Physicians' willingness to share: a TPB-based analysis

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Introduction

Knowledge sharing is attracting an unprecedented attention in health-care organizations (Ferlie *et al*, 2012). The continuous improvement of hospitals as complex and integrated systems depends on the mobilization of the expert knowledge held by physicians – and yet knowledge sharing is proving a behaviour that managers struggle to foster and that does not often emerge spontaneously (Van Beveren, 2003; Currie *et al*, 2007). The nature of physicians' knowledge is mostly responsible for this struggle. Physicians hold an expert knowledge that is mostly tacit and made of narratives regarding the know-how and know-why of medical practice (Atkinson, 1995). Managers thus suffer an irresolvable information asymmetry against physicians and cannot readily access, codify and mobilize their knowledge (Adler *et al*, 2008). The diffusion of knowledge-sharing behaviours thus depends on the capacity to arouse physicians' *willingness* to expose their knowledge (Ryu *et al*, 2003; Garbutt *et al*, 2008; cf. also Lam & Lambermont-Ford, 2010). To make things even more complicated, managers cannot expect this willingness to emerge spontaneously in the majority of physicians. Past research is in fact adamant to show that physicians might hoard their unique knowledge because they could preserve their professional autonomy and avoid a time-consuming activity (Waring & Currie, 2009). Furthermore, physicians are also confronted with practical problems in the transmission of knowledge. Von Hippel (1994) introduced the concept of 'stickiness' to indicate the high cost of transferring information from a transmitter to a recipient because of the tacitness of the knowledge required to exploit

such information. Because of this stickiness, the transmission is potentially very costly and the most significant knowledge may get lost in each stage of the transfer process – and ultimately, physicians might refrain from the effort.

Building on this premise, many contributions have already investigated the psychological antecedents that motivate an individual to engage in knowledge sharing. The Theory of Planned Behaviour (TPB) (Ajzen, 1991) has proven a particularly successful theoretical model – with various applications in both professional (e.g., Ryu *et al*, 2003) and non-professional contexts (e.g., Tohidinia & Mosakhani, 2010). TPB provides a valid explanation of the proximal antecedents of knowledge sharing – indicating that individuals' intention to share knowledge is a combination of three psychological antecedents, attitude, subjective norm and perceived behavioural control (PBC).

Accepting the TPB as an appropriate framework for the proximal antecedents of knowledge sharing, it becomes relevant to recognize the environmental, organizational and managerial factors that affect physicians' attitude, subjective norm and PBC – as these factors are the ones that managers can most directly affect. We are already confronted with a wealth of contributions identifying many factors (e.g., trust, social network, organizational culture and climate) that have proven significant for knowledge sharing (Wang & Noe, 2010). Overall, it is fair to say that we already have an advanced picture of both the psychological and the managerial/organizational antecedents of knowledge sharing – but these aspects have remained disconnected from each other. This gap limits the actionability of the knowledge produced thus far because it remains unclear how environmental, organizational and managerial factors affect individuals' intentions to share – or, conversely, how the relevant conditions of physicians' intentions can be appropriately affected.

Our study addresses this opportunity by providing a tighter connection between the TPB framework and the managerial/organizational factors that have emerged as relevant in past research. By doing this, we can use the TPB framework to explain how such managerial/organizational factors affect physicians' intention to share. The TPB framework allows us to highlight how these factors affect physicians' attitude, subjective norm and PBC.

The paper is structured as follows. In the next section, we will briefly outline the rationale and contents of the TPB, while the section 'Methodology' will outline the methodology used in this conceptual paper to collect relevant papers on knowledge sharing and to classify them in the TPB framework. The subsequent section 'Findings' will be dedicated to report the findings, that is, report the key antecedents that concur to explain professionals' attitude, subjective norm and PBC. The section 'Discussion' concludes the paper by discussing the findings, providing managerial implications and suggesting possible directions of future research.
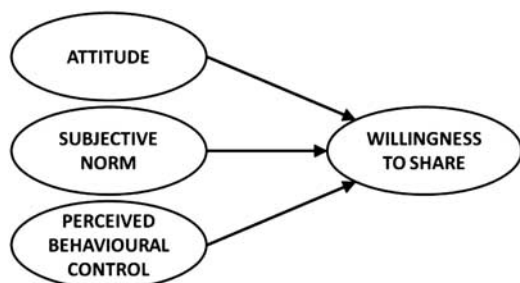
Theory of planned behaviour

In the present section, we will outline the key constructs that populate the TPB and the explanatory hypotheses that link it with knowledge-sharing behaviours.

The TPB model appears to be a highly appropriate framework to investigate the antecedents of knowledge sharing. As a matter of fact, several contributions have already validated its explanatory power for knowledge-sharing behaviours occurring in professional and non-professional contexts (e.g., Lin & Lee, 2004; Tohidinia & Mosakhani, 2010) – and also in the specific case of physicians' willingness to share (Ryu *et al*, 2003). Besides knowledge sharing, the TPB has been widely used to explain diverse physicians' behaviours, such as adherence to guidelines (Rashidian & Russell, 2011), acceptance of telemedicine (Hu & Chau, 1999) and delivery of preventive services (Millstein, 1996).

The TPB posits that the engagement in a behaviour is most directly affected by individuals' *intention*. In Ajzen's (1991) words, 'intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior' (p. 181). In this regard, previous contributions already support the hypothesis that knowledge sharing is not carried out mindlessly or by coercion, but rather individuals volitionally choose to share or hoard their knowledge (Kuo & Young, 2008a, b).

Individuals' intention is, in turn, affected by individuals' attitude, subjective norm and PBC. First, individuals may be willing to share because they evaluate favourably the benefits that they might attain through its enactment. Previous meta-analyses have largely supported the central role of attitude in behavioural formation (Kraus, 1995; Armitage & Conner, 2001), which is explained by the fact that individuals develop beliefs about the outcomes and accord their favour to those behaviours that provide them with more desirable consequences. Second, individuals are also affected by the social pressures that push them to comply with a generally accepted behaviour. The concept of subjective norm reflects the idea that individuals, irrespective of whether or not they believe knowledge sharing to be useful or detrimental, may engage in the behaviour to follow or imitate what others do or ask to do. Physicians are professionals that indeed live in open systems and have multiple people that might stimulate them into performing the behaviour, such as peers and professional associations (Ferlie *et al*, 2005). Finally, the construct of PBC reflects the notion that individuals are more willing to share if they perceive it is easy to engage in the behaviour and control its consequences. Several contributions have, in this regard, highlighted how individuals refrain from sharing their knowledge once they have found significant obstacles in, for instance, expressing their tacit knowledge into explicit forms (Edmondson *et al*, 2003). According to the TPB, PBC is also a direct antecedent of knowledge-sharing behaviour: motivated individuals, in fact, might lack the possibility to share

Figure 1 Conceptual framework from Ajzen's (1991) Theory of Planned Behaviour.

knowledge, because the behaviour is too difficult or lack control over it.

Overall, Figure 1 shows the conceptual framework that we have adopted for this study.

Methodology

On the basis of this conceptual framework, we collected contributions regarding antecedents of knowledge sharing and classified the findings according to the TPB framework. More specifically, we collected both studies that had directly investigated physicians' knowledge sharing and studies that provide evidence from other industries that can be transferred to hospital contexts. In order to have a comprehensive picture of the available evidence on knowledge sharing in the literature, we implemented three complementary search strategies. We capitalized on Foss *et al*'s (2010) contribution that already provided a systematic review of existing contributions on knowledge sharing. They collected contributions published in 13 top-tier managerial journals between 1996 and 2006. We updated their review by searching for contributions from 2007 to 2012 in the same journals. Second, we collected contributions in knowledge management journals, namely, *Knowledge Management Research and Practice, Journal of Knowledge Management, Journal of Intellectual Capital, The Learning Organisation, Knowledge and Process Management* (cf. Serenko & Bontis, 2009). The time span considered was 1996–2012. Finally, cross-references and forward citations of the selected papers were also reviewed. Common to these strategies, we adopted individuals' knowledge-sharing behaviour as our unit of analysis. In this view, we selected those contributions that dealt (more or less explicitly) with the factors promoting or inhibiting individuals' intentions to share their knowledge. The findings from 85 papers are presented in the following paragraphs.

Findings

Attitude

Attitude is a salient feature of physicians' decision making, as they are regarded as pragmatic decision makers that would reject any change that they do not perceive as beneficial to their practice and status (Friedson, 2001). Unsurprisingly, the latest research is expanding the knowledge on professionals' attitude to explore the factors affecting TPB (Jeon *et al*, 2011; Seba *et al*, 2012). It is thus fundamental for hospital managers to understand what are the benefits and the costs that individuals associate with knowledge sharing. Past research reveals a complex mélange of factors that concur to shape physicians' attitude towards knowledge sharing. Nine distinct factors could be recognized.

First, physicians might be moved by an ethical account of the medical benefits they would contribute to, when sharing knowledge. Physicians' education, personal experiences or, simply, intrinsic beliefs might stimulate an internal drive to share knowledge 'simply' because it is recognized as a relevant behaviour to improve the quality of care. Such ethical concerns about knowledge sharing have been reported in various contexts (Wang, 2004; Lin, 2007; Gagné, 2009; Tseng & Fan, 2011), and in hospitals can be best exemplified in (more or less) explicit references in medical oaths.

Second, physicians might be moved by a rational account of the organizational benefits they would contribute to, when sharing knowledge. The conviction that effective knowledge sharing would trigger an improvement in knowledge stocks, which everyone, from professionals to patients, can beneficiate from (Van Raak *et al*, 2005), can in fact trigger organizational citizenship behaviour, that is, an altruistic work behaviour that goes beyond 'the reach of traditional measures of job performance' (Van Dyne *et al*, 1994, p. 765). This occurs especially when physicians identify themselves with their organization and accept its perspective and goals as their own (Van den Hooff & de Ridder, 2004). Once the organization puts an emphasis on knowledge sharing, the physician might feel the need to reciprocate with extra effort in their work.

Third, physicians might be moved by a rational account of the personal benefits they would attain when sharing knowledge. Physicians might in fact engage in knowledge sharing with the expectation that this altruistic behaviour will foster future returns from the community (Blau, 1964). Specifically, physicians may be motivated to share their knowledge because they expect that the receiver to reciprocate with practical favours, but also with the gradual establishment of long-term collaborations (Bock & Kim, 2002; Chiu *et al*, 2006; Chen & Hung, 2010).

Altogether, these factors might suggest that non-sharing represents an irrational choice for physicians and thus no external intervention is needed to foster their intention to share. Several contributions on extrinsic motivators, that is, our fourth factor, add to this notion by indicating that interventions such as incentives or sanction might even be deleterious to spontaneous knowledge sharing. Evidence is indeed conflicting. On one hand, extrinsic motivators are thought to encourage knowledge sharing because they inflate the benefits of sharing through incentives and the cost of non-sharing through sanctions (Ferrin & Dirks, 2003). However, these interventions are difficult to implement, hospital managers being unable to monitor whether physicians share knowledge at their best. Thus, mandatory

requirements might be easily eluded (Kaser & Miles, 2002). Furthermore, previous evidence has increasingly challenged the actual utility of extrinsic motivators, arguing that they may discourage knowledge sharing because they are often perceived as manipulative and controlling (Bock & Kim, 2002) and 'do not create a lasting commitment, they, merely, and temporarily, change what we do' (Kaser & Miles, 2002, p. 56). As a result, rewards and sanctions may 'crowd-out' motivation, with individuals willing to share only when expecting a reward (Osterloh & Frey, 2000).

Fifth, knowledge is a precious asset for competition over promotion and access to resources by holding unique information and know-how (Husted & Michailova, 2002). Competition may alter the perception of costs derived from knowledge sharing because 'if people could own the knowledge that is scarce and important, they would acquire great benefit from the organisation. That is, once they share their scarce knowledge, their knowledge advantage would be lost and benefit would also be damaged. In this case, why would people share their specific knowledge with others?' (Yang & Wu, 2008, p. 1130). It should be noted, however, that the extent of competitive behaviour among physicians has received mixed evidence. While some contributions pointed out how physicians face many tensions because of competition for patients and hospital privileges (Pearson, 1999), others undervalued the strength of this competition (Akre *et al*, 1997).

Sixth, knowledge sharing is precious for reputation. In this case, workers can willingly spend their knowledge in order to increase their reputation. Reputation may be such a strong motivator that individuals would share their knowledge even when colleagues don't reciprocate or free ride (Wasko & Faraj, 2005). The actual extent of this argument, however, is ambiguous as reputation interacts with competition. Workers, in fact, may act on a 'hidden profile', that is, actively provide others with commonly held information (thus improving their reputation), but hide unique knowledge (thus preserving their precious assets for competition) (Thomas-Hunt *et al*, 2003). Reputation may also lead workers not to share uncertain information nor failures to avoid negative exposure. Some contributions have shown this behaviour to be quite common among physicians, whose perception of their mistakes is often much more negative than their peers' judgements (Akre *et al*, 1997). Moreover, even when diffused solidarity among physicians was observed, important information and feedback on individuals' mistakes were hidden.

Seventh, knowledge is precious for professional autonomy. Because of the complexity of clinical practice, any control outside peer reviews is implausible and resisted because 'the ideological core of professionalism is its claim to a discretionary specialisation' (Friedson, 2001, p. 109), which is a source of power and authority and smoothes the calculative rationality of management. Accordingly, attempts to codify and standardize knowledge may not be welcomed if they are perceived as imposing limits to the natural flow of physicians' practice (Walter & Lopez, 2008).

Eighth, attitude towards knowledge sharing is hampered by fears of hosting 'knowledge parasites'. The possession of attractive knowledge often derives from a significant effort in its production and identification. Then, its possessor may not be willing to share such knowledge with others that have not spent as much effort or are perceived as free riders (Husted & Michailova, 2002). The lack of control over opportunism – thus – becomes an incentive *not* to share knowledge.

Last, attitude towards knowledge sharing might not be the results of a rational assessment of costs and benefits, but rather of taken-for-granted assumptions that consolidate over time and reflect what is intended as 'the right thing to do' and the 'right way to do it' (Feldman & Pentland, 2003; Mueller *et al*, 2004). Such taken-for-granted assumptions are the results of the cognitive–cultural pillars characterizing the social context (e.g., unit, hospital, professional association, nation) in which the individual is embedded. Chow *et al* (2000) showed, for instance, that Chinese employees were more inclined to share their knowledge compared with their Anglo–American counterpart because of different cultural backgrounds – while De Long & Fahey (2000) pointed out that different knowledge-sharing behaviours could be explained by the different cognitive–cultural pillars of their belonging organizations. Likewise, indirect evidence in the healthcare setting also suggests that physicians are affected by the culture/cognitive pillars of their hospitals as well as of their belonging departments (Parker, 2000).

Table 1 summarizes these findings, accounting for the expected impact (i.e., the sign), positive or negative, of each factor. Some items have both plus and minus signs to indicate that the literature has not yet reached a consensus over their impact on attitude.

Subjective norm

Positive expectations of benefits and costs may not be the only, nor the foremost, reason why physicians are willing to share their knowledge. Physicians, regardless of their attitude, may be motivated by relevant people in their environment who regard this behaviour as necessary and useful. This argument is reflected in the 'Subjective Norm' construct, which refers to individuals' willingness to comply with this social pressure. The 'subjective norm' construct thus interprets the intention to share not only as a rational choice, but also as a socially affected behaviour. Physicians shape in fact their expectations from frequent interactions with 'Relevant people' who can use their position or authority to expose their ideas and influence (Sparrowe *et al*, 2001; Reinholt *et al*, 2011).

Accordingly, in this section, our attention shifts to identifying the prominent actors (in hospital and professional network) that can reportedly influence physicians' behaviours. On the basis of the literature review, we identified four major actors (Table 2).

Table 1 Factors affecting physicians' attitude towards knowledge sharing

Factors – attitude	Description	Sign
Ethical motives	Physicians perceive knowledge sharing as a moral duty, for patients' and practice good	+
Organizational citizenship behaviour	Physicians perceive knowledge sharing as a relevant behaviour for hospitals' good	+
Return expectation	Physicians perceive knowledge sharing as a convenient behaviour, expecting recipients to return the favour in subsequent transactions	+
Extrinsic motivators	Physicians perceive knowledge sharing as a convenient behaviour, expecting a reward	+
	Physicians stop sharing their knowledge when they stop receiving rewards from it (crowding out effect)	−
Reputation	Physicians perceive sharing of best practice as a convenient behaviour for personal reputation	+
	Physicians perceive sharing of mistakes or uncertain knowledge as a risky behaviour for personal reputation	−
Competition	Physicians perceive sharing of unique knowledge assets as a loss of competitive advantage	−
	Physicians perceive the exposure ensued by knowledge sharing as an asset competitive advantage	+
Threat to autonomy	Physicians perceive sharing of expert knowledge as a risky behaviour for autonomous decision making	−
Fear of knowledge parasites	Physicians fear that others would free ride their efforts	−
Taken-for-granted assumptions	Physicians' attitude is (positively or negatively) affected by the cultural and cognitive taken-for-granted assumptions that characterize the context (hospital or department) in which the physicians are embedded	+/−

Table 2 Relevant people affecting physicians' subjective norm

Influences – subjective norm	Description	Sign
Top management	Managers pressure physicians to share through mandatory interventions, communication and rituals of transition	+
Peers	Peers pressure physicians to share through peer reviews and persuasion	+
Opinion leaders	Opinion leaders drive physicians to share knowledge through access to new knowledge	+
Professional associations	Professional associations drive physicians to share knowledge through social connection and access to external knowledge	+

First, hospital managers themselves may exert pressure through mandatory interventions, communication strategies and rituals of transition (Lorenzi & Riley, 2000). The introduction of *ad hoc* roles such as the knowledge broker and the chief knowledge officer can be interpreted as an attempt to generate a social pressure on employees for sharing best practices (Bontis, 2001). The effectiveness of these interventions is still under question, especially in the context of hospitals where the presence of knowledge brokers is still limited and thus there is not much evidence on whether physicians, administrators or other subjects are best suited for this role (Dobbins *et al*, 2009). What we do know, however, is that physicians – and professionals, in general – tend to work 'encapsulated' in their units (Llewellyn, 2001) and defend their professional autonomy by hoarding their knowledge, but also resisting or avoiding influences from those outside their clique – managers, administrative staff and professionals from other units and disciplines, in particular. This evidence can help understand the role that should be accorded to 'hybrid managers'– that is, former physicians who embrace an administrative or managerial role – as the most effective in advancing new policies and decisions, as they have backgrounds, languages and experiences close to physicians (Fitzgerald *et al*, 2006). Still, the overwhelming evidence that the impact of management on knowledge sharing is far from immediate indicates that hybrid managers might need peculiar 'evangelical skills' (Bontis, 2001) to be effective. Furthermore, previous research has shown, for example, how individuals' positive trust in management is a fundamental mediator of the linkage between managerial interventions and effective knowledge sharing (Renzl, 2008), while autocratic styles of leadership inhibit knowledge sharing (Srivastava *et al*, 2006). The concern over management effectiveness is especially salient in the context of hospitals. Past research, in fact, has consistently shown how often managerial interventions failed to win professionals' legitimization and were opposed as intrusive (Lapsley, 2001).

Second, peers within the hospital are often the most effective source of social pressure for physicians. Two arguments motivate this finding. On the one hand, because of professional autonomy, peer reviews are the main source of physicians' evaluation. Thus, peers' expectations and judgments are accounted as most relevant to guide physicians' behaviours (Friedson, 2001). On the other hand, professionals look to their reference groups to guide their behaviour when role expectations are ambiguous or conflicting (Haas & Park, 2010). As such, 'if withholding behavior appears socially unacceptable, it would seem to threaten the rewards that the reference group can provide and increase the risk of sanctions' (p. 876).

Table 3 Factors affecting perceived behavioural control

Factors – PBC	Description	Sign
Individual factors		
Self-efficacy	Physicians need combinative capabilities to share knowledge	+
Relational factors		
Network access	Transfer of health knowledge requires weak and strong ties between sharers	+
Shared meaning	Physicians need to share a common interpretation of events	+
Trust	Physicians need to trust recipients not to be opportunistic or reject their efforts	+
Organizational factors		
Procedural justice	Physicians share more knowledge if they perceive organizational fairness in allocating resources	+
Culture	Physicians share more knowledge if it is an important activity that needs no further incentive	+
Psychological safety	Physicians share more knowledge if hospitals do not have a 'who's to blame?' climate	+
Workload	Physicians have less time to share knowledge if they are burdened with workload	− (Uncertain)
Technological factors		
Technology	Physicians are facilitated by the support of technologies which remove barriers of time and spaces	+
	Physicians do not exploit technologies which they consider as alien or irrelevant to their goals	− (Uncertain)

This suggests that hierarchical solutions should be coupled with initiatives that facilitate local empowerment (Carroll & Edmondson, 2002), where leaders with little formal authority can exert a significant pressure on colleagues. Managers can refer to them as 'local champions' in advocating knowledge sharing as a small number of physicians can influence a much larger number of hesitant colleagues (Leonard-Barton, 1985).

Third, influences to physicians may also come from opinion leaders that lay outside the organization. Opinion leaders have a significant role in managing changes such as the adoption of new practices or technologies (Valente & Davis, 1999). It has been noted, however, that the influence of academic opinion leaders is still limited, and physicians that have gained much reputation as clinical referents in the territory are instead much more influential (Mohrman *et al*, 2001). Physicians have shown a stronger attitude to obtain information from journals and books for their clinical practice rather than peers (Haug, 1997), even if other contributions seems to suggest the exact opposite (Gabbay & Le May, 2004). The impact of opinion leaders on knowledge sharing through journal and books, however, is mostly unexplored.

Finally, past research also suggests that professional associations might play a notable role. Professional associations, in fact, have been shown to support the diffusion of new technologies (e.g., Swan & Newell, 1995) as well as new policies and practices (Greenwood *et al*, 2002). Professional associations, in fact, represent reference groups that physicians relate to when making decisions that affect their own practice (Greenwood *et al*, 2002; Haas & Park, 2010). There is still limited knowledge on the role of professional associations in triggering knowledge sharing (cf. Currie & Suhomlinova, 2006) and thus the extent of this positive impact is largely unexplored in the literature.

Perceived behavioural control

A positive evaluation of knowledge sharing is not sufficient in fostering the relative behaviour as professionals may face a variety of tangible constraints in translating their attitude into an actual behaviour. Removing obstacles to knowledge sharing and creating conditions to facilitate its enactment are further fundamental steps. Past research identified a vast range of factors that affect individuals' control over knowledge sharing and its consequences. These factors can be related to (a) individual ability, (b) the relationship among individuals, (c) organizational support and (d) technological opportunities (Table 3).

With regard to ability, knowledge sharing is an intrinsically complex behaviour to perform for physicians. Expert knowledge is in fact mostly tacit – being constituted mainly of narratives regarding both the know-how and know-why of clinical practice (Atkinson, 1995). As such, 'the aim of a skillful performance is achieved by the observance of a set of rules which are not known as such to the person following them.' (Polanyi, 1958, p. 49). Accordingly, the knowledge to be shared reflects 'an art which cannot be specified in detail cannot be transmitted by prescription, since no prescription for it exists. It can be passed on only by example from master to apprentice.' (p. 52). In conditions of knowledge stickiness, physicians need to overcome a number of barriers 'such as the recipient's lack of absorptive capacity, causal ambiguity, and an arduous relationship between the source and the recipient' (Szulanski, 1996, p. 28). Because of these difficulties, a lack of self-efficacy – defined as 'the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations' (Bandura, 1995, p. 2) – would hinder both the intention to share knowledge and its actual occurrence. A large number of

contributions have in fact found self-efficacy to be a predictor of knowledge sharing in multiple different contexts (e.g. Hsu *et al*, 2007; Lin & Huang, 2008; Lin *et al*, 2009; Chen & Hung, 2010).

The relationships between individuals also play an important role, as knowledge sharing is a socially embedded behaviour. Three factors associated with social relations are relevant PBC-wise.

First, the nature and content of the social network linking individuals is relevant. Scholars have devoted much attention in understanding whether strong ties or weak ties are more suited (Wasko & Faraj, 2005; Chiu *et al*, 2006; Bosua & Scheepers, 2007; Van den Hooff & Huysman, 2009; Radaelli *et al*, 2011). On the one hand, strong ties, involving recurring relationships between close friends or colleagues, allow individuals to better articulate their tacit knowledge. Stronger ties allow faster and more credible communications because of the trust and expected reciprocation that had developed over time. Accordingly, they are highly needed when knowledge is complex (Hansen, 1999). On the other hand, Granovetter (1973) argued in favour of weak ties, whose distant and infrequent relationships 'provide people with access to information and resources beyond those available in their own social circle' (p. 209), thus bridging otherwise disconnected individuals. Furthermore, strong ties may favour network inertia, while weak ties, drawing on the concept of 'loose coupling' (Weick, 1976), are less constraining and allow more adaptive relationships. As a result, Hansen (1999) found out that neither strong nor weak ties alone lead to efficient knowledge sharing. Second, shared meaning is needed to guide individuals into a common interpretation of events (Bechky, 2005). Several scholars have directly drawn on Schutz's (1982) concept of 'lifeworld', which point outs, respectively, the continuous evolution of new meanings and the necessity for a reference framework that provides individuals with implicit guidelines for organizing, shaping their interpretations and enacting meaning to events and situations. Third, trust based on affection (i.e., confidence in others' good intentions) and on cognition (i.e., confidence in others' ability to properly interpret and use the knowledge) (Chowdhury, 2005) – is one of the most investigated and consolidated antecedents of knowledge sharing, to such an extent that it has been defined as 'the single most important precondition for knowledge exchange' (Rolland & Chauvel, 2000, p. 239). As a result, it is widely established that individuals would not spend their time on knowledge sharing if they believe recipients to be opportunistic or unable to use the knowledge. Trust is particularly important in those contexts where control mechanisms cannot be fully deployed (McEvily *et al*, 2003), such as hospitals. As Ouchi (1979) pointed out, 'task performance is inherently ambiguous, and teamwork is common, so that precise evaluation of individual contribution is all but impossible. In such cases, highly formalized and lengthy periods of socialization are required, during which doctors and nurses are subjected not only to skill training but also to value training or indoctrination.' (p. 837).

With regard to organizational support, four factors have emerged.

First, several contributions showed that employees 'perform organizational citizenship behaviors with greater frequency when they perceive fairness in the means by which organizations and their representatives make allocation decisions' (Tepper & Taylor, 2003, p. 97). Physicians are particularly affected by the extent they believe that their hospitals make decisions – for example, budgeting technology adoption, postgraduate training, the management of impaired colleagues and peer review (Posdakoff *et al*, 2000; Tangirala & Ramanujam, 2008) – that are consistent, accurate, correct and unbiased. When this happens, physicians might feel an obligation to reciprocate with contributions that go beyond required behaviours (Posdakoff *et al*, 2000). Consistently with much literature that links individuals' perceptions of procedural justice with organizational citizenship behaviours, several contributions have also proposed a positive impact on knowledge sharing (Bartol & Srivastava, 2002; Tepper & Taylor, 2003; Lin, 2007).

A second factor relates to culture, that is the collection of fundamental values that gives meaning to organizations. This concept differs from 'shared meaning' as it relates to the content of values and not to common understanding of meanings. Several contributions documented how organizational culture is frequently perceived as a critical success factor for knowledge management because it underlies the legitimization of knowledge management (De Long & Fahey, 2000). Organizational commitment to establish a knowledge-friendly culture, in fact, supports the identification of knowledge sharing as an important activity that needs no further incentive – which thus does not only affect individuals' attitude towards the behaviour, but also makes it much easier to perform (Cabrera & Cabrera, 2002; Heisig, 2009).

Third, several contributions have recognized the need for 'psychological safety', that is, the 'shared belief that the team is safe for interpersonal risk taking', which leads to 'a sense of confidence that the team will not embarrass, reject, or punish someone for speaking up' (Edmondson, 1999, p. 354). Psychological safety is a distinct construct from subjective norm because it relates to individuals' perception of behavioural ease and not to social pressures that alter individuals' perception of behavioural worth. Psychological safety can directly affect individuals' comfort in sharing their mistakes and best practices, which eventually lead to superior knowledge-sharing performance (Siemsen *et al*, 2009). Conversely, 'who's to blame?' reactions to problems, criticisms of 'reinventing the wheel' and 'not invented here' diffidence are detrimental to knowledge sharing (Bock *et al*, 2005; Boh, 2007). These arguments are supported by evidence that cooperative behaviours are spoiled by non-cooperation and result in tit-for-tat or, worse, non-cooperative reactions by the potential sharer (Yang & Wu, 2008).

Finally, workload affects time and resources that can be devoted to knowledge sharing. Findings on workload are mixed. Some contributions pointed out a negative impact on knowledge sharing because excessive workload may reduce time and dedication that physicians can spend on this behaviour (Jabr, 2007; Siemsen et al, 2008). Others, however, did not observe any significant impact as physicians were able to find time to spend on knowledge sharing anyway (Hara & Hew, 2007).

With regard to technological support, information systems have attracted a lot of attention because they have the potential to (a) remove barriers of time, space and convenience (Van den Hooff et al, 2004, Gastaldi et al, 2012); (b) improve the visibility of knowledge-related actions, thus helping workers to monitor each other (Bjørn & Ngwenyama, 2009) and (c) create 'interruptive events' (i.e., events that interrupt the flow of routine activities and are dedicated to learning new practices or sharing experiences) that allow workers to focus on the specific theme of knowledge sharing (Zellmer-Bruhn, 2003). Accordingly, organizations are increasingly confronted with the appeal of Information & Communication Technologies (ICT) as the primary solution for knowledge management. Hospitals, in particular, can count on a wide range of technologies, from intranets to electronic health records, that can trigger new and improved communication dynamics among physicians (Aidemark, 2008).

Nevertheless, scholars are cautious regarding the actual facilitation provided by information systems. Two issues, in fact, need to be solved: (a) individuals' technological acceptance and (b) proper integration in the workflow (Berg et al, 2003) and in the social context (Ellingsen & Monteiro, 2003). First, it has been widely observed how the introduction of new technologies is a complex process, where workers – and physicians in particular – are often antagonist or indifferent to innovations they regard as alien or irrelevant (Lapointe & Rivard, 2005). In fact, 'the mere existence of evidence is not sufficient to ensure the adoption of best practice into routine clinical care' (Sanson-Fisher et al, 2003), but hospital managers need to promote the perception of usefulness to physicians. In fact, when information systems are perceived as useful, physicians have proven to be both able and willing to overcome any problems with ease of use (Chau & Hu, 2002).

The second issue regards the position that technologies should have into a much wider communication strategy. It has been argued that 'if these knowledge management systems are going to work, they must be accompanied by social processes where people can come to terms with new ways of working' (Aidemark, 2008). Such a statement is strongly coherent with similar non-health-related findings, which assess that 'the contribution of ICT … is more likely to occur in a setting where other, richer communication media are used as well' (Van den Hooff et al, 2004, p. 178). This provides a strong relationship between technology facilitation and social capital. As observed, a lively and stimulating community, where individuals are pushed to share knowledge out of emulation, positive competition and intrinsic motivation, is mostly grounded on two factors: communication viability and trusting climate among co-workers (Coleman, 1988). Information systems, by bridging ties between individuals (thus increasing the network dimension and communication frequency) and increasing knowledge traceability, specifically address these issues and thus can have an indirect yet strong impact on knowledge sharing (Van den Hooff et al, 2004).

Discussion

Hospital administrators are confronted with the difficult task to diffuse knowledge-sharing behaviours among physicians. This result is crucial for the continuous improvement of hospital delivery systems and yet managers cannot expect knowledge sharing to emerge spontaneously from the majority of physicians nor to regulate it through incentives, sanctions or mandatory solutions. Unlocking physicians' intention to share thus represents the key challenge that managers should face. Building on this premise, our study adopted the TPB framework to articulate how diverse individual, organizational and environmental factors establish or inhibit physicians' intention to share.

The TPB proved an appropriate framework to comprehend and structure the multiple findings of the literature, as all its factors could be ascribed as enablers to (or constraints of) attitude, subjective norm and/or PBC (Table 4).

The analysis revealed that these individual properties are stimulated by factors that are located at five different levels: (1) intrinsic characteristics of the physician; (2) the workgroup that physicians are connected to; (3) the professional group that physicians belong to; (4) the organization in which the physicians are embedded; and (5) the social environment in which both the organization and the physician are embedded. Such a mélange of factors has two main implications. On the one hand, it suggests the intrinsic complexity of managing the diffusion of knowledge-sharing behaviours. With no 'silver bullet' capable of obtaining physicians' engagement, stimulating knowledge-sharing behaviours requires indeed a comprehensive strategy of interventions that accounts for all the different sources of influence. Past research already provides many examples of failed attempts to diffuse knowledge-sharing behaviours because, for instance, interventions at the organizational level (e.g., technologies, incentives) overlooked the dynamics of competition in workgroups or the barriers of professional autonomy dividing physicians from managers (Currie & Suhomlinova, 2006); or because intrinsically motivated physicians struggled to endorse knowledge sharing in organizational and environmental contexts, which are indifferent or sceptical to knowledge sharing (Husted & Michailova, 2002). On the other hand, the findings also suggest that the problem of managing the diffusion of knowledge-sharing behaviours cannot be circumscribed to managers.

Table 4 Overview of factors affecting knowledge-sharing intention

Source	Attitude	Subjective norm	PBC
Intrinsic mechanisms	Ethical motives Return expectations OCB		Self-efficacy
Social relationships	Reputation Competition Fear of parasites	Colleagues	Network access Shared meaning Trust
Professionalism	Professional autonomy Cognitive/cultural pillar	Professional peers Professional groups	Cognitive/cultural pillar
Organization	Extrinsic motivators Cognitive/cultural pillar	Top management	Procedural justice Psychological safety Workload Technological support Cognitive/cultural pillar
Environment	Cognitive/cultural pillar	Opinion leaders	Cognitive/cultural pillar

Rather it must become a distributed responsibility involving executive as well as middle managers, information system administrators, opinion leaders, professional associations and physicians. Each actor, in fact, brings to the cause a specific contribution that other actors cannot replicate with the same effectiveness. Managers, for instance, are in a privileged position to introduce structural arrangements that could be conducive to knowledge sharing; but cannot fully address the dynamics of reputation, competition and trust that are best understood by the physicians working in the group and are best handled by dominant clinicians (Reay *et al*, 2006). Likewise, colleagues working in the same hospital might lever norms of reciprocity to engage other physicians into sharing their unique knowledge; but cannot address the principles of professional autonomy as strongly as other 'relevant people' in the professional group.

With these considerations in mind, the diffusion of knowledge-sharing behaviours in hospitals would require a complex strategy that would need to move multiple directions – from building social networks to build individuals' self-efficacy and from the establishment of cognitive/cultural pillars to the introduction of technology supports. From managers' perspective, the problem becomes to identify which interventions are priority and could exert most impacts with limited efforts (and resources). Past research does not provide enough empirical data to provide a clear-cut answer on which interventions can be privileged as priority. The TPB perspective, however, can help to outline a possible strategy of intervention that moves along the three directions of attitude, subjective norm and PBC.

The starting point is addressing physicians' attitude, and in particular having them elaborate a positive notion of knowledge sharing. Physicians have different reasons to consider knowledge sharing as 'a right thing to do' for patients and the hospital, as personally convenient (e.g., for reciprocity and reputation) as well as personally inconvenient (e.g., for professional autonomy or competition).

A rather obvious implication is that managers should lever the positive aspects and downsize as much as possible the threats for physicians' autonomy and competition. Past research is indeed adamant to show that physicians might pay limited attention to knowledge sharing because they struggle to see the improvements that justify the adoption of a more systematic and structured approach. Van de Ven (1986) provided an illuminating description of the challenge: 'there is the human problem of managing attention because people and their organizations are largely designed to focus on, harvest, and protect existing practices rather than pay attention to developing new ideas. The more successful an organization is the more difficult it is to trigger peoples' action thresholds to pay attention to new ideas, needs, and opportunities' (p. 591). In order to obtain such attention, at least two interventions can be suggested. One is an effective communication of the superior outcomes that are achieved through knowledge exchange. Past research suggests in this regard that communication by itself is not enough, but rather supporters of knowledge sharing are required to engage in narratives and discourses that also provide sensemaking and gradually build the cultural and cognitive basis of the hospital (cf. Gioia & Thomas, 1996; Goodrick & Reay, 2009).

The second intervention relates to the development of a cohesive and tight social network in which 'relevant people' can exert their social influences and affect physicians' attitude – by means of subjective norm. The establishment of a cohesive and tight network needs to face a crucial challenge in physicians' 'encapsulation' in their professional or work group. Such encapsulation reflects a defense of professional autonomy, but is also the consequence of care processes, structural arrangements and cultural predispositions that lead physicians to perform chunks of care without considering the possibility to integrate their work (and knowledge) with others (Bion & Heffner, 2004). The review reveals that close boundaries represent a pervasive element affecting a negative attitude

for fear of competition and defence of professional autonomy; orienting subjective norm towards professional peers and away from managers and other professionals; limiting the establishment of trust, psychological safety and social capital across units and departments – and thus PBC. Past research has already investigated this topic and revealed the role of specific boundary spanners to overcome this limitation. Two interventions stand out. On one hand, meetings can act as both boundary spanners, as well as catalysing attention towards knowledge sharing. Meetings represent in fact occasions in which professionals are brought together and should be stimulated to collaborate towards a common goal – thus, developing an adept social network and a layer of shared goals and meanings. At the same time, they could be used as 'interruptive events' (Zellmer-Bruhn, 2003) in which physicians stop being fully absorbed by their routine, and could exploit opportunities for sharing. On the other, a more radical rethinking of process towards integrated and multidisciplinary principles is proving salient. A systematic review revealed in fact that the introduction of care pathways is conducive to knowledge sharing (Deneckere *et al*, 2012) because physicians are put in the condition to 'have to' converge their different competencies to achieve a common goal. A correct implementation of care pathways would in fact create the structural (e.g., knowledge inter-dependencies) and cognitive (e.g., shared goals) conditions to facilitate and motivate knowledge sharing. By connecting tightly activities and outcomes from different professionals and orienting them to a common purpose, these interventions have been able to generate both shared goals and strong knowledge inter-dependencies.

A third preoccupation is related to the practical barriers that physicians face when trying to share knowledge. Workload and space distances particularly are factors that are virtually impossible to fully neutralize, so a key problem is how to reduce their influence. In the first regard, much attention has been granted to the selection and adoption of information technologies (Blumenthal, 2009; Jha *et al*, 2009). Knowledge repositories, intranets and social networks are becoming increasing popular solutions and hospital managers have to think if and how to invest on them. Given the increasing resource constraints, it is crucial to demonstrate the added value that such investments would make on hospital outcomes as a whole – and not just knowledge sharing. Past research and experiences report encouraging results, but also important risks of failures. In this regard, the primary concern for managers is to make technologies matter within their specific organization and for their specific purpose. The selection process requires hospital managers to assess the actual need for a new information system in order to identify the soundest solution and avoid pro-innovation biases. Once selected, the technology must be promoted to physicians because their willingness to adopt the technology may represent a major barrier. In the adoption process, hospital managers can capitalize on a wealth of contributions that have investigated ICT adoption through the lenses of behavioural sciences and socio-technical approaches. These contributions have already clarified the need to fit technological conveniences (e.g., usability) with individuals' motivation and the content of clinical processes, such as task complexity.

Concluding remarks for further research

This study is grounded on a recollection of contributions on knowledge sharing and hopes to be the ground for further empirical research. We anticipate at least two major directions for future research.

First, theory-grounded and empirical-based investigations are needed to test the framework and clarify both the significance and relevance of each factor. Our overview points out that several factors (e.g., reputation, technology or workload) need future research to provide further empirical basis. Our conceptual model encompasses a sizable amount of factors and mechanisms that may affect physicians in their intention to share knowledge. The result is a multilevel model that is arguably too rich and complex to be dealt empirically. Our study is indeed intended as a guiding framework for a next phase in which more parsimonious models are derived through grounded approaches and then tested to reveal the most relevant mechanisms in hospital contexts. Hospital contexts provide indeed a flourishing opportunity for both theory building and testing, as hospitals are highly complex and heterogeneous systems in which multiple micro-realities coexist. It is thus fair to say that different physicians might display different behaviours and intentions as they are differently influenced by the unit or department, which they belong to, or to their professional and disciplinary culture and so on It is particularly relevant to clarify that physicians do *not* belong to a common community of practice, and significant differences might exist between experts belonging to different disciplinary areas (oncologist *vs* orthopedist, for instance) – also because the very nature of their work is also different. As such, empirical investigations should account for these professional and disciplinary differences as they might be crucial for any practical implication. It is also fair to say that a physician might follow different dynamics and motivations when s/he shares knowledge (1) within the professional group, or unit or department; (2) across disciplinary boundaries; (3) to other professions (e.g., nurses); and (4) to managers. Hospital managers are asked to support each of these four behaviours, but each might bring along specific issues – which all represent opportunities for researchers to reveal different mechanisms of change. As a whole, researchers are invited to follow different methodological directions, since the field needs to couple qualitative studies – such as longitudinal case studies and ethnographies (cf. Kellogg, 2009) to build theories and explain extreme cases of success or failure, with quantitative, surveys, that instead, are able to enumerate frequencies.

Second, we focused our attention on the individual-level analysis of knowledge sharing, that is, which factors

underlie the formation of a positive attitude, subjective norm and PBC. We do not claim that this review is conclusive in terms of factors and mechanisms. We previously highlighted the need for future research to disentangle a number of contrasting results in the literature. Furthermore, there might be other factors that past research has yet to highlight. In particular, there is an increasing interest in the role played by increasingly expert patients in affecting physicians' behaviours, approach to care and outcomes (e.g., Fox *et al*, 2005). Findings have yet to translate into the knowledge-sharing field and a few remarkable questions remain open: (i) does patients' 'expertise' lead physicians to more knowledge sharing within the hospital? (ii) Should patients' increasing 'expertise' lead physicians to go beyond the tradition doctor–patient relationship and share their knowledge also with patients?

Furthermore, the focus on individual factors should not downsize the importance of maintaining an organizational perspective on knowledge sharing. As a matter of fact, the review of contributions revealed the importance of organizational and institutional contexts as relevant loci in which professionals' attitude, subjective norm and PBC emerge. It might be argued that this perspective is already rampant in the literature of new practices and the findings collected in this area can be actively used to understand how knowledge sharing emerges, consolidates and diffuses among practitioners. At the same time, several authors (e.g., Foss *et al*, 2010; Volberda *et al*, 2010) have recognized that a few issues remain open. Three stand out, in our opinion: (a) how individual efforts to share knowledge aggregate to form the organizational knowledge base; (b) how organizations learn from their knowledge base and translate it into improved organizational performance; (c) given the role attributed to the structural, cognitive and cultural pillars as either conducive to or constraining knowledge sharing, it remains a largely open question how individuals either exploit or overcome such influences in their agency.

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