

THE DIRECT AND INDIRECT EFFECTS OF CORE AND PERIPHERAL SOCIAL CAPITAL ON ORGANIZATIONAL PERFORMANCE

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Research summary: In this paper we adopt a core-periphery approach to specify the direct and indirect effects of social capital on organizational performance. We suggest that social capital deriving from stable task relationships between organizational members has a direct positive effect on organizational performance. Said effect depends, in both strength and functional form, on whether actors involved in stable dyads are located at the core or at the periphery of the organization. We also argue that core and peripheral social capital affect performance indirectly by moderating the organization's ability to leverage its human capital to improve performance. Results from a 48-year study of the National Basketball Association support our arguments and bear important implications for strategic human resource practices and organizational performance in competitive settings.

Managerial summary: Stable work relationships among employees generate trust, more efficient work routines, common understanding and thus higher organizational performance. These benefits depend on the location of such stable relationships in the organization. Relational stability among core organizational members has an immediate, strong impact on performance, an effect that plateaus as stability grows. Stable relationships between core and peripheral members have instead a weaker, yet linear effect on performance. The location of stable relationships is also critical to leverage the talent of core employees, whose contribution to performance is stronger when relational stability is high in the organizational core, yet hindered by stable relations between core and periphery. Such findings provide relevant implications for strategic human resource management, in particular for choices regarding team composition and managing stars.

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INTRODUCTION

Jobs, roles, and tasks are becoming ever more interdependent (Grant and Parker, 2009), suggesting that relationships among employees play an increasingly relevant role in determining organizational performance. Scholars have provided evidence that

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organizations perform better thanks not only to their stock of human capital and individual talent (Becker, 1964), but also because of the social capital that accrues over time via stable employees' work relations (Espinosa *et al.*, 2007; Reagans, Argote, and Brooks, 2005). However, this research has usually conceptualized social capital as a structurally uniform construct; i.e., without considering how it is distributed inside organizations. In this paper we thus propose a core-periphery approach—which has previously been used to qualify the importance of different organizational activities (Cattani and Ferriani, 2008; Siggelkow, 2002)—for exploring how the effect of social capital on organizational

performance might be contingent upon its core or peripheral location in the organization. We believe that our approach contributes to clarifying two ongoing debates within the management literature, which we shall now outline.

A first question is whether organizations always benefit from the stability of their internal relations. While on one hand the social capital imbued in stable work relationships might enhance organizational performance by increasing the reliability and efficiency of how core tasks and roles are performed (Humphrey, Morgeson, and Mannor, 2009), it is also true that high levels of relational stability might negatively affect organizations by making them more inertial, more predictable, and less able to adapt quickly to competitive pressures (Hannan and Freeman, 1984). Our core-periphery analysis helps to resolve such a trade-off, revealing how this tension between organizational efficiency and inertia (1) only emerges for the stability of core organizational relationships, and (2) is contingent on the overall level of stability of the relationships at the organizational core, thus detailing how social capital *directly* affects organizational performance.

Our core-periphery analysis of the benefits of social capital also sheds light on a second open debate in the management literature on the interrelation between social and human capital in regards to organizational performance. Focusing on how social capital might moderate the human capital-organizational performance link is a promising avenue for research (Nyberg *et al.*, 2014), as most studies dealing with both forms of capital tend to juxtapose theoretically rather than interrelate the two. For instance, research on the “war for talent” (Gardner, 2002) exemplifies the general confrontational stance between human and social capital permeating the management literature. While some scholars have justified the “war for talent” by highlighting human capital as the fundamental resource required to build sustainable competitive advantage (Becker, 1964; Coff, 1997), others still have observed that the lack of focus on social capital makes the “war for talent” potentially useless, or even detrimental (Groysberg, Lee, and Nanda, 2008). We believe that such dualistic positions might be overcome by unpacking the interrelations between core and peripheral human and social capital. This fine-grained view helps to illustrate how social capital affects organizational performance *indirectly*, by both favoring and

hindering an organization’s ability to leverage its human capital.

Clearly defining and measuring organizational core and periphery has been a problem that has traditionally hindered the development of this line of research (Hannan, Burton, and Baron, 1996; Siggelkow, 2002). We propose a solution by adopting a network approach (Borgatti and Everett, 1999) to identify the core and periphery of the intra-organizational *task relationship network*. We chose to analyze the social capital imbued in the network of stable task relationships—“dyadic patterns of task interaction between organizational members” (Casciaro and Lobo, 2015: 373)—because their being so central to an organization’s production system renders their relational stability critical for its performance (Dahlander and McFarland, 2013). The transparency and granularity of our data—a longitudinal sample from the National Basketball Association (NBA), from 1966 to 2014—allowed us to operationalize clearly the organizational core and periphery in the task relationship network. By measuring how critical factors of production (i.e. the players) relate to each other, we were able to heed the advice of Hannan and colleagues who suggested that “research ought to measure connections [between elements] directly” to discriminate between core and periphery (Hannan *et al.*, 1996: 507).

THEORY

The role of social capital in determining organizational performance

The patterns and the stability of relationships between co-workers can have important implications for performance, as intra-organizational networks may affect both the flow of resources (Brass, 1984) and the coordination required to perform interdependent tasks (Espinosa *et al.*, 2007; Reagans *et al.*, 2005). Thus, organizational performance may not only be affected by members’ abilities (Becker, 1964), but also by the ties between them. For instance, Groysberg and his colleagues have shown that highly productive financial analysts are, on average, unable to maintain the same performance when hired by a new firm, possibly due to changes in their organizational networks (Groysberg *et al.*, 2008).

This research points at social capital theory as complementary to human capital theory in

explaining organizational performance. Social capital is the value that individuals and organizations accrue from their relationships (Coleman, 1988; Leana and Van Buren, 1999). While this value may also derive from relationships across organizational boundaries (Somaya, Williamson, and Lorinkova, 2008), we focus wholly on the internal social capital emerging from stable task-based interactions among organizational members, thus following the definition of social capital proposed by Payne and colleagues who suggest that organizations “derive social capital from the internal forces within their collective ... achieved primarily as the collective matures and strong recursive bonds develop between actors who interact frequently” (Payne *et al.*, 2011: 494).

Research has emphasized how social capital accrues over time through the maintenance of stable social networks (Coleman, 1988). The stability of networks is a key source of their value because “social structures, and the resources to which they provided access, accumulate rather than decay over time” (McEvily, Jaffee, and Tortoriello, 2012: 548). Recursive and long-lasting ties between employees allow for the emergence of shared norms, a common language, and trust (Coleman, 1988; Jones, Hesterly, and Borgatti, 1997). These will increase the likelihood of standardized practices and cooperative behaviors to emerge, thus improving coordination and performance (Leana and Van Buren, 1999; Taylor and Greve, 2006). Social capital embedded in stable ties serves to increase cohesion, improve employees’ buy-in to shared goals (Leana and Van Buren, 1999), and enhance their ability to coordinate their activities (Katz, 2001), thus improving organizational performance (Payne *et al.*, 2011). Indeed, organizations whose members sustain stable work relations over time perform better (Pfeffer and Sutton, 2006) in contexts as diverse as surgery (Reagans *et al.*, 2005), and software development (Huckman, Staats, and Upton, 2009).

A core-periphery view of social capital

While recognizing that the social capital imbued in stable intra-organizational relationships can yield positive performance returns, extant research assumes that all organizational members are structurally equal when accounting for the performance implications of such stability (Gardner, Gino, and Staats, 2012). Accordingly, it remains unclear whether (and the extent to which) performance

outcomes might be contingent on the distribution of social capital within organizations. In this paper, we argue that the location of stable intra-organizational relationships does indeed matter, and theorize how social capital’s influence on performance is contingent upon the core or peripheral position in the organization of those individuals who are involved in stable relationships.

Our reasoning is grounded in two considerations. First, one of the benefits of relational stability is that it facilitates the coordination of interdependent tasks (Harrison *et al.*, 2003). Relational stability between organizational members underpins the development of the tacit knowledge necessary to manage effectively the high levels of task interdependence that are typical of networks (Harrison *et al.*, 2003; Reagans *et al.*, 2005). Surgical hip-replacement teams are contexts where coworkers who shared work experiences over time develop “relationship-specific heuristics that enhance how well people performing distinct roles interact with each other”, a form of social capital embedded in stable ties that improves teams’ performance (Reagans *et al.*, 2005: 872). We might therefore expect stable relations among employees to be more relevant where the level of interdependence is higher.

Second, the level of task interdependence and the criticality of organizational tasks are heterogeneous across a given organization, and are likely to be at their highest at its core (Siggelkow, 2002). Management scholars have proposed a “core-periphery imagery” (Hannan *et al.*, 1996: 506) to qualify organizational activities with different degrees of interdependence and criticality, analyzing a variety of contexts, namely: high-tech start-ups (Hannan *et al.*, 1996), voluntary social service organizations (Singh, House, and Tucker, 1986), minicomputer producers (Romanelli and Tushman, 1994), and mutual funds (Siggelkow, 2002). However, despite the general consensus on the usefulness of core-periphery models to define which organizational elements are more critical for performance, there is much less clarity about how the core-periphery distinction should be operationalized in organizations (Siggelkow, 2002). In fact, Hannan and colleagues admit there is “no consensus on exactly what constitutes the core”, only suggesting that “coreness means connectedness, [and that] elements in the core are linked in complicated webs of relations with each other and with peripheral elements” and that “research ought to measure connections [between elements] directly”.

to discriminate between organizational core and periphery (Hannan *et al.*, 1996: 506–507).

Following these considerations, we posit that a core-periphery analysis (Borgatti and Everett, 1999; Cattani and Ferriani, 2008) of the intra-organizational *task relationship network* might represent a valuable approach to specify the social capital-organizational performance link. We focus on task relationships as they play a critical role in a firm's functioning and performance (Casciaro and Lobo, 2015; Dahlander and McFarland, 2013). For instance, Crowston (1997) illustrates how an organizational goal (e.g., developing a new operative system) can be broken down into multiple relational tasks among employees (e.g., exchange, co-develop, and test software modules). Such dyadic task relationships can be aggregated at the organizational level to form a network that describes how employees interact to perform organizational tasks, describing the web of interdependent activities carried out by the organization. Applying a core-periphery analysis to such a network (Borgatti and Everett, 1999) allows us to identify those organizational members located at the core of the organization, thus discriminating between members who play key coordinating roles, have greater relevance and exposure within—and beyond—the organization, and are more central to the organization's interdependent webs of routines and tasks (Humphrey *et al.*, 2009; Summers, Humphrey, and Ferris, 2012), and more peripheral members who have less integrative importance.

We thus distinguish the performance implications of core and peripheral social capital in the form of relational stability located at the core and periphery of the intra-organizational task relationship network. Given the higher levels of interdependence among the members of the organizational core (Siggelkow, 2002), and the benefits relational stability provides to managing task interdependence efficiently (Harrison *et al.*, 2003; Reagans *et al.*, 2005), we might expect social capital to have more impact on organizational performance when it resides in stable task relationships located at the core of the organization, where task interdependence is at its maximum. For this reason, we posit that the relational stability of dyads among core organizational members (here labeled core relational stability, RS_C) will have a more positive impact on performance than that emerging from dyads that include at least one peripheral actor (peripheral relational stability, RS_P). Thus:

Hypothesis 1: Core relational stability (RS_C) has a stronger positive effect on organizational performance than does peripheral relational stability (RS_P).

The marginal effect of relational stability on organizational performance

In addition to influencing the strength of the link between social capital and organizational performance, the core-periphery location of a stable relationship might also impact its marginal effect. Since the benefits of relational stability derive from learning processes and the accumulation of the tacit knowledge that facilitates coordination, one would expect it to display positive decreasing returns akin to those of learning curves (Epple, Argote, and Devadas, 1991). However, we propose that the marginal returns of relational stability will decrease at a faster rate when they derive from stable dyads between core members (or RS_C) than from dyads involving at least one peripheral member (or RS_P). Two sets of mechanisms guide our reasoning: one internal to the organization, and the other external.

The internal mechanisms that suggest RS_C will have diminishing returns on performance are grounded on the same factor that makes RS_C more relevant than RS_P : the higher level of interdependence among core members. As discussed, stability promotes the generation of tacit knowledge (Berman, Down, and Hill, 2002), which facilitates the coordination of interdependent tasks, thus positively affecting performance (Reagans *et al.*, 2005). However, as core members' activities are those where most of the interdependence resides, higher levels of RS_C will correspond to a comparatively higher stock of tacit knowledge than in the case of RS_P . This makes the organizational core comparatively more susceptible to knowledge ossification than the periphery (Berman *et al.*, 2002). Knowledge ossification is a process via which, over time, a high stock of tacit knowledge becomes increasingly less flexible, inhibiting further adaptation and learning (Berman *et al.*, 2002; Dahlander and Frederiksen, 2012). Thus, while still beneficial for coordination, high levels of RS_C may lead to rigidity and reduced internal communication, because members need less interaction to coordinate their actions (Katz, 1982). This makes organizations overly self-referential and inward-looking, increases routinization, limits variation, and restricts their ability to adapt to

ever-changing environments, possibly even triggering competency traps (Levinthal and March, 1993). Such processes may thus turn core competencies into core rigidities (Argyris, 1999), making high levels of RS_C increasingly less beneficial—and even potentially detrimental—to organizational performance (Berman *et al.*, 2002). In contrast, the lower level of interdependence of dyads involving at least one peripheral member makes them less vulnerable to knowledge ossification and potential learning rigidity.

The external set of mechanisms justifying the faster decrease of performance returns to RS_C relates to the effects of relational stability on rivals' strategic responses. In competitive contexts, when facing a highly stable organization rivals will likely try to develop effective competitive responses (Aime *et al.*, 2010; White, 1981). Three independent mechanisms can improve rival organizations' abilities to develop such countermeasures. The first is the *predictability* of a focal organization's actions. An initial lack of rivals' response to a focal organization's successful routine set is generally due to their insufficient knowledge about such routines (Aime *et al.*, 2010). However, if the routine set does not change it will become more predictable, making it easier for rivals to adjust to it successfully over time. At high levels, relational stability increases predictability by strengthening collective identity. Although this facilitates coordination, providing the focal organization with a temporary advantage (Zuckerman, 2008), the ensuing stable role structure enables competitors to understand, anticipate, and thus take advantage of how the focal organization can be expected to respond to different situations (Aime *et al.*, 2010; Zuckerman, 2008). The second mechanism is *observability*. While predictability allows rivals to adjust successfully to a focal organization's actions, that adjustment is likely to be faster in contexts where rivals can observe the focal organization's enactment of its stable routine set directly, allowing them to develop appropriate competitive responses more easily (White, 1981). As rivals observe a focal organization, the value of the tacit knowledge embedded in its network decreases, since they use their observations to develop increasingly effective competitive strategies and tactics (Aime *et al.*, 2010). The third mechanism is *exposure*. Observation alone is not always sufficient to allow rivals to learn enough about a focal firm's routine sets and adapt their strategies successfully, as capturing all the nuances of a given routine set

might require some level of direct exposure, possibly via direct interaction with the focal organization. Greater exposure to a stable organization's routine set will afford rivals greater understanding of how it is enacted, allowing them to develop more effective responses (Aime *et al.*, 2010).

The predictability, observability, and exposure of routines performed by stable core dyads are greater than those enacted by dyads located in other parts of the organization. As core organizational members enact routines more frequently, not only do they become more predictable and observable over time, but rivals may have more opportunities to be directly exposed to them, increasing their likelihood of developing effective competitive responses (Aime *et al.*, 2010). In contrast, routines involving at least one member of the periphery are enacted slightly differently and less frequently, reducing their predictability and observability and limiting their exposure to the organization's rivals, thus safeguarding RS_P against adaptive competitive responses. The increased likelihood of knowledge ossification, paired with the greater predictability, observability, and exposure of routines, implies that RS_C and RS_P impact performance differently, leading us to posit that:

Hypothesis 2: Core relational stability (RS_C) exhibits positive diminishing performance returns, which decrease at a faster rate than does peripheral relational stability (RS_P).

The role of social capital in the human capital-organizational performance link: co-location effects

In addition to its direct influence, social capital may also affect organizational performance indirectly by facilitating the deployment of human capital. Stable ties between employees might facilitate the utilization of their knowledge, skills, and abilities, thus providing an optimal environment for exploiting their human capital (Cattani *et al.*, 2013). This view is consistent with research highlighting the role of social capital in helping firms "acquire, recombine, and release resources" as well as "essential information about opportunities to ... integrate resources" (Blyler and Coff, 2003: 680), thus making social capital essential for the effective use of human capital. This also echoes research underlining how ties represent conduits where individual expertise flows, thus making social capital a key

mechanism that enables knowledge integration, as it "affect[s] the conditions necessary for exchange and combination to occur" (Nahapiet and Ghoshal, 1998: 250). To capture fully how social capital unlocks the value of human capital, however, we need to delve deeper into the relationship between these two resources and their core-periphery location in the intra-organizational network. Not considering this might lead to spurious results, due to the lack of fine-grained understanding of the mechanisms underlying their interaction (Foss, 2011).

We thus propose that social capital accrued in the form of relational stability may play different roles in the deployment of human capital, depending on the reciprocal location of these two forms of capital. We propose that social capital might *facilitate* the full deployment of human capital within organizations, thus positively moderating its relationship with performance, only when the two types of capital are co-located, at either the core or the periphery. This is because the mechanisms enabling the full deployment of human capital generated by stable ties—e.g., trust, psychological safety, and shared mental models—hinge on the presence of such ties among the specific employees whose human capital is deployed. Related research shows how the presence of ongoing ties favors information sharing and facilitates social integration, thus allowing better leverage of the skills and experience of those individuals who are part of shared endeavors (Cattani *et al.*, 2013). However, such effects are highly dependent upon the core-periphery location of such ties: it is crucial to recognize that information sharing can only be optimized where stable ties are present, given how they promote trust between organizational members. The presence of such ties is also a pre-condition for the transfer and utilization of individual members' skills, abilities, and expertise, for they are the conduits through which such resources can be mobilized. Similarly, social capital needs to be co-located with human capital to facilitate the latter being leveraged toward improving performance, as social capital emerges from experiences that are not shared in general in the organization but within the context of specific relationships, which makes it difficult for individuals who are not part of such ties to leverage their value.

Hypothesis 3: Relational stability positively moderates the effect of human capital located in the same part of the organization (core or periphery) on organizational performance.

The role of social capital in the human capital-organizational performance link: cross-location effects

When social and human capital are not co-located, we would not simply expect a lack of a positive interaction between these two types of resources; rather, in this case we posit a *negative* moderation of social capital on the human capital-organizational performance link. Several reasons lead us to theorize such a negative effect. High levels of relational stability in a certain part of the intra-organizational network might lead members in this area to become overembedded in such ties, resulting in parochialism, and thus reducing their ability to leverage resources coming from elsewhere in the organization (Adler and Kwon, 2002), a typical case of how "ties that bind might turn into ties that blind" (Powell and Smith-Doerr, 1994: 393). The greater the relational stability among a given subgroup of employees—at either the organizational core or the periphery—the higher the likelihood that such group will become inward-looking and insulated from the rest of the organization, thus limiting its ability to use and benefit from resources (such as human capital) located elsewhere. Consistent with Hargadon's (2006) view on the effect of the dense connections characterizing "small worlds", we also argue that the presence of high relational stability at either the core or the periphery shapes the perceptions of people embedded in those relationships, thereby preventing them from "seeing the value of people, ideas, and objects that reside outside" such areas (Hargadon, 2006: 207). This is consistent with Adler and Kwon's (2002) observation that high levels of trust—emerging from stable ties—may limit firms' ability to innovate, as they make them less interested in changing their relationships, seeking out and adapting to new ideas (Kern, 1998). The similarity-attraction paradigm (Byrne, 1971) and social identity theory (Tajfel and Turner, 1986) also support our arguments, as they argue that employees prefer to work with similar others and are more likely to trust and cooperate with in-group rather than out-group members (van Knippenberg and Schippers, 2007). Moreover, as trust and cooperation develop within the stable in-group, often a sense of prejudice and competition emerges toward the out-group, hindering the deployment of human capital in tasks that require collaboration across the two groups, which is very likely in interdependent settings (Tajfel and Turner, 1986).

For these reasons, the presence of relational stability, either at the core or at the periphery, might diminish the efficiency of human capital located elsewhere, due to limited knowledge of how other organizational members might contribute, a lack of trust and cooperation toward them, and/or cognitive blindness to their talent. Thus:

Hypothesis 4: Relational stability negatively moderates the effect of human capital located in a different part of the organization—core or periphery—on organizational performance.

METHODS

We tested our hypotheses using longitudinal data on the membership and performance of North American basketball clubs forming the National Basketball Association (NBA). Several organizational scholars have found sports clubs appropriate contexts in which to investigate organizational phenomena (Day, Gordon, and Fink, 2012). Sports settings offer scholars several advantages, including accurately measured data, transparency of strategy and processes, and a relatively controlled environment in which clubs compete under the same rules for the same goals (Day *et al.*, 2012). Additional reasons make the NBA a particularly good setting to test our hypotheses. Unlike other professional sports, basketball is a highly interdependent activity (Keidel, 1984), and thus more closely resembles the tasks typically performed in contemporary firms (Katz, 2001). This makes our findings more generalizable to highly interdependent settings that lack strict bureaucratic role structures, such as start-ups, small/medium sized firms, or larger firms that center their activities on high performance teams, such as professional service firms. Moreover, the clear core-periphery structure of the interdependent production activities of basketball clubs may generate important insights transferable to other organizations structured around a core set of activities.

Our analyses are based on 48 years of data (1966–2014). We statistically modeled the annual performance of NBA basketball clubs between 1976 and 2014. This yielded a sample of 1,020 club-year observations involving 30 organizations operating in the NBA. We extended our data collection back to 1966 to calculate lagged variables, including our indicator for relational stability.

We used data on individual players to calculate our explanatory and control variables. Since our focus was on those players who stayed with a club long enough to have a meaningful impact on its social mechanisms, we restricted our sample by including only players who appeared on a game roster for at least five percent of the games each team played in a season,¹ leading to a final sample of 20,369 player-season observations. We lagged all our explanatory and control variables by one year to ensure correct temporality in our estimations.

Core-periphery structures in the National Basketball Association

We use a network approach to operationalize organizational core and periphery, analyzing the intra-organizational task relationship network of NBA clubs. Core-periphery models based on organizational networks have indeed been investigated in the past (cf. Cummings and Cross, 2003), but sparsely so due to the rarity of rich, large, longitudinal datasets on intra-organizational networks (cf. Dahlander and McFarland, 2013). Our dataset overcomes this limitation, as it provides two significant benefits. First, it offers the possibility to observe consistently how the critical factors of production (i.e., the players) of the organizational production unit (i.e., the playing team) interrelate with each other. This allows us to analyze the effect on organizational performance of the social capital emerging from stable task relationships, providing enough granularity to explore the intra-organizational core-periphery structure of such networks. Secondly, basketball data allow us to analyze the inner workings of multiple organizations (30) over a large period of time (48 years), thus providing one of the few large longitudinal datasets of intra-organizational networks (Dahlander and McFarland, 2013).

In our context, we defined a task relationship as the dyadic work interaction between each two players, measured as the total number of minutes jointly spent on the court over a season. In fact, although a team can field 12 players for each game, only 5 of them are active on the court at any time. These players' rotations create variance in terms of

¹Using alternative cut-offs of 10 and 15 percent did not affect our results significantly.

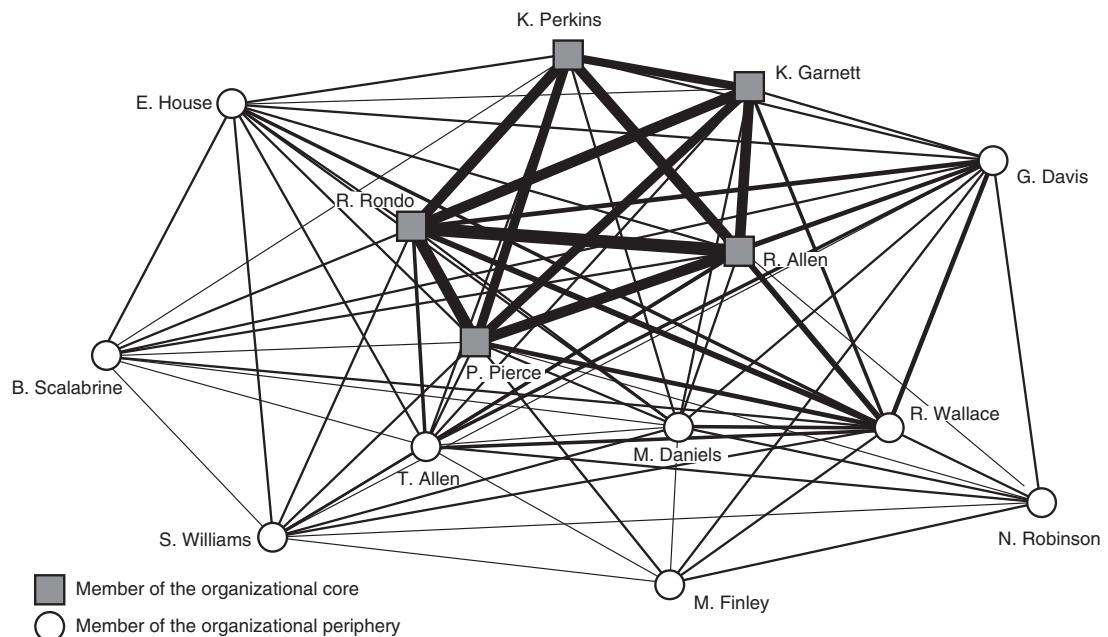


Figure 1. Intra-organizational task relationship network of the 2009/2010 Boston Celtics

dyadic collaboration on the court. Thus, aggregating such dyadic task relations into a club-level network reveals the structure of the task relationship network, as exemplified in Figure 1, where thicker lines represent more time two players spent playing alongside each other over the season.

Figure 1 displays a clear structural pattern. It shows how the task relationship network breaks into a subset of highly interdependent core players (the organizational core) and a less interdependent group (the periphery). Two important things should be noted. First, although all players face the same fundamental tasks—shooting, dribbling, passing, and defending—their actual roles may be more or less interdependent contingent on their structural position in the organization. Second, while players from the starting unit are likely to be in the core, our operationalization of core-periphery is not based on starters vs. bench players, but rather emerges from the structure of the task relationship network shown in Figure 1, which is based on their actual interactions. This visual core-periphery distinction is statistically supported by analyzing the network using an algorithm to identify members of the network core (Borgatti and Everett, 1999). The players identified as part of the core are represented by triangles in Figure 1, thus supporting the initial intuitive idea of the presence of a core-periphery structure in basketball clubs.

Core-periphery operationalization in the 1976–2014 data sample

The fine-grained minute-by-minute data used to construct the network displayed in Figure 1 only became available in 2005, preventing us from applying Borgatti and Everett's algorithm to calculate players' core and periphery positions over our complete sample. Thus, we used *average minutes played per game* to distinguish between players belonging to either the core or the periphery. We performed two analyses to confirm the construct validity of our operationalization. First, we built networks of interdependencies (similar to Figure 1) for the entire NBA between 2006 and 2010, which yielded a total of 120 networks involving 1,952 nodes. We then calculated a measure of *network coreness* for each player in these networks using Borgatti and Everett's (1999) algorithm. The correlation between network coreness and our chosen measure in this subsample was very high (0.90; $n = 1,952$), which gave us a reasonable certainty that *average minutes played per game* was a valid proxy measure for distinguishing between core and peripheral players.

Second, we calculated the structural position (core or periphery) of the 1,952 player-years that were part of this 2006–2010 subsample using Borgatti and Everett's (1999) procedure, and

then used logistic regression to predict players' positions (1 = core; 0 = otherwise) based on their *average minutes played per game*. We used the estimated coefficients to calculate the predicted probabilities of players being members of the core. The predicted probability function increases steeply between 24 and 28 minutes played per game (which lasts 48 minutes), so we decided to consider those players who played more than 26 minutes per game on average over a season as being part of the organization's core. Sensitivity analyses (conducted by varying this threshold by one minute in either direction) revealed no significant changes in our results. We also considered teams' head coaches as part of the core, given their central role both in building the organization's extant routine set and in deciding which routines were to be enacted. An additional analysis, performed excluding the coach from the core, does not alter the reported results.

Dependent variable

Organizational performance

We measured organizational performance as the *percentage of games won* during the regular season. An alternative operationalization could have been using the financial performance of basketball clubs. However, since most U.S. professional sports (including basketball) use mechanisms to cap players' salaries and share revenues in order to create competitive balance (Sanderson and Siegfried, 2003), under a model to "cooperate financially [in order] to compete effectively" (Day *et al.*, 2012: 401), we felt measuring organizational performance with a financial metric would not entirely capture the competitive dynamics among NBA clubs. Since our hypotheses relate to competitive dynamics, we preferred to follow the most common practice among scholars studying organizational performance using sports data, who model it by using game performance (cf. Aime *et al.*, 2010; Berman *et al.*, 2002; Holcomb, Holmes, and Connelly, 2009; Moliterno and Wiersema, 2007; Pfeffer and Davis-Blake, 1986). As percentage of games won is a continuous variable bounded between 0 and 1, which could be problematic when applying regression analysis, we decided to transform our dependent variable using a logit link function (Greene, 2008).

Independent variables

Social capital: core and peripheral relational stability (RS_C and RS_P)

Consistent with previous research showing that shared experience is accumulated at the dyadic level (Reagans *et al.*, 2005), we assessed a club's RS_C as the number of stable dyads present in the organizational core over time. Hence we calculated RS_C by counting, for each pair of core members (players who played an average of more than 26 minutes per game over the season, plus the head coach) the number of seasons they had played together over the previous 10 years.² We also considered players' past common experience at clubs where they had previously played together. Thus, an imaginary Club Alpha which has three core members (A, B, and C) who have played together before—A and B for the last three seasons, with C joining only one year ago—would have a RS_C value of 5 (A–B = 3, A–C = 1, and B–C = 1). But if B and C had played together for Club Beta for one season five years ago, the B–C score would increase to 2, raising Club Alpha's RS_C value to 6. We calculated RS_P following the same logic used for RS_C , except that in this case we considered any possible dyad that involved *at least* one peripheral player (i.e., that were composed of one core and one peripheral player, or of two peripheral players). We also used an overall relational stability measure—*relational stability total (RS_{TOT})*—to account for the total effect of relational stability, irrespective of network location. In each case, we calculated clubs' relational stability scores as accumulated at the beginning of each season.

Human capital

The NBA provides detailed statistics for every player that has played in league games, which can be integrated in single indices to summarize players' career performance: of these, most experts consider the Player Efficiency Rating (PER) as the most reliable measure of individual performance (Kubatko *et al.*, 2007). The PER is calculated not

²Since we would expect older shared experience to have less impact than more recent ones on the players' joint ability to implement current routine sets, as a robustness check we discounted the impact of stable dyads by different rates for every season prior to the past one. All our results were robust to this different specification of our social capital measure.

only by accurately weighting multiple individual statistics (including points scored, missed shots, rebounds, steals, blocks, turnovers, and assists), but also by standardizing for minutes played and the team “paces” that result from more offensive or defensive team strategies, resulting in an indicator that most closely captures individual players’ talent, with no inflation due to team and coaching strategies. To account for each team’s *human capital*, we considered the players available to each team at the beginning of each season, and then averaged their PER for the previous season ($t - 1$). Two robustness checks confirmed the construct validity of PER as a human capital indicator. Since a fundamental assumption behind human capital is its relative stability over time (Becker, 1964), we checked whether our measure captured that stability by calculating the year-to-year PER correlation: the value we obtained (0.65) seemed to confirm the validity of this assumption. Another assumption behind human capital theories is that the job market offers higher monetary rewards to more talented individuals: again, a correlation of 0.42 between salary and previous year PER seems to indicate the measure’s reliability.

By definition, previous performance data was missing for players in their first season in the league (known as “rookies”). Access to the league is highly restricted by a “drafting” process, making the NBA an almost closed system: between 1976 and 2014, only 2,579 of the 17,001 player-season observations (15%) involved rookies. Therefore, we handled rookies’ prior performance data in two ways: first, by excluding them altogether from the human capital calculations, and second, by using their current year efficiency as a proxy for their talent. As these two choices did not yield significantly different results, we chose to present the latter as it provided better model fit. As an additional control, we included a variable measuring the *number of rookies in the organizational core* in all our regressions.

Control variables

Individual experience

Following Reagans and his colleagues (Reagans *et al.*, 2005), we included three variables in our models to control for the effect of individual players’ experience. Teams’ *players’ average age* helped us to control for potential reduced physical fitness and/or motivation that might negatively

affect older players’ performance. *Players’ average tenure with the club* (i.e., the average number of seasons team members had played for the focal club) accounted for how players working for the same team over several seasons might develop club-specific tacit knowledge. Finally, *players’ average experience in the NBA*—the average number of seasons players have been in the league—controlled for league-specific experience.

Organizational experience

This variable measures the number of years each club had been in the NBA to control for the level of organizational experience with the specific context. In addition, it also acts as a proxy for a club’s status and tradition within the league, which, it could be argued, might significantly correlate with our explanatory variables—higher status clubs might find it easier to retain their top players and attract better “free agent” players.

Coaching variables

As superior coaching skills could be correlated with our explanatory measures (Berman *et al.*, 2002; Pfeffer and Davis-Blake, 1986), we included three separate variables in our models to control for these potential issues. Since more experience with the club can lead coaches to better understand players’ strengths and weaknesses, as well as which strategies they could be expected to implement successfully, we used *coach’s tenure with the club*, measured as the number of seasons a coach had been with the club, to capture this effect. As having a better coach could lead players to stay with the organization longer, we included each coach’s overall record in our models (*coach’s league record*), computed as the percentage of total wins over total games coached in their NBA careers. Since a coach with a longer career has more experience to draw on when deciding which strategies to implement on the court, *coach’s experience in the NBA* (measured as the number of seasons each head coach has been in the NBA, either as a head or assistant coach) controlled for this effect.

Organizational size

The size of organizations’ core and periphery is expectedly highly correlated with our relational stability indicators. We thus included two different

variables—*size of organizational core* and *size of organizational periphery*—to account fully for their potential effects. Such variables represented the total number of core and peripheral players who played for the focal organization in at least five percent of the total games in each season.

Number of newcomers

A low relational stability value for a club might be due to a high turnover of team players, so to capture this effect we controlled for turnover by including the overall *number of newcomers* (i.e., players new to the team) in our models.

Total minutes played by the organizational core

A primary concern in our analysis was to be able to disentangle the effects of relational stability—core vs. periphery—from the fact that core players, by definition, spend more time on the court than peripheral ones, and thus have a greater impact on organizational performance. To control for this important consideration, we included in all our models a variable (*total minutes played by the organizational core*) that captures the amount of time spent on the court by core players during each season.

Salary structures

The structure and size of employee contracts might confound the effect of some of our explanatory variables, especially relational stability. Having the resources to offer higher payrolls may allow teams to retain better players longer, as well as to motivate them to perform better. Thus, we used *total club payroll* as a control, in the form of standard scores calculated on an annual basis. Unfortunately, salary data was not available for our full sample, so this control variable was only included on a restricted subsample (n = 767, Model 5).

Organization and year indicator variables

Despite our best efforts to envisage and control for potential alternative explanations, several others factors might interfere with predicting team success. Since reliable data on local basketball culture, revenues, and profitability were not consistently available for all clubs, we included club-level fixed effects in our regression models to capture any heterogeneity unaccounted for, as well as indicator

year variables to account for time-based fixed effects. Finally, we also included a dummy variable to indicate clubs that relocated and/or changed their name in any specific season.

Estimation models

As clubs member composition might be influenced by their past performance (following the well-known folk heuristic “never change a winning team”), we acknowledge that endogeneity could potentially affect our results. In econometric terms, our dependent variable is likely to be dynamic (depending on its lagged realizations) and our independent variables correlated with past realizations of the error term. To alleviate such concerns we used Arellano-Bond (AB) dynamic panel estimators (Arellano and Bond, 1991), which include a lagged dependent variable to control for reverse causality (Greene, 2008) while avoiding dynamic panel bias (Roodman, 2009). We transformed our data using orthogonal deviations and specified the indicators for human and social capital, number of newcomers, total minutes played by the core, coach tenure with the team and players’ average tenure with the organization as endogenous. A non-significant ($p > 0.05$) Sargan test (Roodman, 2009) across all our models suggests that our estimates were unlikely to be affected by overidentification, confirming the validity of our instruments. We calculated robust standard errors using Huber-White estimators (White, 1980).

RESULTS

Table 1 reports the descriptive statistics and bivariate correlations for our variables. As expected, variables such as human capital, players’ experience with the organization, organizational experience, and coach record are positively correlated with clubs’ winning records. Table 2 presents the results of our regression analysis. Model 1 includes all the control variables and Models 2 through 6 include the explanatory variables used to test our hypotheses.

Model 1 shows that several control variables are statistically significant in the expected directions, with most relationships holding across all the models. Past organizational performance shows a strong, positive, and statistically significant coefficient ($p < 0.01$). Including this variable is important, as it

Table 1. Descriptive statistics and correlation matrix

	Mean	S.D.	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Organizational performance	0.01	0.66	-2.13	1.97																		
2. Past organizational performance ($t - 2$)	0.50	0.15	0.13	0.88																		
3. Players' average age	26.25	1.44	22.56	31.45	0.47																	
4. Players' average tenure with the club	1.74	0.73	0.24	4.67	0.53	0.47																
5. Players' average experience in the NBA	4.40	1.34	1.06	9.00	0.48	0.92	0.50															
6. Size of organizational core	5.92	0.99	3.00	9.00	0.06	0.03	-0.02	0.06														
7. Total minutes played by the organizational core	10.398	2.386	3.169	16.773	0.12	0.07	0.07	0.05	0.46													
8. Number of rookies in the organizational core	0.22	0.47	0.00	4.00	-0.20	-0.22	-0.25	-0.27	0.04	0.03												
9. Size of organizational periphery	9.20	1.66	5.00	15.00	-0.11	0.04	-0.17	0.01	-0.40	-0.39	0.02											
10. Organizational experience	30.52	15.99	2.00	67.00	0.10	0.06	0.10	0.19	0.10	0.00	-0.05	0.11										
11. Coach's tenure with the club	2.66	3.12	0.00	22.00	0.28	0.11	0.31	0.10	-0.02	0.05	-0.13	0.02	0.00									
12. Coach's league record	0.51	0.11	0.15	0.89	0.47	0.35	0.35	0.37	0.01	0.01	-0.20	0.03	0.15	0.32								
13. Coach's experience in the NBA	10.93	6.67	0.00	31.00	0.09	0.12	0.10	0.15	0.06	0.03	-0.07	0.10	0.14	0.43	0.27							
14. Human capital, total	13.30	1.01	9.37	16.93	0.27	0.24	0.33	0.28	-0.04	0.06	-0.15	-0.24	0.01	0.15	0.26	0.08						
15. Human capital, core	16.79	1.83	7.40	28.03	0.35	0.33	0.36	0.37	-0.21	-0.08	-0.21	0.02	0.06	0.21	0.35	0.09	0.46					
16. Human capital, periphery	11.65	1.30	7.17	15.31	0.04	0.08	0.11	0.09	-0.18	-0.23	-0.06	-0.05	-0.01	0.04	0.08	0.04	0.80	0.02				
17. Number of newcomers	5.63	2.26	0.00	14.00	-0.19	-0.11	-0.57	-0.15	0.11	-0.07	0.24	0.37	0.10	-0.15	-0.12	-0.01	-0.34	-0.23	-0.17			
18. Relational stability, total	48.25	28.39	1.00	173.50	0.41	0.42	0.77	0.44	0.00	0.08	-0.28	-0.02	0.05	0.32	0.32	0.15	0.24	0.36	0.06	-0.57		
19. Relational stability, core	12.51	10.96	0.00	72.00	0.43	0.34	0.61	0.35	0.38	0.34	-0.30	-0.29	0.09	0.22	0.30	0.14	0.18	0.21	-0.08	-0.36	0.67	
20. Relational stability, periphery	35.74	22.59	0.00	150.00	0.30	0.36	0.67	0.39	-0.18	-0.06	-0.21	0.12	0.02	0.29	0.26	0.12	0.22	0.35	0.12	-0.54	0.93	0.35

Sample size n = 1,004. Correlations bigger than |0.062| are statistically significant at the 0.05 level

Table 2. Results of GMM regression analysis of organizational performance^a

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Past organizational performance (t - 2) ^b	0.515** (2.770)	0.464** (2.740)	0.443** (2.602)	0.357* (2.191)	0.032 (0.166)	0.326* (2.446)
Players' average age	0.017 (0.638)	0.025 (0.841)	0.018 (0.676)	0.009 (0.291)	-0.003 (-0.114)	0.018 (0.811)
Players' average tenure with the club	-0.039 (-0.760)	-0.124** (-2.627)	-0.137** (-3.239)	-0.127** (-2.787)	-0.066 (-1.238)	-0.094** (-2.684)
Players' average experience in the NBA	0.079* (2.411)	0.043 (1.255)	0.062 (1.927)	0.067 (1.832)	0.095** (2.702)	0.041 (1.490)
Size of organizational core	-0.153*** (-5.340)	-0.179*** (-6.931)	-0.191*** (-6.491)	-0.208*** (-9.255)	-0.192*** (-6.813)	-0.148*** (-5.171)
Total minutes played by the organizational core ^c	0.007*** (5.770)	0.007*** (6.569)	0.008*** (7.676)	0.008*** (7.930)	0.008*** (7.829)	0.009*** (9.356)
Number of rookies in the organizational core	-0.199*** (-6.208)	-0.164*** (-5.012)	-0.167*** (-5.343)	-0.138*** (-3.790)	-0.203*** (-4.898)	-0.147*** (-4.577)
Size of organizational periphery	-0.059*** (-3.854)	-0.088*** (-5.811)	-0.071*** (-4.430)	-0.076*** (-5.466)	-0.075*** (-4.856)	-0.068*** (-4.469)
Number of newcomers	-0.020 (-1.488)	0.011 (0.842)	-0.003 (-0.194)	0.007 (0.507)	0.013 (0.835)	-0.005 (-0.439)
Organizational experience	0.011** (2.660)	0.011** (2.767)	0.011** (2.786)	0.011** (2.916)	0.015*** (3.311)	0.009* (2.415)
Organizational experience (squared) ^c	-0.016** (-2.712)	-0.017** (-2.794)	-0.017** (-2.819)	-0.017** (-3.026)	-0.023*** (-3.475)	-0.013* (-2.445)
Club has relocated in current season (1 = yes)	0.239*** (4.430)	0.235*** (4.613)	0.226*** (4.537)	0.262 (1.938)	0.236*** (3.331)	0.249*** (5.143)
Coach's tenure with the club	0.011 (1.455)	0.004 (0.579)	0.007 (0.918)	0.007 (0.938)	0.006 (0.840)	0.003 (0.390)
Coach's league record	1.231*** (6.331)	1.198*** (6.961)	1.184*** (7.024)	1.387*** (6.800)	1.328*** (6.639)	1.048*** (6.594)
Coach's experience in the NBA	-0.005 (-1.723)	-0.005 (-1.578)	-0.006 (-1.898)	-0.007* (-2.369)	-0.006 (-1.691)	-0.005 (-1.551)
Human capital, total	0.142*** (5.633)	0.142*** (6.090)	0.153*** (6.640)	0.151*** (7.087)	0.133*** (5.943)	
Relational stability, total		0.008*** (6.919)				
Relational stability, total (squared) ^c		-0.003* (-2.023)				
Relational stability, core			0.008*** (4.318)	0.015*** (4.008)	0.011** (2.867)	0.007* (1.854)
Relational stability, core (squared) ^c			-0.028** (-2.660)	-0.022** (-2.409)	-0.027*** (-3.841)	
Relational stability, periphery			0.005*** (4.010)	0.005*** (3.736)	0.004** (2.880)	0.004*** (3.495)
Relational stability, periphery (squared) ^c			-0.003 (-1.406)	-0.003 (-0.621)	-0.001 (-0.621)	-0.002 (-1.355)
Total club payroll					0.056* (1.799)	
Total club payroll (squared)					-0.028* (-1.992)	

Table 2. Continued

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Human capital, core						0.120*** (11.520)
Human capital, periphery						0.072** (5.114)
Human capital, core × Relational stability, core						0.002** (2.702)
Human capital, core × Relational stability, periphery ^c						-0.054* (-2.056)
Human capital, periphery × Relational stability, periphery ^c						0.026 (0.205)
Human capital, periphery × Relational stability, core ^c						0.025 (0.649)
Club fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.560***	-2.080**	-2.231***	-1.909*	-1.586*	-0.730
Observations (club-year)	1,004	1,004	1,004	1,004	757	1,004
Sargan test of overidentifying restrictions (p-value)	0.189	0.120	0.204	0.253	0.259	0.172

^a z-scores are in parentheses.

^b A significant Arellano-Bond test ($p < 0.001$) proved the presence of serial autocorrelation of order 1 in our data, which ruled out $t - 2$ realizations of our dependent variable from the instrument set and $t - 1$ realizations from our models (Roodman, 2009). Tests for serial autocorrelation of order 2 were not significant across our models ($p > 0.05$). We also restricted the instrument set to $t - 3$, to limit the overall number of instruments, which might otherwise produce biased estimates (Roodman, 2009). This reduces the number of usable observations in our regression models from 1,020 to 1,004. Using longer lags does not significantly change the reported results.

^c Coefficient multiplied by 100.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; one-tailed tests for hypothesized effects

allows us to make inferences about the other coefficients while correctly controlling for endogeneity due to the GMM estimators. Larger teams seem to perform worse than smaller ones ($p < 0.001$), but this is not true of older teams, as the relationship between age and performance was not statistically significant. As expected, organizational experience is positively related to performance ($p < 0.01$), and its negative quadratic term displays diminishing returns ($p < 0.01$). Coaching variables do not display a clear effect on organizational performance. Coaches' past winning records are positively related to performance ($p < 0.001$), but previous head coaching experience and tenure with the club do not appear to impact performance ($p > 0.05$). Most importantly, all models support the positive effect of human capital on performance ($p < 0.001$).

Hypotheses testing

Models 2–5 tested Hypotheses 1 and 2. Model 2 introduces our first indicator of social capital,

relational stability total (RS_{TOT}), a variable that captures the dyadic stability of teams' networks without differentiating for stable dyads' network positions. The coefficient of RS_{TOT} is positive and statistically significant ($p < 0.001$), while the negative direction and statistical significance of its quadratic term ($p < 0.05$) proves that, consistent with previous theorizations (cf. Epple *et al.*, 1991), relational stability displays diminishing returns.

Model 3 introduces the linear terms for core relational stability (RS_C) and peripheral relational stability (RS_P), both of which show positive and statistically significant coefficients ($p < 0.001$). A comparative F-test between the two coefficients provides initial statistical support for Hypothesis 1, showing that the linear coefficient for RS_C is greater than that for RS_P ($p < 0.001$). Thus, a stable dyad in the core has almost twice the positive effect on performance as a stable peripheral dyad. We then add the mean-centered quadratic terms for RS_C and RS_P in Model 4, where the positive and statistically

significant ($p < 0.001$) coefficient for RS_C and the negative and statistically significant ($p < 0.01$) coefficient for its squared term show that stability of relations between core members displays diminishing returns to organizational performance. The significant ($p < 0.001$) and positive coefficient for peripheral relational stability (RS_P) and the lack of support for its quadratic coefficient ($p > 0.05$), suggests that, in contrast to RS_C , RS_P 's relationship to performance is linear.³ A closer interpretation of Model 4 coefficients shows that RS_C exhibits a stronger effect on performance than its peripheral counterpart, but also diminishing returns. This implies that the estimated coefficient for RS_C is greater than that for RS_P between -1.5 and $+2$ standard deviations (SD), but with statistical reliability ($p < 0.05$) approximately between -1.5 and $+1$ SD. Therefore, our analysis supports Hypothesis 1 with statistical certainty within the latter data range, providing partial support for the hypothesis. When considering the effect dyad-by-dyad, we find that stability in the core has, on average, a much stronger effect than a stable dyad including at least one peripheral member. However, when considering the standardized effect of stability (thus controlling for the fact that the periphery is generally much larger than the core), we find that increasing the core relational stability of 1 SD has a stronger effect on performance only within 2 SD above the mean. At higher levels, peripheral stability is instead relatively more beneficial.

As players' salary data were only partially available, we tested their influence in a separate model (Model 5), featuring a subsample of our data ($n = 767$). As expected, higher payrolls seem to correlate positively with organizational performance ($p < 0.05$), but their size also displays diminishing returns, as shown by the negative and statistically significant ($p < 0.05$) quadratic effect. Including a salary indicator in this model did not affect our other findings.

We tested Hypotheses 3 and 4 in Model 6. We did so first by separating each club's human capital into core and peripheral components, using the same procedure used to distinguish core and peripheral relational stability. Then, we introduced in Model

6 the two separate human capital indicators, which were positive and significant ($p < 0.001$), as well as all four interactions between core and peripheral human and social capital. Hypothesis 3 predicted that human and social capital located in the same structural location should positively impact performance by facilitating the deployment of human capital. Empirically, Hypothesis 3 is proven only for capital co-located in the core, as shown by the positive significant coefficient of the interaction between core human capital and core relational stability ($p < 0.01$). Hypothesis 4 posited that social capital would inhibit the effectiveness of human capital located elsewhere in the organization. Once again, our data support such prediction only for human capital located in the core ($p < 0.05$). Thus, Hypotheses 3 and 4 are only partially supported, as they are empirically demonstrated only for the human capital located in the core.

Regression diagnostics and robustness tests

We conducted regression diagnostics on the full models to consider potential violations of regression assumptions. Residuals appeared to be normally distributed on a quantile-quantile plot, and low VIFs for our independent variables (mean VIF = 3.17) seemed to exclude severe multicollinearity issues. We also tested for the presence of influential outliers by estimating our models with a robust regression procedure (Greene, 2008), which did not affect our results.

We ran a moderated curvilinearity test (Cohen *et al.*, 2003) to prove that the degree of curvilinearity (and hence, the diminishing returns) of the relationship between relational stability and organizational performance increases as stability becomes more concentrated among core team members. We estimated a regression model using our single measure for overall team stability (RS_{TOT}) and its mean-centered quadratic term (RS_{TOT}^2), and then introduced a measure of coreness ($Coreness_{RS}$) into the model obtained by dividing RS_C by RS_{TOT} , thus creating an index that represented the percentage of RS_{TOT} concentrated in the team core. Finally, we created interaction terms between $Coreness_{RS}$ and both RS_{TOT} and RS_{TOT}^2 , and statistically tested their interactions. For better interpretation, these results are graphically displayed by the regression surface in Figure 2, which depicts the change of the effect of relational stability (x-axis) on team performance (z-axis) contingent upon the variation in coreness of

³To account fully for the correlations between our control and explanatory variables, we ran an additional analysis including all our control variables split into their core and periphery components, as well as their respective quadratic terms. Our main results were robust to this additional specification.

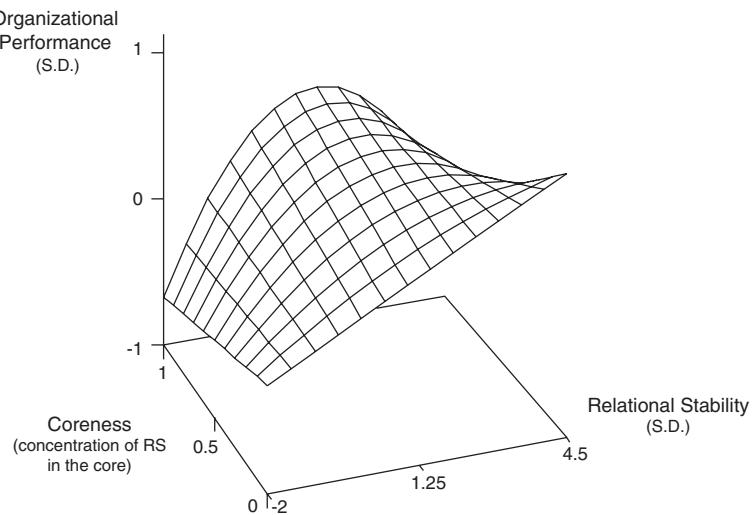


Figure 2. Regression surface of moderated curvilinearity analysis

that stability (y-axis). These results suggest that, at low levels of coreness (i.e., closer to the viewer), the marginal effect of relational stability on performance is approximately linear, but as relational stability becomes increasingly concentrated in the network core (farther away from the viewer), the functional form describing its effect on performance becomes parabolic. These results provide additional evidence for our hypotheses.

The comparative effects of human and social capital on organizational performance

In addition to specifying the direct and indirect effects of social capital on organizational performance, our analysis also sheds light on its relative influence, vis-à-vis human capital, on such outcome. From a theoretical standpoint, the resource-based view (Barney, 1991) suggests that a firm's competitive advantage is based on the idiosyncratic nature of its resources. Over time, a positive abnormal performance can be better sustained when such resources are more specific to the focal organization (or at least are less likely to be imitated by competitors), making "imperfect imitability" a key condition for a resource to generate sustained competitive advantage (Barney, 1991). While human capital is considered one of the least imitable organizational resources (Coff, 1997)—a logic underlying HR practices leading to the "war for talent"—this reasoning implies that resources that are even harder to imitate will have an even greater impact on organizational

performance. Indeed, acquiring social capital on the market is generally more difficult than obtaining human capital. While the latter can be obtained by entering the relevant labor market, or by "poaching" employees from competitors, acquiring social capital externally involves additional challenges due to its intrinsically relational nature (as a "socially complex" resource; Barney, 1991).

We used dominance analysis to compare the relative importance of human and social capital (Budescu, 1993). This method not only considers the predictors' direct effects on the dependent variable, but also their effects when combined with other predictors and the proportionate contribution each makes to the explained variance. We found that our human capital indicator ranked first in terms of importance, followed by our two social capital indicators (core and peripheral relational stability) jointly considered. If we standardize the total "importance" of our predictors (using the standardized dominance weight; Budescu, 1993) at 100 percent, we find that human capital accounts for 14 percent, and social capital for 12 percent. Thus, human and social capital seem to play an equivalent role in predicting basketball clubs' performance.

DISCUSSION AND CONCLUSION

In this paper, we contribute to advancing the literature on social capital by specifying its direct and indirect effects on organizational performance. We do so by demonstrating how the direct impact of

relational stability in the task relationship network on organizational performance depends on the structural position of the members participating in stable dyads, focusing in particular on differentiating core and peripheral effects. Specifically, the impact of social capital accumulated among core members is stronger than that deriving from dyads that include at least one peripheral member, although only up to a certain point, as this effect is subject to diminishing returns that make it decrease faster than the impact of relational stability involving at least one peripheral member. This finding may not only be due to faster knowledge ossification of tacit knowledge characterizing the core's stable relationships, but also to the competitive environment. Higher stability at the organizational core makes organizations more effective and reliable, yet also more predictable for competitors, increasing the latter's ability to develop effective competitive responses.

We believe these joint effects push the literature to overcome a simplistic, positive view of the effects of social capital, helping to reconcile the mixed evidence on the relation between stability and organizational performance. Although most management literature agrees on the beneficial role of stability and common experience in teams and organizations, some scholars have found evidence for a strictly linear relationship between stability and performance (Reagans *et al.*, 2005), where others have found these relationships to be subject to diminishing returns (Berman *et al.*, 2002) or even inverted U-shaped effects (Katz, 1982). Our findings suggest that this confusion may stem from construing all organizational members as structurally equal and show how this assumption of structural equality might lead scholars to ignore variations in interdependence and predictability across internal network structures that might lead to such mixed findings.

By highlighting the role of networks' structural features in accounting for the performance implications of social capital, we also contribute to the current research specifying the micro-determinants of resources integration within organizations, supporting the view that "not only does the level of a resource matter, but so too does its structure within the team" (Gardner *et al.*, 2012: 1001). The granularity of our data enabled us to account for the internal structure of task relationship networks, allowing us to advance the literatures on two fronts. First, we provide a rare case of identifying the relational operationalization of organizational core-periphery

structures, thus accounting for their relative effects (Hannan *et al.*, 1996). Second, we contribute to the advancement of the understudied aspect of network stability (Burt, 2002), which lacks "a focus on intra-organizational task relationships and their dynamics" (Dahlander and McFarland, 2013: 70).

Our exploration of the indirect effect of social capital on organizational performance furthers the relatively scarce research on the interaction between human and social capital (Wright, Coff, and Moliterno, 2014). We shed light on how social capital favors or hinders the role of human capital in promoting organizational performance, while also responding to a long-standing call to investigate empirically the role of social capital in the diffusion and exploitation of resources within organizations (Nahapiet and Ghoshal, 1998). While recent research has focused on the mechanisms influencing the micro-foundations of human capital-based advantage in terms of attracting, retaining, and motivating talent in organizations (Coff and Kryscynski, 2011), our work adds to the understanding of which elements favor the leveraging of existing human capital. Our examination of the interaction between these two resources provides at least three other theoretical contributions. First, our finding of a negative moderation of peripheral social capital on the relation between core human capital and organizational performance represents an additional example of social capital's negative externalities (Adler and Kwon, 2002). Second, our findings are consistent with recent research investigating the extent to which the structural location of human capital—at the core or at the periphery—affects team outcomes differently (Humphrey *et al.*, 2009), and extends it by considering to what extent various types of human capital are affected by social capital located in different parts of the organization. Third, our results contribute to the studies that link team diversity to performance, answering a recent call "to extend social categorization (and similarity/atraction) analyses with insights from the study of social networks in organizations" (van Knippenberg and Schippers, 2007: 526). Structural sources of heterogeneity—i.e., the position within a network, be it core or periphery—adds a new, critical dimension to the analysis of how diversity affects organizations. It also furthers our understanding of the scope conditions of two of the main traditions of diversity research. By showing that structural homogeneity positively affects the link between

human capital and performance, our results confirm the view that social categorization theory (Tajfel and Turner, 1986) and the similarity-attraction paradigm (Byrne, 1971) are particularly suitable to relational applications (cf. van Knippenberg and Schippers, 2007), thus stimulating diversity researchers to analyze the implications of structural diversity for individual and organizational outcomes. The relative demographic homogeneity of our context⁴ makes our results robust to the counterargument that diversity of background helps performance, as proposed by the informational diversity/cognitive resource perspective (Williams and O'Reilly, 1998), and thus cleanly isolates the effect of structural diversity. Without such clarity, the mechanisms underlying the hypothesized relations in Hypotheses 3 and 4—based on structural diversity and hinging upon social categorization theory and the similarity-attraction paradigm—could be confounded by others proposed by the informational diversity/cognitive resource perspective (Williams and O'Reilly, 1998), which generally views diversity as beneficial. While we see demographic homogeneity as an additional strength of our study—as it allows us to isolate the influence of diversity as per the social categorization and similarity-attraction paradigm—future studies might attempt to generalize our results to situations where core and peripheral members have substantially different backgrounds and demographic characteristics to explore fully the role of diversity along different dimensions.

Finally, our finding that social capital does not yield higher performance returns than human capital might seem to question a fundamental premise of the resource-based view of the firm, i.e., that the more idiosyncratic, the more valuable resources are (Barney, 1991). An alternative explanation for this result might be linked to the characteristics of our context. In high visibility conditions, the deployment of idiosyncratic resources may make the focal organization more predictable and thus more susceptible to competitors' timely strategic countermeasures, in part limiting their strategic value. Also, in contexts featuring high levels of task interdependence, while relational stability provides

a coordination advantage, it might also impede quick adaptation if and when change becomes necessary, in turn limiting the value of this type of social capital. Exploring the limits of such highly idiosyncratic resources as social capital might represent an important avenue for future studies in the resource-based tradition.

Managerial implications

Our findings about the direct effects of social capital on performance suggest that managers should focus on creating the conditions for structural stability by giving employees time to get to know and to adjust to each other, even if they are not immediately successful, possibly by creating a “safety net” to minimize and tolerate the short-term inefficiencies generated by temporary errors and mistakes. These results represent additional evidence against the widespread practice of hiring temporary workers to maximize cost flexibility (Pfeffer and Sutton, 2006). While offering short-term, non-guaranteed contracts does allow managers to adjust more quickly to demand fluctuations, the practice also undermines the accumulation of social capital in the form of relational stability, which we have shown to provide a positive return on organizational performance.

Our results also provide an explanation for why HR practices leading to the “war for talent” can generate underwhelming results (Gardner, 2002). Hiring the most talented individuals might not be the best solution if done at the expense of sacrificing stability, as the advantages associated with the new talent might be offset by social capital losses. In addition to maximizing the organizational stock of individual talent, paying more attention to social capital—and, most importantly, to its location in the organizational network—can be a fruitful parallel practice in hiring and retaining employees, which could enable organizations and teams to reap greater rewards from their existing network structures (Reagans *et al.*, 2005). By considering the levels and location of its existing social capital, managers can also maximize the value of the organization's existing human capital. As the effective leverage of human capital partially depends on social capital, the right conduits must exist in the organization for the acquisition of talent to exert fully its potential positive effects. Hiring talented core employees is particularly beneficial when social capital is also present in the

⁴Core and peripheral groups are not substantially different in terms of age, prior experience, gender, ethnicity, and biometric information (comparisons are available from the authors upon request).

organizational core, while benefits might be offset by the presence of stable ties outside of it.

Limitations and future research

In evaluating the results of this study, we must alert the reader to its limitations. Despite the advantages of studying sport teams, such organizations do not represent the whole spectrum of organizational activities. While basketball clubs' characteristics might match those of most highly interdependent production or service-oriented organizations (such as start-ups and professional service firms), the applicability of our findings may differ in other contexts, such as project-based organizations dealing primarily with creative and/or temporally defined tasks (Maoret, Massa, and Jones, 2011), although research has shown that past common experience can be critical also for creative endeavors (Taylor and Greve, 2006). Future research could also look at the different nature of the routines behind different types of organizational tasks and associate them with the beneficial and/or detrimental effects of social capital in stable or changing conditions. As organizations in our setting display fairly definite core-periphery structures, we were able to differentiate between parts of the network featuring stark differences in their degree of interdependence and observability. This may not hold true in all organizational settings: for instance, other types of organizational networks may be defined by a homogeneous degree of interdependence across their structure, may be more or less observable, or might also display multiple areas of high interdependence. Future research should consider the validity of our findings across these various scope conditions.

The two sets of mechanisms that we have identified regarding relational stability are predicated on the emergence of knowledge ossification and the presence of rivals that might take advantage of situations of high predictability, observability, and exposure to organizations' routine sets. Future studies could investigate the extent to which our results hold in contexts where knowledge ossification is less of a concern, or in noncompetitive settings. We have also assumed that relations between individuals are not negative, so that shared experience among current organizational members can positively impact organizational performance. While this might seem a strong assumption, what makes it relatively robust is that, especially in sports clubs, negative ties tend to be broken off,

either by the parties involved or by management. Moreover, high levels of task interdependence make negative relationships less likely to emerge in our context (Labianca and Brass, 2006).

The interaction we found between human capital and social capital poses a question regarding the nature of the dynamic relationship between these two types of resources. Distinguishing whether it is an organization's social capital that favors attracting and retaining certain types of individuals or human capital that leads to different patterns of social capital accumulation has important implications for management, especially in light of our findings about the role of the interaction of these two types of resources for organizational performance. Finally, it is important to mention that our econometric analyses lack a source of exogenous variance, which could be leveraged to identify causal effects more precisely in our analysis. Whereas we believe that our econometric modeling improves upon similar approaches employed in the past, future research should employ exogenous instruments and, by doing so, provide an even stronger evidence about the magnitude and direction of causality between human capital, social capital, and organizational performance.

Conclusions

By qualifying how the benefits of social capital depend on its location—core or periphery—in the intra-organizational task relationship network, we showed (1) that social capital located in the core has stronger, yet more quickly diminishing returns on organizational performance and (2) that social capital located outside the core hinders the positive effect of the human capital of core organizational members on performance, thus offering a more comprehensive theoretical framework of how social capital matters, directly and indirectly, for organizational performance. These results have implications that cannot be ignored for strategic human resource practices aimed at recruiting new employees and at leveraging value from existing talent. We hope that the more nuanced understanding we provide of the role that relational resources play in linking stability to outcomes might help managers to rethink widespread hiring and retaining practices such as the “war for talent”, by getting to grips with the complex role that social capital plays in favoring or hindering organizational performance.

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