Variable		
Knowledge Transfer Likelihood	If the chef in the scenario asked you for it, how likely is it that you would provide [X]?	Measured after administration of each scenario *7-point scale, where 1 is very unlikely, 4 is neutral, and 7 is very likely*
Mediating Variable		
Expected Norm Conformity	If you provided [X], how likely is it that this chef would (a) modify it rather than copy it exactly, (b) credit you as its creator, (c) ask permission before passing it to others?	Measured after administration of each scenario *7-point scale, where 1 is very unlikely, 4 is neutral, and 7 is very likely.* $\alpha = .73$
Independent Variables		
Density	Sorenson and Audia (2000) measure, restricted to the 20 nearest neighbors	Michelin Guide, 2009 Italy
Geographical proximity	High: Geographically very close to your restaurant Low: Geographically very distant from your restaurant	Experimentally manipulated in each scenario
Control Variables		
Notional counterpart		
Similarity of Positioning	High: Cuisine style and ambience similar to your restaurant Low: Cuisine style and ambience different from your restaurant	Experimentally manipulated in each scenario
Reputation	High: Zagalin cuisine rating: 28. Comments: creative, innovative, unique style Low: Zagalin cuisine rating: 20. Comments: lacks imagination, unoriginal, ordinary style	Experimentally manipulated in each scenario

Table 1. *(Continued)*

Variable	Measure	Source
Experience	High: Chef has 20 years of industry experience	Experimentally manipulated in each scenario
	Low: Chef has 20 years of industry experience	
Frequency of review	High: Frequently reviewed by local media and customers (among restaurants with more reviews)	Experimentally manipulated in each scenario
	Low: Rarely reviewed by local media and customers (among restaurants with fewer reviews)	
Respondent		
Owner	High: Chef owner	Measured after administration of both scenarios
	Low: Other position	
Male	High: Male	Measured after administration of both scenarios
	Low: Female	
Chain	High: Restaurant affiliated to a chain	Measured after administration of both scenarios
	Low: Restaurant not affiliated to a chain	
Tenure	Integer count of years of experience in the industry	Measured after administration of both scenarios
Stars	High: Restaurant awarded Michelin star(s)	Michelin Guide, 2009 Italy
	Low: Restaurant not awarded Michelin stars	
Transferred Knowledge		
Recipe	X = the recipe for a dish	Measured for both *Knowledge Transfer Likelihood* and *Expected Norm Conformity*
Signature Recipe	X = the recipe for one of your signature dishes	

		Measured for both *Knowledge Transfer Likelihood* and *Expected Norm Conformity*
Cooking Technique	X = information about a cooking technique	Measured for both *Knowledge Transfer Likelihood* and *Expected Norm Conformity*
Context		
Competitors	Number of competitors in the area	Michelin Guide, 2009 Italy
Residents_m	Number of residents in the municipality where the respondent is located (millions)	ISTAT, 2010
Income_m	Disposable income in the municipality where the respondent is located (thousands Euros, for the average taxpayer)	Italian Ministry of Interior and ISTAT, 2007
Residents_p	Number of residents in the province where the respondent is located (millions)	ISTAT, 2010
Income_p	Disposable income in the province where the respondent is located (thousands Euros)	Italian Ministry of Interior and ISTAT, 2008
Tourists_p	Number of tourists in the province where the respondent is located (millions)	Ministry of Tourism 2007
Food Expenditure_p	Food expenditure in the province where the respondent is located (thousands Euros)	Italian Ministry of Interior and ISTAT, 2008

Table 2. Descriptive Statistics and Correlations.

Variable	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Knowledge Transfer Likelihood	4.8	2.0	1	7	1																					
2. Expected Norm Conformity	3.7	1.3	1	7	.2	1																				
3. Density	3.9	3.1	.5	15	.0	.1	1																			
4. Geographical Proximity	0	1	−1	1	−.1	.0	.0	1																		
5. Similarity of Positioning	0	1	−1	1	.0	.0	.0	.0	1																	
6. Reputation	0	1	−1	1	.1	.1	.0	.0	.0	1																
7. Experience	0	1	−1	1	.0	.0	−.1	.0	.0	.0	1															
8. Frequency of review	0	1	−1	1	.0	.0	.0	.0	.0	.0	.0	1														
9. Owner	.6	.8	−1	1	.0	.0	−.2	.0	.0	.0	.0	.0	1													
10. Male	.6	.8	−1	1	.0	.0	.1	.0	.1	.0	.0	.0	−.2	1												
11. Chain	−.9	.5	−1	1	.0	.0	.0	.0	.1	.0	.0	.1	−.1	.1	1											
12. Tenure	26.7	9.9	4	60	.0	−.1	.0	.0	.0	.0	.0	.0	.2	.0	.0	1										
13. Stars	−.6	.8	−1	1	.1	.1	.0	.0	.0	.0	.0	.1	.1	.0	.2	−.1	1									
14. Signature Recipe	−.3	.9	−1	1	−.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	1								
15. Cooking Technique	−.3	.9	−1	1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	−.5	1							
16. Competitors	45.6	66.0	0	372	.0	.0	.8	.0	.0	.0	.0	.0	−.1	.1	.1	.0	.1	.0	.0	1						
17. Residents_m	.1	.4	0	2.7	.0	.0	.6	.0	.1	.0	.0	.1	−.1	.0	.1	.0	.1	.0	.0	.7	1					
18 Income_m	17.1	4.0	6.3	32.8	.0	.0	.6	.0	.0	.0	.0	.0	−.1	.2	.1	.1	.0	.0	.0	.6	.4	1				
19. Residents_p	.9	.9	.1	4.2	.0	.0	.5	.0	.0	.0	.0	.1	−.2	.1	.1	.0	.1	.0	.0	.6	.7	.4	1			
20. Income_p	19.7	2.9	12.1	24.4	.0	.0	.3	.0	.0	.0	.0	.0	.0	.1	.0	.1	.0	.0	.0	.3	.2	.6	.1	1		
21. Tourists_p	5.9	7.5	.1	33.6	.0	.0	.4	.0	.1	.0	.0	.0	−.2	.1	.0	.0	.1	.0	.0	.3	.4	.2	.5	.2	1	
22. Food Expenditure_p	2.7	.2	2.3	3.3	.0	.0	.3	.0	.0	.0	.0	−.1	.0	.0	.0	.1	.0	.0	.0	.3	.2	.2	.2	.4	.0	1

with the subject or method disturbance terms in the two equations through which we estimate the dependent and mediating variables. Thus, estimates based on OLS should be unbiased. However, when we insert the effect of the mediating variable into the main equation, our estimates will be biased by any correlations between the subject or method disturbance terms of the two equations (Shaver, 2005). Fortunately, the presence of two scenarios per respondent allows us to use a fixed-effects specification. As a result of introducing fixed effects for each respondent, our coefficient estimations are based on the different stimuli created by the two scenarios. The fixed-effect specification allows each respondent to have a separate intercept, thus controlling for any stable attribute at the respondent level, such as the respondent's baseline propensity to trust others. In other words, a fixed-effect regression requires that changes in the independent variables (rather than their baseline level) be associated with changes in the dependent variable. In this way, we are able to isolate the effects that are produced uniquely by differences across the two scenarios (see also Di Stefano et al., 2014, 2015).

The use of fixed effects allows us to better isolate the effects of our experimental manipulations, but some of our control variables are fixed characteristics at the level of the respondent (e.g., experience). In order to observe the potential effect of these fixed control variables, we must use the less robust random-effects specifications. For random-effects models to be consistent, the random error associated with each subject must not be correlated with other regressors. We test this assumption using Hausman's (1978) test. We report results for random effects only in those cases in which the Hausman test was passed, so to observe the behavior of variables at the individual level when random-effect models are consistent.[12]

Each respondent was asked separately about both conformity to norms of knowledge use and knowledge transfer in case of recipes, signature recipes, and cooking techniques. The questions were repeated after each of the two scenarios. This means that for each respondent we have six observations of responses: three types of knowledge for two scenarios. The scenario treatments are random and thus the errors are i.i.d. at the scenario/respondent level, but they are clearly related for the three observations

[12]We also tried ordered probit as an alternative specification, given that both our dependent variable (*knowledge transfer likelihood*) and our mediating variable (*expected norm conformity*) are ordinal variables. Results are consistent with those presented here (fixed-effects OLS and random-effects GLS regressions).

within each scenario. In order to address potential concerns that this creates, we clustered standard errors at the scenario-subject level. This treatment of errors is an example of the Huber−White sandwich estimator (Huber, 1967; White, 1980; Wooldridge, 2002). To test the robustness of this correction, we performed a bootstrap estimation of our error structure to account for other possible disturbances. Results of the bootstrap estimation with 5,000 bootstrap resamples with replacement support the sign and significance of our results. Results are also consistent when clustering standard errors at the subject level only.

RESULTS

According to our theory, we should observe a positive relationship between density and the expectation that notional colocated firms will conform to norms of knowledge use (H1), as well as a mediation effect exerted by this expectation of conformity to norms on the relationship between density and knowledge transfer to notional colocated firms (H2). The analyses displayed in Table 3 allow us to test our first hypothesis. We only report

Table 3. Determinants of Expected Norm Conformity.[a]

	Model 1		Model 2		Model 3	
	coef	se	coef	se	coef	se
Geographical proximity (GP)	−.079***	.027	−.161***	.044	−.163***	.045
GP × Density			*.023***	*.009*	*.021***	*.009*
Similarity of positioning	.007	.029	.005	.029		
Reputation	.220***	.028	.221***	.028		
Experience	−.002	.029	.001	.029		
Frequency of review	.047	.029	.050*	.029		
Signature recipe	.042**	.019	.042**	.019		
Cooking technique	−.019	.020	−.019	.020		
_cons	3.726***	.016	3.725***	.016	3.719***	.013
N	3,036		3,036		3,036	
F	11.948***		1.977***		7.320***	
$R^2(\omega)$	.041		.044		.007	

Notes: [a]Within-$R^2(\omega)$ reported for all models; only fixed-effects OLS regressions reported; controls for respondent/context: included. *$p < .1$, **$p < .05$, ***$p < .01$.

results from fixed-effects OLS regressions, as we did not pass the Hausman test for any of the random-effects models. This explains why all the control variables that are constant at the subject level (i.e., controls at the level of respondent and context) are not displayed in the table – any constant term is reduced to a linear combination of the subject-level dummies and, as a result, all the fixed-effect models appear not to have controls. We first enter the main effects (model 1), then include the interaction term (model 2), and finally report the most basic model by removing control variables while leaving the interaction term and the related main effects only (model 3). Results provide strong support for H1, as shown by the positive and significant coefficient of the interaction term between *geographical proximity* and *density* across all specifications. A chef is more likely to expect a notional counterpart to conform to social norms when they are colocated in dense areas. In particular, the probability of observing the highest expectation of norm conformance (i.e., 7) increases by 23% for notional counterparts who are colocated in areas whose density is above the median.[13]

As a robustness test, we also ran the same analyses independently on the three norms regulating knowledge transfer in this industry. As shown in Table A1, the coefficient of the interaction term between *geographical proximity* and *density* is positive across all models, suggesting that colocated chefs expect their notional counterparts to adhere to all three norms of behavior. However, the coefficients are statistically significant only if we look at expectations of conformity to the social norms "cite the source" and "don't pass on." The significance of the effect is not confirmed for the norm "don't copy exactly." Based on our conversations with chefs, we speculate this is the case because of the "strength" of this norm, which our respondents described as being the most fundamental and universally binding among the three. Consistently, expected conformity to this norm should be less subject to the influence of any factor, as on average chefs expect any counterpart to abide by it, independent of any contextual condition. The descriptive statistics seem to support this intuition, as the average value for expected

[13]In order to better assess the economic significance of our results, we ran an ordered probit regression with robust clustered standard errors and individual fixed effects. Based on the resulting estimates, we computed the predicted probability of observing each value taken by our dependent variable (from 1 to 7) when the interaction term (between geographical proximity and a dummy variable marking when density is above the median) moves from 0 to 1, with all other variables held at their means.

conformity to "don't copy exactly" is 4.90 (SD = 1.75) – a much higher value if compared to the average values for expected conformity for "cite the source" ($M = 3.46$, SD = 1.89) and "don't pass on" ($M = 2.72$, SD = 1.76).

Hypothesis 2 predicts that the expectation that a notional colocated firm will conform to social norms mediates the relationship between density and the likelihood of knowledge transfer to such firm. According to our theory, density increases the likelihood that notional colocated firms will conform to norms, which in turn increases the likelihood of transferring knowledge to them. This implies that we expect to observe a significant mediating effect of *expected norm conformity* on the relationship between the interaction of *geographical proximity* and *density*, and *knowledge transfer likelihood*. We test this hypothesis with a series of mediation analyses based on the coefficient estimates from fixed-effects OLS regressions explaining expected norm conformity (see Table 3, model 2) as well as knowledge transfer likelihood (the model we used to predict *knowledge transfer likelihood* is shown in Table 4, models 2 and 3).[14]

According to the traditional stepwise approach (Baron & Kenny, 1986), the presence of a mediation effect is indicated if (1) the independent variable significantly predicts the mediating variable, (2) the independent variable significantly predicts the dependent variable, and (3) the mediating variable significantly predicts the dependent variable while controlling for the effect of the independent variable. Results of our analyses confirm the presence of a mediation effect, as (1) the interaction between *geographical proximity* and *density* significantly influences *expected norm conformity* ($\beta = .023$, $t = 2.47$, $p = .014$), (2) the interaction between *geographical proximity* and *density* significantly influences *knowledge transfer likelihood* ($\beta = .026$, $t = 1.83$, $p = .068$), and (3) *expected norm conformity* significantly influences *knowledge transfer likelihood* when controlling for the interaction between *geographical proximity* and *density* ($\beta = .134$, $t = 4.57$, $p = .000$).

To determine the significance of the indirect effect of the independent variable through the mediating variable, we performed a Sobel test, which tests the hypothesis of no difference between the indirect and direct effect (Sobel, 1982). Results of this test confirm the presence of a significant mediating effect ($z = 2.17$, $p = .015$). Since the Sobel test is based on the key assumption of normality, we conducted a robustness test using a

[14]In Table 4 we report results from fixed-effects OLS regressions for all models, and results from random-effects GLS regressions for the full model only, for which we passed the Hausman test.

Table 4. Determinants of Knowledge Transfer Likelihood.[a]

	Model 1 (FE)		Model 2 (FE)		Model 3 (FE)		Model 4 (RE)	
	coef	se	coef	se	coef	se	coef	se
Geographical proximity (GP)	−.227***	.038	−.318***	.060	−.296***	.060	−.280***	.057
Density							.018	.035
GP×Density			.026*	.014	.022	.014	.021	.013
Expected norm conformity					*.134****	*.029*	*.180****	*.028*
Similarity of positioning	−.096**	.038	−.098***	.038	−.098***	.038	−.063*	.036
Reputation	.172***	.039	.174***	.039	.144***	.038	.119***	.037
Experience	.034	.039	.037	.039	.037	.039	.030	.037
Frequency of review	−.004	.037	−.001	.036	−.008	.036	−.008	.035
Owner							.000	.080
Male							.089	.093
Chain							.028	.140
Tenure							−.002	.007
Stars							1.559*	.945
Signature recipe	−.407***	.027	−.407***	.027	−.413***	.027	−.416***	.029
Cooking technique	.241***	.025	.241***	.025	.244***	.025	.244***	.026
Competitors							−.000	.002
Residents_m							.185	.238
Income_m							−.007	.030
Residents_p							−.068	.133
Residents_p×Stars							−.068	.084
Income_p							−.005	.035

Table 4. *(Continued)*

	Model 1 (FE)		Model 2 (FE)		Model 3 (FE)		Model 4 (RE)	
	coef	se	coef	se	coef	se	coef	se
Income_p×Stars							−.027	.026
Tourists_p							−.004	.010
Food Expenditure_p							−.088	.368
Food Expenditure_p×Stars							−.306	.357
_cons	4.748***	.024	4.747***	.024	4.249***	.111	4.634***	1.018
N	3,036		3,036		3,036		3,036	
F	7.818***		62.047***		56.812***			
Chi^2							526.568***	
$R^2(\omega)$	.193		.194		.202		.200	

Notes: [a]Within-$R^2(\omega)$ reported for all models; FE stands for fixed-effects OLS regression, RE for random-effects GLS regression. *$p<.1$, **$p<.05$, ***$p<.01$.

nonparametric test, namely, the bootstrap test of the indirect effect (Zhao, Lynch, & Chen, 2010). Following Preacher and Hayes (2004), we performed a bootstrapped estimation of the indirect effect through the mediating variable using 5,000 bootstrap resamples and a bias-corrected and accelerated 95 percent confidence interval (Preacher, Rucker, & Hayes, 2007). The indirect effect is considered statistically significant if the confidence interval does not include 0. In our case, the bootstrapped method confirms a significant mediation effect, as the 95 percent confidence intervals for the conditional indirect effect of the interaction of *geographical proximity* and *density* does not include 0 (confidence interval between .003 and .063). Thus, we can reject the hypothesis that the mediator has no indirect effect on the likelihood to transfer knowledge at the .05 level. Results from all our analyses consistently confirm the presence of a significant mediation effect of *expected norm conformity* on the relationship between the interaction of *geographical proximity* and *density*, and *knowledge transfer likelihood*. In terms of economic magnitude, the probability of observing the highest likelihood of knowledge transfer (i.e., 7) increases by 5% when expectation of norm conformance is above the median, to the extreme of a 26% increase when taking its highest value (i.e., 7).[15]

In summary, our results suggest that density increases the expectation that a notional colocated firm will adhere to social norms. This higher expectation mediates the relationship between density and the likelihood of knowledge transfer to notional colocated firms.

ROBUSTNESS TESTS

Thus far, we have interpreted our results as suggesting that density increases the expectation that notional colocated firms will conform to social norms, and that this increased expectation in turn mediates the relationship between density and the likelihood of knowledge transfer. In this

[15]In order to better assess the economic significance of our results, we ran an ordered probit regression with robust clustered standard errors and individual fixed effects. Based on the resulting estimates, we computed the predicted probability of observing each value taken by our dependent variable (from 1 to 7) when a dummy variable marking when expected norm conformity is above the median (/takes the value of 7) moves from 0 to 1, with all other variables held at their means.

section, we attempt to separate the evidence for this interpretation from other possible explanations.

The first rival explanation we investigate is that our results are driven by a selection process that alters the nature of chefs operating in dense versus nondense areas. One could argue that people select into clusters based on some characteristics that have to do with their propensity to trust and cooperate with their competitors. If so, the fact that we observe the association of density with the expectation of conformity to norms and the likelihood of transferring knowledge could be an artifact of the firms' original location choice.[16] If selection were indeed responsible, we would expect firms located in clusters to have higher normative expectations and being more likely to transfer knowledge to all firms, and not just the ones they are colocated with. To investigate this potential, we better examine the behavior of our *density* measure.

First, we cut the variable at its average, and compare the expectation of conformity to norms and the likelihood of transferring knowledge for respondents in areas whose density is above versus below the average density in our population. When examining differences in expected norm conformity, we find that chefs operating in areas whose density is below-the-average ($M = 3.77$, $SD = 1.36$) do not differ from those operating in areas whose density is above-the-average ($M = 3.87$, $SD = 1.42$; $p = .265$). Similarly, we found no different in knowledge transfer likelihood between chefs in located in areas with below-the-average density ($M = 4.84$, $SD = 1.67$) and those located in areas with above-the-average density ($M = 4.81$, $SD = 1.76$; $p = .771$). We find consistent results by splitting the sample in four quartiles based on density, and examining the behavior of our dependent variables when comparing respondents across quartiles.

Second, we examined the *density* variable continuously by running a simple OLS with robust clustered standard errors and individual fixed effects. Results show that density does not predict the expectation of

[16]A different concern is related to the fact that our respondents are on average more trustworthy compared to non-respondents. However, we believe there is no evidence to explain why this should be the case. As we discussed above, the only type of bias that we seem to encounter with our respondents is that they represent the élite of the industry (even though the size of the effect is quite small). Moreover, results of our analyses do not show any effect of the respondent's reputation on the expectation of conformity to any social norm. Also, when controlling for reputation, we are able to observe a significant effect of density on the expectation that a notional colocated firm will adhere to the norms.

conformity to norms ($\beta = .529$, $t = 1.25$, $p = .210$) and the likelihood of transferring knowledge ($\beta = .953$, $t = 1.29$, $p = .197$). This evidence seems to suggest that chefs operating in dense areas do not differ on average from chefs operating in nondense areas in their propensity to trust and exchange knowledge with others.

A second concern deals with differentiation. In fact, one could argue that firms located in clusters do not infringe on the intellectual capital of their neighbors because this could reduce their differentiation in the eyes of customers. This differentiation principle (Tirole, 1997) is central to spatial models of competition (Graitson, 1982) and suggests that firms sharing the same location will try to maximize differentiation from colocated firms over other meaningful dimensions. In equilibrium, firms will choose positions that allow them to capture the maximum number of potential customers. Following this argument, one could argue that firms in dense areas choose not to infringe on each other's intellectual capital (i.e., not copying each other) not because of their conformity to social norms but because of their desire to avoid losing potential customers and profits. We try to rule out this alternative explanation by looking at only one of the three norms regulating knowledge transfer in the industry, that is, "don't pass on." This norm should not be affected by the incentive of the receiver of the transferred knowledge to move their position closer to the sender. The same would not be true for the norms "don't copy exactly" and "cite the source," as infringing the former or complying with the latter may reduce differentiation from a counterpart. Results, shown in Table A1 (model 3), confirm that when located in dense areas, firms expect notional colocated firms to adhere to this norm as well. Thus, it appears the effect of density on norms is not just determined by density caused differences in the incentive to differentiate products.

A third possible concern is that barriers to entry might alter the nature of competition in dense areas. One could argue that the effect we observe is not due to the density of the area itself but to different competitive conditions that may characterize certain areas. In other words, what we are picking up may not be the effect of density but the effect of a more general advantage some areas may enjoy. As a consequence, firms should have higher expectations that notional colocated firms will not infringe on their intellectual capital and, as a consequence, be more willing to transfer knowledge to them, because they all share a pooled return. In order to rule out this alternative explanation, we first measure each player's *ability to capture value* by looking at the degree to which restaurants in an area appear able to charge abnormal prices. To create this measure, we first regress the average price each restaurant charges (as reported by the Michelin Guide) against a series of restaurant attributes and local demographics (Tables A2–A4). The regression is estimated according to the specification:

$$P_i = B(X_i) + e_i \tag{2}$$

The error term of this regression (price residual) provides our measure of the restaurant's ability to charge an abnormal price. Then we measure the relative advantage of local areas by computing *area advantage* – that is, the average *ability to capture value* for players located in the area. We do this by computing the Sorenson and Audia (2000) measure adjusted to the nearest 20 restaurants and weighted by price residuals. Our measure is

$$\text{Area Advantage} = \sum_{j=1}^{20} \frac{e_i}{D_{ij}} \tag{3}$$

where e_i is the price residual obtained from the regression result (Eq. (2)) and D_{ij} is the great circle distance between firms i and j. The sum is computed for j ranging from the 1st- to the 20th-nearest neighbor. As shown in Table 5 (models 3 and 4), we find no evidence that the relative advantage of an area has any effect. The coefficient for the interaction term between *area advantage* and *geographical proximity* does not have a significant effect on *expected norm conformity*.

A final concern deals with incentives to keep information private. One may argue that firms located in clusters are more willing to transfer knowledge because involuntary knowledge spillovers are so great that all knowledge is already "in the air." We try to rule out this alternative explanation by looking at the effect the interaction between *density* and *geographical proximity* has on the likelihood of requesting (rather than transferring) knowledge. If firms located in clusters will get knowledge "through the air," they should be less likely to directly request such knowledge from their neighbors. Our test does not reveal that these behaviors change on average for firms that are notional colocated in clusters, thus providing no evidence in support of this alternative explanation. The coefficient for the interaction term between *density* and *geographical proximity* is nearly zero and does not significantly predict the likelihood of knowledge requests ($\beta = .002$, $t = .11$, $p = .909$).

Table 5. The Effect of Local Competition on Expected Norm Conformity.[a]

	Model 1 (FE)		Model 2 (RE)		Model 3 (FE)		Model 4 (RE)	
	coef	se	coef	se	coef	se	coef	se
Geographical proximity (GP)	−.079***	−.027	−.071***	−.026	−.170***	−.045	−.127***	−.043
Density			.062**	−.028			.061**	−.028
GP × Density					*.026****	*−.01*	*.015**	*−.009*
Area advantage			−.012	−.015			−.011	−.015
GP × Area advantage					*−.007*	*−.009*	*−.004*	*−.008*
_cons	3.726***	−.016	4.230***	−.965	3.726***	−.016	4.248***	−.96
N	3,036		3,036		3,036		3,036	
F	11.948***				9.741***			
Chi^2			105.189***				107.643***	
$R^2(\omega)$	.041		.041		.044		.043	

Notes: [a]Within-$R^2(\omega)$ reported for all models; FE stands for fixed-effects OLS regression, RE for random-effects GLS regression; controls for respondent/counterpart/knowledge/context: included. *$p < .1$, **$p < .05$, ***$p < .01$.

CONCLUSION

Scholars have argued that strong legal protection of intellectual capital can be a valuable means of facilitating safe knowledge transfer among firms colocated in dense areas (Porter, 1990). However, not all industries are protected by strong intellectual property rights, not all firms can access them, and not all knowledge can be safely secured. When knowledge is not legally protected, its transfer is particularly puzzling since it implies forgoing the use of secrecy as a means of protection. These voluntary revelations would be even more remarkable in geographically concentrated areas given that any information transferred from one party may diffuse rapidly to others. Once it has been transferred, proprietary knowledge may indeed easily flow "in the air." If this were the case, why would a firm located in a dense area choose to voluntarily transfer knowledge to colocated firms?

In this paper, we test a possible answer to this puzzle by investigating the effect of density on the expectation of adherence to social norms regulating the use of transferred knowledge. We show that density is associated with a greater expectation that a notional local firm will follow such norms. We also demonstrate that this belief then predicts the propensity to transfer knowledge to notional colocated firms. Finally, we show that expected norm conformity mediates the relationship between density and knowledge transfer. Thus, we provide one answer for how the initial resistance to information exchange is overcome in dense areas.

We believe our study offers three other contributions to extant literature. First, we show that expectations of norm conformity are contingent on cognitive considerations and contextual characteristics. Not only can such expectations be influenced by characteristics of the counterpart (Di Stefano et al., 2014), but also they are affected by characteristics of the environment in which firms are located. This is mirrored in our results, which show that the expectation competitors will adhere to social norms is stronger when the structural characteristics of an industry create the basis for more cooperation.

Second, our findings suggest that social norms of knowledge use may be able to substitute for missing regulatory institutions such as patent laws and protect knowledge transferred in dense areas. In contexts in which legal protection of intellectual capital is weak, knowledge transfer can be secured by the existence of social norms (Di Stefano et al., 2014; Fauchart & von Hippel, 2008). Firms colocated in dense areas are expected to adhere to norms, which have a strong positive effect on the likelihood to transfer knowledge. Geographic concentration contains the seeds of its own protection, as it increases the expectation that competitors will adhere to social norms.

Third, from a methodological standpoint, the use of experimental design combined with its administration to a large population of respondents allows us to explore an alternative avenue for research on knowledge transfer in dense areas, which usually has relied on secondary data, such as patent citations (Ratanawarada & Polenske, 2007). We propose that scenario-based experiments may be valuable because they allow direct study of subjects' perceptions, which is particularly useful when trying to examine what firms located in these areas expect from notional colocated firms.

Our study has limitations. It analyzes only one industry, gourmet cuisine. In this industry, it is reasonable to expect density to be heavily influenced by customer location, which could indeed offer an additional explanation for the propensity of these firms to transfer knowledge. Higher demand could increase the incentives to look for external knowledge.

A second limitation of our research is endogenous to the use of a scenario-based experiment and lies in the fact that we measure intended, rather than real, action. In this respect, we find reassurance in the fact that results from our qualitative interviews seem to suggest chefs behave in accordance to our experimental findings. Interviewees located in geographically concentrated areas reported greater expectation that their local competitors would adhere to behavioral norms. For example, when we asked a chef in an area with few restaurants about her interaction with local chefs, her business partner interrupted to say the local chefs did not cooperate. "Only here," the chef replied. "When I was [in a dense area], I talked a lot with other chefs."

Related to the above point is the fact that we look at notional instead of actual colocated firms. As explained above, our results suggest that density increases the expectation that a notional colocated firm will adhere to social norms, thus increasing the propensity of knowledge transfer. The emphasis on the notional nature of the colocated firm is very important given our empirical approach, which essentially enables us to show that firms in denser areas respond more to a treatment that changes their perception that a given firm is farther/closer. But perceived (i.e., notional) colocation is not the same as actual colocation, as individuals may perceive the firms that they are more likely to know, or trust more as being the ones that are close by.[17]

[17]We thank one of our anonymous reviewers for bringing this limitation to our attention.

Finally, our models explain a minority of the variance for the expected conformity to social norms. This comes as no surprise. First, we report within variance, capturing the variance we can explain by comparing the two scenarios each chef faced. Moreover, it is reasonable to expect one type of contextual characteristics (i.e., density) may have a limited impact on social norms, which mostly have been described as influenced by, for instance, the availability of mechanisms for observing and sanctioning deviations (Ingram & Clay, 2000). The investigation of the role these mechanisms play falls beyond the scope of our study, and hence we leave it open to future research. Future studies could indeed examine the effect of the underlying mechanisms through which density directly affects expectations of norm conformity.

In summary, our study examines the crucial role of expectations of norm conformity in fostering knowledge transfers in geographically concentrated areas. We show that dense areas can contain the seeds of their own protection. The very proximity that they provide creates a safe environment in which firms trust one another and may safely transfer knowledge: Firms located in geographic concentrations expect colocated firms to conform to social norms restricting the use of knowledge obtained from one another. Better understanding the mechanisms behind this effect could provide new insight into the geography of innovation, location choices, and, ultimately, the incentives behind innovation efforts.

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APPENDIX

Table A1. Determinants of Expected Conformity to the Three Norms of Knowledge Use.[a]

	Conformity_Copy		Conformity_Cite		Conformity_Pass	
	coef	se	coef	se	coef	se
Geographical proximity	−.024	.067	−.239***	.063	−.169***	.057
Geographical proximity × Density	*.014*	*.015*	*.025**	*.013*	*.025**	*.013*
Similarity of positioning	−.002	.040	.017	.041	−.017	.039
Reputation	.246***	.041	.214***	.040	.216***	.040
Experience	.056	.040	−.027	.042	−.017	.040
Frequency of review	.102**	.040	.021	.040	.021	.038
Signature recipe	−.067**	.030	.121***	.027	.084***	.026
Cooking technique	−.012	.033	−.024	.029	−.029	.026
_cons	4.871***	.026	3.489***	.023	2.737***	.021
N	3,036		3,036		3,036	
F	6.211		11.414		7.648	
$R^2(\omega)$	.023		.035		.030	

Notes: [a]Within-$R^2(\omega)$ reported for all models; only fixed-effects OLS regressions reported; controls for respondent/counterpart/knowledge/context: included. *$p < .1$, **$p < .05$, ***$p < .01$.

Table A2. Variables and Measures.

Variable	Measure	Source
Average Price	Average price charged by the restaurant	Michelin Guide, 2009
Fork	Comfort. Ranges from 1 to 5	Michelin Guide, 2009
Color	Uniqueness. Dummy variable	Michelin Guide, 2009
Star	Food quality. Ranges from 0 to 3	Michelin Guide, 2009
Promise	Restaurant expected to get star. Dummy	Michelin Guide, 2009
Inhabitants_kmq	Number of inhabitants per square kilometer	ISTAT 2001, Province level
Unemployment	Unemployed workers	ISTAT 2001, Province level
Family members	Average family members	ISTAT 2001, Province level
Tourists_p	Number of tourists in province (millions)	Ministry of Tourism, 2007

Table A3. Descriptive Statistics and Correlations.

Variables		Mean	Std. Dev.	Min	Max	1	2	3	4	5	6	7	8	9
1.	Average Price	44.60	17.53	17.5	260	1.0								
2.	Fork	1.81	.70	1	5	.6	1.0							
3.	Color	.06	.23	0	1	.3	.2	1.0						
4.	Star	.12	.38	0	3	.6	.4	.3	1.0					
5.	Promise	.00	.06	0	1	.1	.1	.0	−.0	1.0				
6.	Inhabitants_kmq	959.47	1,585.48	2	8,566.00	.1	.0	−.0	−.0	.0	1.0			
7.	Unemployment Rate	8.09	6.32	0	39.07	−.1	−.1	−.0	−.0	.0	.1	1.0		
8.	Family Members	2.48	.26	1.67	3.88	−.1	.0	.0	.0	.1	−.3	.4	1.0	
9.	Tourists_p	6,294.28	7,775.20	78.00	33,60.00	.2	.0	.0	.0	.0	.1	−.1	.1	1.0

Table A4. Determinants of Average Price.

	Model 1	
	coef	se
Fork	10.705**	0.345
Color	7.308**	.962
Star	19.726**	.633
Promise	14.425**	3.593
Inhabitants_kmq	.001**	.000
Unemployment Rate	.121	.083
Family Members	−5.760**	1.149
Tourists_p	.000**	.000
_cons	34.901**	3.486
N	2,528	
F	159.626**	
R^2	.633	

Notes: Controls for regions (dummy variables): included. *$p < .05$, **$p < .01$.