Intrafirm Knowledge Flows: The Impact of Knowledge Sourcing and Status Motives on Managers' Knowledge Transfer Decisions

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Abstract

This research investigates knowledge transfer decisions of managers. In multi-unit firms, transfer of knowledge among business units is essential for leveraging resources available inside the firm. I examine whether managers' willingness to transfer knowledge from their unit is influenced by the source of that knowledge - whether it is internally or externally sourced - and how status recognition from corporate headquarters affects this dynamic. Using an experiment, managers are more inclined to transfer internally sourced knowledge compared to externally sourced knowledge when there is no recognition involved. Moreover, the disparity in managers' willingness to transfer knowledge based on its origin diminishes when status recognition from corporate headquarters is present. These findings offer valuable insights into the design of control systems aimed at mitigating internal information frictions in multi-unit firms.

Keywords: knowledge sourcing; knowledge transfer; status motives; cooperation; divisional performance management

1. Introduction

Firms grant decision rights to business unit managers for sourcing local knowledge that is specific to their specialization and area of expertise (Jensen and Meckling 1995; Jensen and Meckling 1999; Moers 2006; Parker and Kyj 2006; Campbell, Epstein, and Martinez-Jerez 2011). Such specific knowledge can either be generated by the business units internally (through experimentation and learning) or acquired by them externally (through scanning and search) (Turner and Makhija 2006). Internal knowledge sourcing relies on in-house R&D and exploration of innovative ideas, whereas external knowledge sourcing happens via purchase, licensing, collaboration, or alliance formation for leveraging knowledge created by other entities (Rosenkopf and Nerkar 2001). For instance, business groups at Pfizer develop chemical and biological lead molecules using internal R&D as well as external collaborations with biotechnology companies and universities.[1] Similarly, Ernst & Young uses EY Partner Ecosystem to combine internal knowledge with technological expertise from external collaborators to offer innovative cloud-based platform solutions.[2]

I investigate whether managers' willingness to transfer knowledge to other units of the firm depends on whether that knowledge is sourced internally or externally, and whether status recognition moderates this effect. Prior research documents that owing to economic and psychological factors, managers tend to value external and internal knowledge differently (Menon and Pfeffer 2003). Managers tend to protect the knowledge assets that are generated in their units by their teams and restrict the outflow of knowledge stock to other units in the firm to avoid leakage of proprietary information that can potentially weaken their expert position in the firm (Szulanski 1996; Pierce 2012; Von Krogh, Nonaka, and Rechsteiner 2012).

[1] Pfizer Inc. Form 10-K (December 31, 2021) Part I (Item I - Business: pp 5) Research and Development.
[2] EY Partner Ecosystem - https://www.ey.com/en_gl/alliances

Internally generated knowledge is proprietary in nature, and it serves as a source of expert status in the knowledge-based hierarchy of a firm (Garicano 2000; Cassiman and Veugelers 2006; Mom, Van Den Bosch, and Volberda 2007). In contrast, externally acquired knowledge is accessible to other units of the firm through their scanning efforts and distal search (Speckbacher and Wabnegg 2020). I argue that when managers make investments in knowledge creation internally, they develop a sense of psychological ownership for the knowledge resources they created. Such specific knowledge gained through experience and effort becomes an important part of their identity, lowering the propensity to share the knowledge with others (Pierce, Kostova, and Dirks 2001; Brown, Crossley, Robinson 2014; Berger, Fiolleau, and MacTavish 2019).

In a knowledge-intensive economy, a large portion of a firm's economic value is not captured by the book value of both physical and intangible assets reported by the firms (Iqbal, Rajgopal, Srivastava, and Zhao 2021; Belo, Gala, Salomao, and Vitorino 2022). From the firm's perspective, transfer, and utilization of distributed knowledge across business units is a key source of competitive advantage (Argote and Ingram 2000a; Argote, Lee, and Park 2021). Sharing of knowledge resources in the form of accumulated expertise, technical know-how, and task-specific information has a significant influence on organizational learning (Nonaka 1994; Li and Sandino 2018; Liu, Zhang, Gupta, Zheng, and Wu 2022). When the business units have a high degree of complementarity, a lack of willingness to transfer knowledge can result in the loss of valuable opportunities as the units cannot learn from the experience of one another (Hansen 2002; Li and Sandino 2021). Alphabet (the parent company of Google) uses inter-unit knowledge exchange for its self-driving car unit, Waymo, with the help of accumulated *learning* from Google Maps.[3] Similarly, Uber Eats (the online food ordering and delivery

[3] Reuters (2021): https://www.reuters.com/technology/alphabets-waymo-partners-with-google-maps- offer-autonomous-rides-2021-06-03/

platform of Uber) uses an AI-based prediction algorithm, DeepETA, to synchronize data from Uber rides for planning the network of food delivery paths.

The transfer of knowledge created in one business unit of a firm to another business unit is important to avoid wasting resources on duplication of work or repetition of mistakes (O'Dell and Grayson 1998; Ipe 2003). As this internal transparency is crucial but not obvious, firms design coordination strategies that encourage business unit managers to manage interdependencies across multiple units (Ditillo 2012; Von Krogh et al. 2012; Andreicovici, Bormann, Hombach 2021). Given that the transfer of specific knowledge is prohibitively costly, firms have to develop incentives and controls to reduce these costs (Jensen and Meckling 1995). In doing so, firms design status-driven tournaments (inter-unit competition for providing innovative ideas) for the creation and then transmission of knowledge across various parts of the organization (Deodhar and Gupta 2022; Bol, LaViers, and Sandvik 2023). Charness, Masclet, and Villeval (2014) show that status-seeking by obtaining a higher rank may lead individuals to engage in sabotage and unethical behaviors. Prior accounting research by Berger et al. (2019) shows that relative performance evaluation of managers can result in counterproductive knowledge sharing behaviors. Similarly, Tafkov, Towry, and Zhou (2022) document that owing to goal dilution, managers are less willing to invest in new knowledge creation when they are concerned about making an internal transfer of such knowledge to other units of the firm. Further, Parker and Kyj (2006) document the positive effects of organizational commitment on upward information sharing from subordinates to superiors in the budgeting process.

I test whether firms can resolve the tension between local knowledge creation and knowledge transfer by offering symbolic rewards to the managers i.e., publicly recognizing their expertise and efforts in knowledge creation and knowledge transfer. I hypothesize that absent status recognition, managers' willingness to transfer internally generated knowledge

will be lower than externally acquired knowledge. I further hypothesize that the effect of knowledge sourcing on managers' willingness to transfer knowledge will be weaker when status recognition from corporate headquarters is present than when it is absent. By offering status-enhancing incentives to managers, firms can mitigate the tension about the lack of willingness to share knowledge with other members of the organization. Status-enhancing incentives, such as recognition for knowledge sharing, not only reduce costly searches by other units but also foster a culture of cooperation and mutual trust, essential for scaling-up innovations taking place in the firm. Prior accounting research documents the effect of status differences and prestige on the knowledge-sharing decisions of individuals (Haesebrouck, Cools, and Van den Abbeele 2018; Leiby 2018; Bol and Leiby 2022). This research calls for further investigation into the role of status motives in knowledge acquisition and knowledge creation. In the context of a multi-unit firm, expert status recognition is a form of symbolic non-monetary reward offered by the firm to business unit managers for their efforts in knowledge creation and dissemination (Tsai 2002; Ellingsen and Johannesson 2007).

I conduct an experiment in which participants assume the role of a manager in a business unit and decide whether to transfer knowledge to another business unit within the firm. I manipulate whether this knowledge is sourced internally (i.e., by in-house development of a patent for a novel technology) or externally (i.e., by the purchase of a patent from another company). To examine the impact of status recognition, the firm either has the policy to offer an award for the knowledge-sharing efforts of business unit managers or there is no award for the knowledge-sharing efforts of managers. The scenario emphasizes the detrimental impact of the transfer on the focal unit's profitability and relative rank in the organization as there is no transfer price or monetary reward offered by the receiving unit. To measure the willingness to transfer knowledge, participant managers choose the extent to which they are willing to transfer the knowledge of new technology to another competing unit.

Contrary to my prediction, I find that in the absence of status recognition managers are more willing to transfer internally generated knowledge than externally acquired knowledge. But consistent with my hypothesis regarding status recognition, I find recognition moderates managers' willingness to transfer internally versus externally generated knowledge. Supplemental analyses explore the alternative causal link between knowledge sourcing and willingness to transfer and find that managers feel less (more) concerned about sharing internal (external) knowledge owing to a lower (higher) need for knowledge protection. Results show that when managers source knowledge externally (internally) they tend to value it more and therefore tend to safeguard it more. In contrast, managers perceive internally sourced knowledge to be under their control and hence the desire to safeguard it is also lower. Thus, I find that managers' need for knowledge protection mediates the relationship between knowledge sourcing and managers' willingness to transfer knowledge. Further, as predicted, I find that the effect of knowledge sourcing on managers' willingness to transfer knowledge is reduced when status recognition from corporate headquarters is present than when it is absent. In sum, status recognition not only increases overall willingness to transfer knowledge but also reduces the asymmetry in managers' willingness to transfer knowledge that is internally sourced than knowledge that is externally sourced.

My results offer several important practical implications for multi-unit firms. The results show that by recognizing managers by way of "awards" for their knowledge-sharing efforts, firms mitigate the asymmetric effect of knowledge sourcing on managers' knowledge transfer decisions. Awards increase managers' willingness to transfer both externally acquired knowledge as well as internally generated knowledge. This result implies that public recognition and symbolic rewards are a powerful source of motivation for managers as they ameliorate their status concerns. Firms can use awards as a policy signal from the top to encourage middle managers to diffuse innovations throughout the firm. Despite the usefulness

of knowledge available within the firm, managers tend to overlook the existing resource pools owing to absence of corporate policies that propel cooperation across business units (O'Dell and Grayson 1998; Pierce 2012). The findings suggest that firms must recognize the efforts of managers for solving business problems not only via internally generated knowledge but also recognize managers for external knowledge acquisition, nudging them to look beyond the boundaries of the firm.

My results contribute to three growing streams of accounting research. First, I extend the prior research on knowledge creation and knowledge sharing (Hwang, Erkens, & Evans, 2009; Haesebrouck et al. 2018; Berger et al. 2019; Haesebrouck, Van den Abbeele, and Williamson 2021; Tafkov et al. 2022; Wu 2022). As these two decisions are interconnected, it is essential to understand the effect of one on the other. Results of this study show that control practices can significantly influence innovation diffusion across the boundaries of business units in firms. The results extend our understanding of the costs and benefits of internal (make) versus external (buy) sourcing of knowledge assets and their utilization across business units in the form of inter-unit knowledge flows (Arya, Mittendorf, and Yoon 2004; Hugon et al. 2021). Next, my results contribute to the literature on non-financial incentives in firms, and the effects of such incentives on crucial decisions like knowledge exchange and resource utilization in firms. In particular, my paper contributes to the literature on the design and use of symbolic rewards and recognition as a mechanism for motivating managers to share local knowledge across other parts of the organization (Burke 2022; Li and Sandino 2018; Cai, Gallani, and Shin 2023; Kelly, Liu, and Presslee 2023). It underscores the importance of nudging middle managers to disseminate the knowledge possessed by their teams throughout the organization. Using social incentives, firms can enhance managers' pride in sharing knowledge that finds wider applications in the firm.

Last, my results contribute to the literature on designing control systems to foster cooperation and trust among agents possessing heterogeneous resource pools and specific knowledge in firms (Jensen and Meckling 1995; Abernethy, Bouwens, and van Lent 2004; Abernethy, Hung, and van Lent 2020). Specifically, the paper contributes to the literature on coordination and control in innovative settings where individual units compete for resources (Faraj and Sproull 2000; Faraj and Xiao 2006). The results of this paper show that firms can encourage external exploration along with internal exploitation by the use of non-financial incentives. It also opens avenues for future research on the openness of knowledge recipients towards utilization of existing knowledge available within the firm (exploitation in the form of existing firm-specific knowledge) as compared to the exploration of an external market for knowledge (Wang, Libaers, and Park 2017). It is valuable to further understand whether and how different forms of knowledge influence preferences of managers towards the different stakeholders of the firm.

2. Background and Hypotheses Development

2.1. Background

Knowledge creation and knowledge transfer decisions in firms are interlinked (Price, Rai, and Minssen 2020; Tafkov, Towry, and Zhou 2022). The interplay between knowledge creation and knowledge transfer is particularly important for multi-unit conglomerates where business units source unique local knowledge. For a multi-unit firm, it is important that managers not only make investments in knowledge creation but also share the knowledge with other units of the firm (Argote and Ingram 2000; Tsai 2002). I identify three key reasons for intra-firm knowledge transfer. First, knowledge transfer across separate business units of a firm facilitates firm-wide diffusion of novel ideas and solutions, an essential element of organizational learning (Argote, Lee, and Park 2021). Second, internal information flows

enable utilization and application of the knowledge created inside the firm and facilitate knowledge retention (Li and Sandino 2018; Sandvik, Saouma, and Seegertet 2020; Speckbacher and Wabnegg 2020; Li and Sandino 2021). Last, knowledge sharing creates trust between the transferring and the receiving unit which is essential for cooperation (Levin and Cross 2004). Overall, multi-unit firms use decentralized knowledge creation and rely on "coopetition," i.e., they simultaneously use cooperative and competitive behavior among organizational units, to foster knowledge sharing (Tsai 2002).

I explore the core tension faced by the business unit managers regarding whether or not to share knowledge from their unit with other units with whom they are competing for internal resources (Foss and Mahnke 2012; Laursen and Salter 2014). It is important to understand how firms integrate performance management and knowledge management practices (Rowe and Widener 2011; Bedford, Bisbe, and Sweeney 2022). In absence of sound knowledge management practices, firms may not fully recover the investments made in knowledge creation due to underutilization of knowledge assets situated in distinct parts of the organization. We already know that status motives, i.e., desire to gain respect from others, plays an important role in the context of knowledge sharing (Bol and Leiby 2022). However, little is known about whether status-enhancing incentives, in the form of symbolic rewards and recognition, mitigate the concerns of managers about perceived risks of making inter-unit knowledge transfers (Thomas-Hunt, Ogden, and Neale 2003; Bock, Zmud, Kim, and Lee 2005). So far, limited attention has been paid to the role of explicit and implicit controls used for knowledge transfer in divisionalized firms to align the interests of individual units with those of the firm.

Extant accounting research on knowledge sharing focuses on the effects of incentives and communication architecture in firms on the knowledge transfer decisions of knowledge creators (Haesebrouck et al. 2018; Berger et al. 2019; Haesebrouck et al. 2021; Hugon, Lin,

and Markov 2021; Tafkov et al. 2022). This research calls for furthering our understanding of the topic by examining the propensity of senders to share knowledge in the context of different knowledge sources, i.e., self-generated versus generated by others. Additionally, it calls for extending research on how management control practices interact with different sources of knowledge (Grabner and Haesebrouck 2022). My research extends this literature by expanding our understanding about the role of social recognition in the absence of monetary rewards for knowledge sharing.

2.2. Hypotheses

2.2.1. Knowledge sourcing and knowledge transfer

The degree to which business unit managers source knowledge internally versus externally depends on numerous factors, such as the performance of their unit and the stage in the business unit life cycle (Foss and Pedersen 2002; Garg and Zhao 2018; Polidoro, Lampert, and Kim 2022). Understanding whether knowledge sourcing affects managers' propensity to make inter-unit knowledge transfer decisions is crucial for multi-unit firms where managers have the right to source unique knowledge to foster productivity and innovation (Audretsch and Belitski 2023). Research in management and strategy suggests that owing to economic and social costs associated with each form of knowledge, managers tend to value external and internal knowledge differently. Menon and Pfeffer (2003) document that managers prefer external knowledge over internal knowledge because of the possibility to learn novel ideas and practices from outsiders. Unlike internal knowledge, which is readily available closer at hand, external knowledge is considered to be more valuable due to its scarcity.

Prior research in accounting has studied the phenomenon of knowledge sourcing as a choice between making and buying (Xue 2007; Arya, Mittendorf, and Yoon 2014). Managers sourcing new knowledge experience a tension between gaining recognition by sharing valuable unit-specific knowledge with others and foregoing the recognition by withholding the

knowledge from others (Gagne et al. 2019a; 2019b; Safadi, Johnson, Faraj 2021). In economic terms, the baseline for a rational manager would be, irrespective of the source, not to share any knowledge with another business unit with whom he/she has a competitive, and non-reciprocal, relationship.

Drawing upon the theory of psychological ownership, managers' willingness to transfer self-created (internal) knowledge will be lower than purchased (external) knowledge (Pierce et al. 2001; Brown, Crossley, Robinson 2014). The sense of ownership for the proprietary knowledge generated within their unit creates a negative effect on managers' willingness to share this knowledge with other units in the firm. For instance, Haesebrouck (2021) makes an important distinction between *endowed* information and *earned* information. They document that owing to a sense of deservingness, effort exerted by managers in acquiring information makes them behave more opportunistically. As knowledge forms an important part of an individual's identity, generating internal knowledge (via R&D) enables managers to signal their expert status and ability to exploit internal resources to other agents in the firm. In the absence of formal recognition of their expertise, managers are concerned about the dilution of this expert status in the knowledge-based hierarchy of the firm when they make inter-unit knowledge transfers (Garicano 2000; Bunderson and Reagans 2011).

I theorize that absent a status recognition system, a form of non-financial incentive, managers would weigh the costs of sharing internal and external knowledge differently. Internally generated knowledge (for example, patenting an idea) would generate a stronger sense of ownership and therefore managers would derive higher utility from 'not sharing' rather than sharing. In contrast, externally acquired knowledge (for example, purchasing patents belonging to others) would result in a weaker sense of psychological ownership, making it psychologically less costly for managers to share it with others. Research in cognitive psychology and economics also suggests that individuals are averse to losing what they own

and value what they create higher than what they acquire from others (Muehlbacher and Kirchler 2009; Norton, Mochon, and Ariely 2012; Laursen and Salter 2014). Based on the above reasoning, I predict that internally generated knowledge would lead to a stronger sense of psychological ownership compared to externally acquired knowledge. This strong sense of psychological ownership will in turn lower the willingness of managers to make business unit-specific knowledge available firmwide. Building on these arguments, the following hypothesis is proposed:

H1: In the absence of status recognition from corporate headquarters, managers' willingness to transfer internally generated knowledge will be lower than their willingness to transfer externally acquired knowledge.

2.2.2. Status recognition and knowledge transfer

The status motives of business unit managers are a principal factor affecting their knowledge transfer decisions in firms. Status motives are motives to gain expert status recognition from others in the firm. Recent research in accounting and auditing explicitly documents empirical evidence about the role of status in shaping the preferences of rational economic agents in firms (Knechel and Leiby 2016; Haesebrouck et al. 2018; Gold, Kadous, and Leiby 2020; Bol and Leiby 2022; Rimkus 2022). In the context of this study, it is the motive to hold a higher position in the social hierarchy of the firm by contributing knowledge that is valuable to the firm. H1 predicts that knowledge sourcing has an asymmetric effect on willingness to transfer knowledge i.e., managers' propensity to share knowledge is not uniform across the sources owing to the effect of psychological factors discussed in the theoretical arguments above. This disparity stems from managers' belief about the utility that they derive by preserving the knowledge stock in their unit. One of the channels that cause this disparity is managers' concern for the loss of expert status because of knowledge transfer.

As knowledge within the organization can be viewed as a public good, it is subject to free riding in the absence of appropriate recognition for knowledge transfer. Status recognition

attenuates the concern of managers about the loss of expert positions resulting from the transfer of knowledge sourced by them. It serves as an acknowledgement of expert power in the knowledge-based hierarchy of the firm (Garicano 2000; Wasko and Faraj 2005; Besley and Ghatak 2008; Bunderson and Reagans 2011). Moreover, status recognition serves as a signal from the firm to its managers about their ability to co-operate with other units of the firm and make long-term contributions to the overall growth of the firm. When business units are competing with each other for allocation of resources from the headquarters, status recognition also implies top management teams' support to the transferring units in terms of prospective funding decisions. In the absence of explicit financial incentives, such status-based incentives also act as recognition of the potential for taking a higher role in the firm (Osterloh and Frey 2000; Liu et al. 2022).

Knowledge becomes an integral part of managers' identity in the firm. Sharing knowledge with others reduces their status as creators of new knowledge in the firm, if managers do not get the credit for the knowledge that they generate. Thus, the concern of loss of status impedes intra-firm knowledge flows (Argote and Kane 2009; Huang, Hsieh, and He 2014). Symbolic rewards, in the form of awards for knowledge-sharing, influence the extent to which managers consider the knowledge possessed by their unit as an organization-wide resource (Nonaka and von Krogh 2009; Frey and Gallus 2017a; 2017b; Gallus 2017). Further, by using systems that encourage and reward knowledge exchange, the firm directs the attention of other units to acquire knowledge within the firm (Blasco, Jung, Lakhani, and Menietti 2016).

In sum, I predict that the presence of an award will have a positive effect on managers' propensity to make inter-unit knowledge transfers and reduce the differences in knowledge transfers originating from the different sources of knowledge. The status-enhancing awards bestowed by the firm for knowledge-sharing will offset the effect of the source of knowledge generation, reducing the asymmetry in managers' willingness to transfer knowledge. Thus,

awards act as social incentives to managers for sharing the knowledge from their unit, regardless of the source of that knowledge. Status recognition serves as a non-financial pecuniary incentive which compensates managers for their effort towards making local knowledge available throughout the firm. Therefore, in the presence of status recognition, the difference in managers' willingness to transfer internal and external knowledge will be reduced. Based on the above arguments, and as depicted in Figure 1, the following hypothesis is proposed:

H2: The effect of knowledge sourcing on managers' willingness to transfer knowledge will be weaker when status recognition by corporate headquarters is present than when it is absent.

FIGURE 1

Predicted Interaction Plot for Managers' Knowledge Transfer Decision

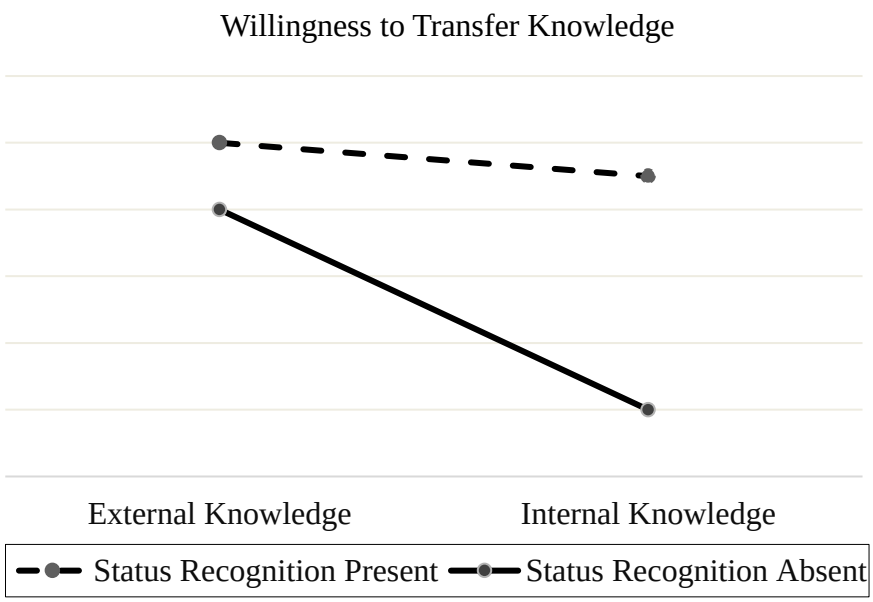


Figure 1 presents predicted and effects of *knowledge sourcing* and *status recognition* on managers' *Willingness to Transfer Knowledge (WTK)* to another business unit of the firm, respectively.

3. Method

3.1. Participants

I recruit participants from Prolific, a crowdsourcing labor market platform catering to academic research (Palan and Schitter 2018). In recent years, especially owing to COVID-19-based lockdowns, the use of crowdsourced platforms (such as Prolific and Amazon MTurk) for conducting online research has proliferated. Some recent papers in economics also suggest that data from Prolific is of higher quality and is less noisy than data collected using MTurk (Peer, Brandimarte, Samat, and Acquisti 2017; Ahler, Roush, and Sood 2020; Gupta, Rigotti, and Wilson 2021; Peer et al. 2021). The use of the Prolific participant pool by accounting researchers is growing and these studies serve as a guiding indicator for the screening of participants to conduct experiments using the platform (Murphy, Wynes, Hahn, and Devine 2020; Cardinaels and Feichter 2021; Hoang, Phang 2021; Helikum, Tan, and Xu 2022).

Prolific allows for an extensive prescreening of participants that enables researchers to exercise control over certain demographic characteristics which are essential for recruiting a suitable participant pool. For the experiment, I prescreen participants on the following demographic variables: current country of residence (US, Canada, or UK); nationality (US, Canada, or UK); age (between 18 and 70 years); first language (English); indicate that they work in a leadership position, hold a position of power, or conduct supervisory duties; indicate that they possess management experience; highest level of education (as having an undergraduate degree or above); approval rate (of minimum 97%); number of previous submissions (minimum 150, maximum 10,000). This criterion yields a sample of 5,083 potential participants for my study, which is less than 4% of the total active participant pool on Prolific.[4] Following Prolific's recommendation for compensation rate, I pay participants a fixed

[4] https://www.prolific.co/: According to the official communication on the website of company, the total active participant pool size is approximately 130,000 workers.

fee of £1.20 for an estimated 10 minutes of participation time. Participants were only allowed to complete this study using a desktop or laptop computer. Participation using mobile phones or tablets was disallowed to ensure that the case scenario was read carefully, and the contextual cues of the case were comprehended properly.

A total of 467 participants signed up for the experiment, offered consent, and began the experiment. After reading the background information, 7 out of 467 participants did not pass the comprehension check despite two consecutive attempts and were exited from the experiment using an automatic redirection which was pre-programmed to end the study after failing the second round of comprehension test.[5] The remaining participants completed the full experiment. The final sample consists of 460 participants. The average participant is 43 years old with 21 years of work experience. In terms of gender diversity, my sample is well-balanced as 51% of the participants are female, 48% are male (1% identified as other gender or preferred not to share their gender identity). Participants possess at least a graduate level of education and have worked or are currently working at a middle or junior management level (19% at upper management, 48% at middle management, 25% at junior management, and 7% in administrative staff roles).

3.2. Experimental procedures

I administer the experiment using Qualtrics. All participants who signed up for the study got directed to the experiment via the study window after validating the prescreening parameters. After giving consent to participate, participants are randomly assigned to one of the four experimental conditions, namely, internal knowledge sourcing, external knowledge sourcing, status recognition absent, and status recognition present. After reading the scenario, they are presented with comprehension check questions to ensure that the details of the scenario

[5] The comprehension test consisted of three factual multiple-choice questions based on the scenario. Each question had one specific and clear answer (e.g., What role are you supposed to assume for the purpose of this study? – a. manager, b. owner, c. financial controller).

have been clearly understood. If participants fail one or more questions in the first round, they are redirected to the scenario and offered another opportunity to answer the questions. After the second attempt, unsuccessful candidates exit the experiment. Participants who successfully answer all comprehension questions correctly, read the decision dilemma about knowledge transfer and decide about the extent to which they are willing to transfer knowledge to another unit. In addition, participants answer the post-experimental questionnaire consisting of manipulation checks, questions about their decision-making process, and demographic questions.

3.3. Experimental design

The experiment uses a 2 × 2 between-subjects design in which I vary two factors. The first factor is *Knowledge Sourcing*, which is manipulated at two levels: external knowledge and internal knowledge. The second factor is *Status Recognition*, which is manipulated at two levels: status recognition absent and status recognition present.[6] Participants assume the role of a manager in a supermarkets unit (Awesome Mart) of a hypothetical multi-unit food and retailing company (Royal Alberta). At first, all manager participants read background information about the company, its corporate structure, and its nature of business. The case scenario presents a context where the unit is facing the challenge of rising competition from flash delivery service grocery retailers. To address the issue, the manager finds an innovative technological solution to the problem by either sourcing the knowledge externally by purchasing a patent from an outside firm or internally by patenting the new technology with the help of in-house R&D. The corporate policy regarding the presence versus absence of a knowledge sharing award is presented along with explicit information regarding the absence of a monetary reward or transfer price for sharing knowledge. The decision dilemma section

[6] The experiment was approved by the Economics and Business Ethics Committee at the University of Amsterdam.

informs manager participants about a request from a competing business unit (Nol.com) for the newly established technological solution by the supermarkets unit. To build tension in the setting, costs, and benefits of transferring knowledge to another unit are explicitly specified. The description conveys information about the potential revenue and profitability loss to their unit that might occur because of knowledge transfer. Yet, it also mentions that managers have full autonomy to make such decisions and that they intend to make a long-term career in the company. Participants are required to mark their willingness to transfer knowledge of new technology to the other business unit on a scale of 0 (not at all willing) to 100 (completely willing).

3.3.1. Knowledge sourcing manipulation

Knowledge sourcing at a business unit level can vary across a continuum from complete external sourcing to complete internal sourcing. It is indeed possible for independent units to have a mix of sources along the continuum. In my setting, I manipulate two distinct knowledge sources (external or internal) to compare the effect of each source on managers' propensity to transfer knowledge obtained from each of these sources. Participants in the external knowledge sourcing condition learn the knowledge is based on purchase of a patent from another firm. This manipulation captures the external exploration of new knowledge outside the firm boundaries by way of scanning and searching. Participants in the internal knowledge sourcing condition learn the knowledge is based on the patent of research from an in-house facility.

3.3.2. Status recognition manipulation

For testing the effect of status recognition on managers' willingness to transfer knowledge to other units of the firm, I manipulate the company's "policy of offering an award for the knowledge-sharing efforts" of the managers. Participants in the status recognition present condition are informed that the company has a policy to publicly recognize the efforts of managers for sharing knowledge from their unit. For high internal validity, participants in

the status recognition absent condition are informed that the company does not have a policy to publicly recognize the efforts of managers for sharing knowledge from their unit.

3.3.3. Dependent variable: willingness to transfer knowledge

Participants decide whether to transfer knowledge, measured as *Willingness to Transfer Knowledge (WTK)*, to the other business unit using a scale ranging from 0 (not at all willing to transfer) to 100 (completely willing to transfer). Before making their decision, participants learn the receiving unit would benefit from this knowledge transfer and learn about the potential downsides of the transfer in terms of follow-up effort and weakening of the financial position of the unit. Participants also learn they have complete autonomy to make such decisions and they were considering a long-term career with the company. The rationale for using such a setting is that unit-level managers have discretion and control over the local knowledge sourced by them. Formal top-down impositions regarding knowledge sharing among business units are detrimental for the firm because managers can selectively hide critical tacit parts of knowledge resources or even restrict new knowledge creation in anticipation of transfer compulsions due to dilution of goals (Szulanski 1996; Berger et al. 2019; Gagné, Tian, Soo, Zhang, Ho, and Hosszu 2019; Tafkov et al. 2022).

3.3.4. Additional discussion of design choices

Next, I highlight three key features of the design. First, I use a patent as a proxy for knowledge source because patents represent a class of knowledge assets that have precise measurement and reporting rules. Although the transfer of patented knowledge also entails tacit elements of knowledge that cannot be inferred by the recipient by simply reading the patent document, it is less ambiguous for the sending manager to postulate the amount of knowledge being transferred.

Second, for status recognition, I use presence (or absence) of the award "policy" as a manipulation, but the participants do not actually receive an award. I believe, this is not a major

concern for the study because the core construct of interest is the "motive" of managers to gain status recognition by sharing knowledge with other managers in the firm. As such, the award is symbolic in nature and, hence, the actual act of receiving an award does not change the theoretical prediction about the effect of the award on managers' status motives. In the results section, I discuss manipulation checks that test and find that participants 'internalized' the manipulation for the presence (or absence) of the award.

Last, there are no monetary rewards or financial incentives (including transfer price) for transferring knowledge to another unit. It is difficult for the giver and receiver of knowledge to estimate the exact value to the recipient ex-ante. This opacity, also known as Arrow's Paradox, is one of the fundamental reasons why internal markets for technology are not efficient (Gupta and Govindarajan 2000).[7] The use of monetary incentives decreases the sending unit manager's ability to signal long-term motives, like career goals, promotion, and motivation to establish thought leadership in the firm. In the presence of transfer pricing, knowledge transfers would involve costly communication on issues such as price negotiations and tax considerations (Arnold, Elsinger, and Rankin 2021; Gupta and Govindarajan 2000). Absent explicit monetary incentives, knowledge transfer becomes a trust-based discretionary process that relies on managers' ability to leverage existing knowledge available in other parts of the firm via relational contracting.

4. Results

4.1. Preliminary analyses and descriptive statistics

I conduct multiple manipulation checks to assess whether participants internalized the knowledge sourcing and status recognition manipulations. To avoid demand effects,

[7] I quote from Arrow (1962, p. 615): "there is a fundamental paradox in the determination of demand for information; its value for the purchaser is not known until he has the information, but then he has in effect acquired it without cost."

participants answered the manipulation check questions after indicating their willingness to transfer knowledge to the other business unit (Asay, Guggenmos, Kadous, Koonce, and Libby 2021). I present two sets of questions to the participants for testing the internalization of manipulations for knowledge sourcing and status recognition. First, on a scale of 0 (generated internally) to 100 (acquired externally), participants were asked to indicate whether the new technology was sourced externally or internally by their unit. Participants in the external knowledge sourcing condition indicated a significantly higher score than the participants assigned to the internal knowledge sourcing condition (external = 77.01, internal = 20.17, $t = 23.45$, $p < 0.001$). Similarly, on a scale of 0 (I totally disagree) to 100 (I totally agree), participants indicate whether they agree that the company publicly recognizes the status of managers for sharing knowledge with managers of other business units. Participants in the status recognition absent condition indicated a significantly lower score than the participants in the status recognition present condition (absent = 18.41, present = 74.14, $t = -23.66$, $p < 0.001$). Additionally, 93.07% of participants in the external sourcing condition indicated the source of technology as buying a patent and 92.13% of participants in the internal sourcing condition indicated setting up of an in-house facility[8]. Using a true/false question, participants were asked whether the company gives an award to encourage managers to share innovations in their business unit. 95.27% of participants in the status recognition absent condition answered 'false' and 85.46% of participants in the status recognition present condition answered 'true.' Collectively, these manipulation checks suggest participants passed the manipulation checks[9].

Before discussing the main variables of the study, I test for random assignment of subjects across experimental conditions with respect to demographic variables on age, gender,

[8] Participants were asked the following question: Your unit developed the technology of quick delivery system by (a) buying a patent from a startup or (b) setting-up an in-house research facility.

[9] Inferences of my results are unchanged if I only consider responses from the participants who answered the manipulation check questions correctly. I thus include all 460 observations in the sample.

level of education, years of work experience, and employment role. Results show no significant differences for demographics based on their assignment to experimental conditions, suggesting effective randomization[10]. Table 1 presents descriptive statistics for the main dependent variable of interest, *Willingness to Transfer Knowledge (WTK)*. From the descriptive statistics, it can be seen that the average WTK is not different across external and internal knowledge sources (external: 53.78, internal: 56.52, t = -0.97, two-tailed p = 0.329). However, in the absence of status recognition, managers' willingness to transfer external knowledge is lower than their willingness to transfer internal knowledge (external: 44.68, internal: 52.18, t (231) = -1.83, two-tailed p = 0.067). Although this difference is significant, its direction is contrary to Hypothesis 1, which states that absent status recognition managers are less willing to transfer internal knowledge.

Results show that the overall *WTK* increases when status recognition is present compared to when it is absent (present: 62.05, absent: 48.42, t (458) = -4.97, two-tailed p < 0.001). More specifically, in presence of status recognition, *WTK* increases both for externally sourced and internally soured knowledge, but it does not differ significantly across external and internal knowledge sources (external: 63.11, internal: 60.98, t (225) = 0.58, two-tailed p = 0.558). Taken together, descriptive statistics suggest that status recognition mitigates the disparity in managers' willingness to transfer knowledge caused by knowledge sourcing and increases managers' willingness to transfer knowledge to other business units. Figure 2 represents the observed effects graphically. As the graphical representation suggests, the pattern of results is partially consistent with the hypothesized predictions i.e., consistent with H2 but not with H1.

[10] I test the balance of demographic characteristics of participants across the four experimental conditions using ANOVA. All p-vales are > 0.10. The p-values are as follows: Age (p = 0.781), Gender (p = 0.874), Education (p = 0.931), Experience (p = 0.615), and Role (p = 0.532).

FIGURE 2

Observed Interaction Plot for Managers' Knowledge Transfer Decision

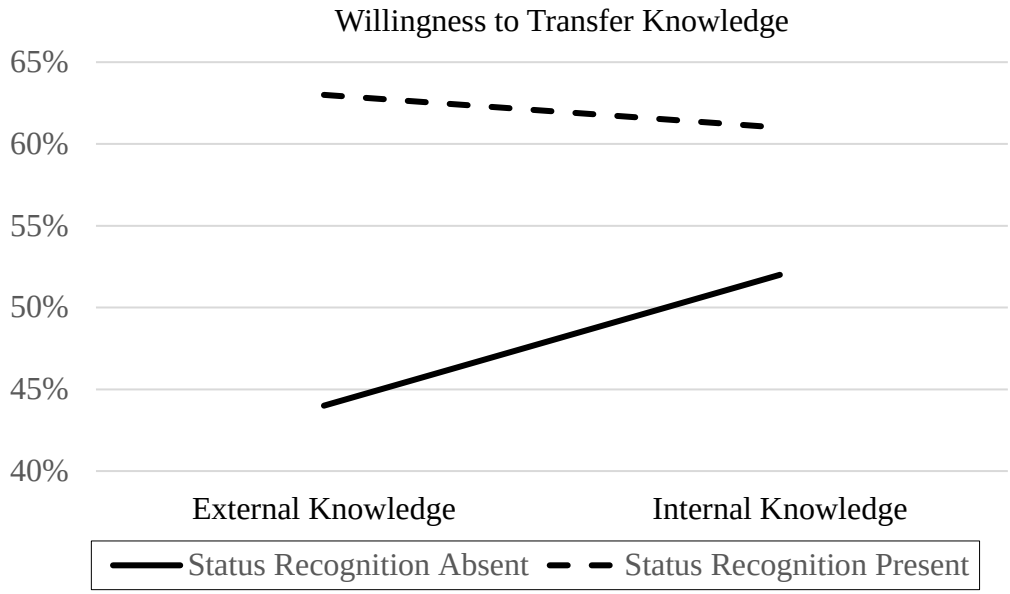


Figure 2 presents observed effects of *knowledge sourcing* and *status recognition* on managers' *Willingness to Transfer Knowledge (WTK)* to another business unit of the firm, respectively.

TABLE 1

Descriptive Statistics about Managers' Willingness to Transfer Knowledge (WTK*)*

	External Knowledge		**Internal Knowledge**		
	Status Recognition Absent	**Status Recognition Present**	**Status Recognition Absent**	**Status Recognition Present**	**Overall**
Statistics					
N	117	114	116	113	460
Mean	44.68	63.11	52.18	60.98	55.14
Standard Deviation	31.91	27.03	30.30	27.78	30.16
Minimum	0	0	0	0	0
Maximum	100	100	100	100	100

This table contains descriptive statistics for *WTK*, in each of the four experimental conditions, and overall. *Willingness to Transfer Knowledge (WTK)*. *Willingness to Transfer Knowledge* is measured on a continuous scale ranging from 0 (not at all willing) to 100 (completely willing to transfer). N = 460.

4.2. Hypotheses testing

4.2.1. Test of H1: The effect of knowledge sourcing

H1 predicts that managers' willingness to transfer internally generated knowledge (via in-house patenting) will be lower than their willingness to transfer externally acquired knowledge (via purchase of a patent) when status recognition is absent. I test H1 using an ANOVA and simple effects tests and present the results in Table 2. I code knowledge sourcing a binary categorical variable (external knowledge = 0, internal knowledge =1). As shown in Table 2, Panel B, a simple effects test reveals that, contrary to the hypothesized effect, in the absence of status recognition, managers' willingness to transfer internally sourced knowledge is higher compared to externally sourced knowledge (52.21 vs. 44.31, $F = 3.80$, $p = 0.051$). Thus, I do not find support for H1.

Next, I test whether the effect of knowledge sourcing on knowledge transfer is mediated by managers' psychological ownership of knowledge. Prior research documents that effortful knowledge creation activates a sense of psychological ownership towards the knowledge and hence, absent rewards, parting away with knowledge is psychologically costly for managers (Pierce et al. 2001). I measure *Psychological Ownership* using participants' responses to two items in the post-experimental questionnaire. Participants respond to these two items using a response scale between 1 (to an extremely small extent) to 7 (to an extremely large extent), and I average participants' responses to these two items.[11]

Table 3 presents results of an ANOVA and simple effects tests for *Psychological Ownership*. My theory states that business unit managers would have a higher sense of psychological ownership towards internally generated knowledge. Absent status recognition,

[11] The two PEQ items were (1) To what extent did you think you were entitled to knowledge obtained by your unit? (2) I feel the ownership of knowledge gained by my business unit. Higher values indicate a stronger sense of psychological ownership. Shapiro-Wilks test for normality shows that these items follow a non-normal distribution (entitlement: $z = 2.01$, $p = 0.022$, ownership: $z = 7.08$, $p < 0.001$). Owing to non-normality, I use omega value for measuring reliability and find omega = 0.79.

contrary to this prediction, I find that knowledge sourcing does not affect psychological ownership ($F = 0.01$, $p = 0.910$). Next, to test whether managers' *Psychological Ownership* mediates the relationship between the source of knowledge and the *Willingness to Transfer Knowledge*, I conduct a mediation analysis using Hayes (2018), model 4, process script for mediation testing with bootstrapping analysis of 5000 samples. Figure 3 depicts the path analysis with *Knowledge Sourcing* as an independent variable, *Willingness to Transfer Knowledge* as a dependent variable, and *Psychological Ownership* as a mediator variable for the sub-sample of participants in the status recognition absent condition ($N = 233$).

Consistent with psychological ownership theory, I find that there is a significant negative effect of *Psychological Ownership* on *Willingness to Transfer Knowledge* (path $B = -7.59$, $p < 0.001$). However, contrary to H1, knowledge sourcing does not affect psychological ownership (path $A = 0.017$, $p = 0.910$). The 95% confidence interval for the indirect effect of knowledge sourcing on knowledge transfer through psychological ownership includes 0, suggesting that the mediation effect is not statistically significant (Lower Bound: -2.5907, Upper Bound: 2.1567). As discussed, the direct effect of knowledge sourcing on willingness to transfer is statistically significant because managers have a greater propensity to transfer internal knowledge as compared to external knowledge (path $C = 7.62$, $p = 0.052$). Taken together, these results show that knowledge sourcing did not activate the sense of ownership towards knowledge but indeed, managers having a strong sense of ownership had a lesser willingness to share knowledge with other members of the organization.

TABLE 2

Effect of Knowledge Sourcing and Status Recognition on Managers' Willingness to Transfer Knowledge

Panel A: Analysis of Variance (ANOVA)

Source	df	MS	F	p-value
Knowledge Sourcing	1	804.09	0.92	0.337
Status Recognition	1	20,647.50	23.65	<0.001
Knowledge Sourcing × *Status Recognition*	1	3,046.14	3.49	0.079
Residual	456	872.90		

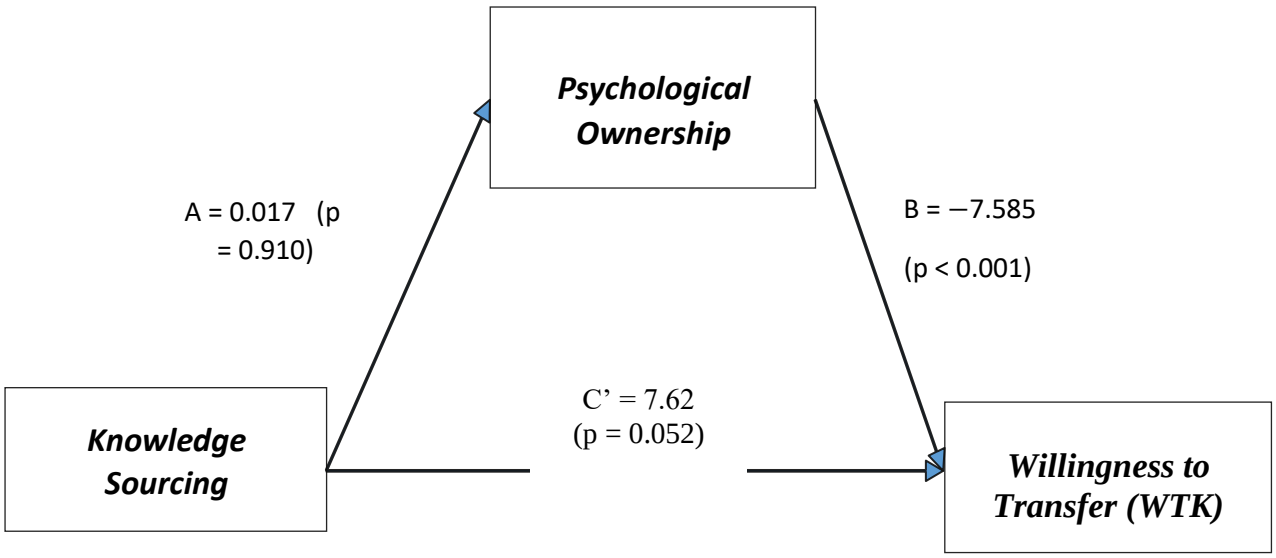
Panel B: Simple Effects

Source	Contrast	df	F	p-value
Effect of source (internal vs. external) when recognition absent	7.90	1	4.017	0.051
Effect of source (internal vs. external) when recognition present	-2.54	1	0.410	0.584
Effect of recognition (present vs. absent) for external knowledge	18.79	1	22.966	<0.001
Effect of recognition (present vs. absent) for internal knowledge	8.36	1	4.426	0.023

This table contains hypotheses tests for *Willingness to Transfer Knowledge* as a dependent variable. Panel A presents the results of a factorial ANOVA and Panel B presents follow-up simple effects. *Willingness to Transfer Knowledge* is measured on a continuous scale ranging from 0 (not at all willing) to 100 (completely willing to transfer). *Knowledge Sourcing* is manipulated as external knowledge for externally purchased patent and internal knowledge for internally generated in-house patent. *Status Recognition* is manipulated as presence or absence of an award for sharing knowledge. It is considered absent when the firm lacks a policy to offer the award and present when such.

FIGURE 3

Mediation Analysis for Psychological Ownership in the absence of Status Recognition



Confidence interval for the indirect effect of *Knowledge Sourcing* on *Willingness to Transfer Knowledge* through *Psychological Ownership:*

	Lower bound	**Upper bound**
Indirect effect	- 2.5907	2.1567
Lower and upper bound represent 95% Confidence Interval (CI).		

Figure 3 presents a mediation analysis for psychological ownership. The reported coefficients in the figure are unstandardized. Path A represents the effect of *Knowledge Sourcing* on *Psychological Ownership* and Path B represents the effect of *Psychological Ownership* on *Willingness to Transfer Knowledge (WTK)*. Path C represents the direct effect of *Knowledge Sourcing* on *WTK* when including the effect of *Psychological Ownership*. The 95% bootstrapped confidence interval for the indirect effect of *Knowledge Sourcing* on *WTK* through *Psychological Ownership* for each effect obtained from drawing 5,000 bootstrapped samples is also reported. A confidence interval that includes zero indicates a non-significant mediation effect.

TABLE 3

Effect of Knowledge Sourcing and Status Recognition on Psychological Ownership

Panel A: Analysis of Variance (ANOVA)

Source	df	MS	F	p-value
Knowledge Sourcing	1	0.79	0.62	0.432
Status Recognition	1	1.84	1.44	0.231
Knowledge Sourcing × *Status Recognition*	1	0.49	0.39	0.534
Residual	456	1.28		

Panel B: Simple Effects

Source	Contrast	df	F	p-value
Effect of source (internal vs. external) when recognition absent	0.02	1	0.02	0.883
Effect of source (internal vs. external) when recognition present	0.18	1	1.54	0.215
Effect of recognition (present vs. absent) for external knowledge	-0.17	1	1.35	0.246
Effect of recognition (present vs. absent) for internal knowledge	0.00	1	0.00	0.955

This table contains the results of a factorial ANOVA in Panel A and follow-up simple effects in Panel B for *Psychological Ownership* across the two experimental conditions. *Psychological Ownership* is measured using participants' response to the following items on a scale of 1 (to an extremely small extent) to 7 (to an extremely large extent): (1) To what extent did you think you were entitled to knowledge obtained by your unit. (2) I feel the ownership of knowledge gained by my business unit. *Knowledge Sourcing* is manipulated as external knowledge for externally purchased patent and internal knowledge for internally generated in-house patent. *Status Recognition* is manipulated as presence or absence of an award for sharing knowledge. It is considered absent when the firm lacks a policy to offer the award and present when such a policy is in place.

4.2.2. Test of H2: The effect of status recognition

H2 predicts that the effect of knowledge sourcing on managers' willingness to transfer knowledge will be reduced when status recognition from the corporate headquarters is present than when it is absent. This is an interaction hypothesis which predicts a joint effect of *Knowledge Sourcing* and *Status Recognition* on the dependent variable, managers' *Willingness to Transfer Knowledge*. This hypothesis is tested using a factorial ANOVA. Table 2, Panel A, shows that there is a significant interaction effect between the two factors ($F = 3.09$, $p = 0.079$). Table 2, Panel B presents simple effects tests that show, as predicted in H2, the willingness to transfer is affected by the source of knowledge in the absence of status recognition but is not affected by the source of knowledge in the presence of status recognition ($F = 0.30$, $p = 0.584$). My theory did not predict the effect of status recognition on managers' willingness to transfer knowledge to vary depending upon the type of knowledge.[12] The results show that status recognition has a positive effect on both the sharing of external knowledge ($F = 22.96$, $p < 0.001$) and the sharing of internal knowledge ($F = 5.14$, $p = 0.023$). Thus, this result shows that by alleviating status concerns of managers, firms can mitigate the asymmetrical effect of knowledge sourcing on business unit managers' willingness to transfer knowledge, providing support for H2. The result suggests that by addressing status concerns of managers, firms can enhance knowledge sharing irrespective of the source of knowledge.

Next, I examine whether status recognition moderates the effect of psychological ownership on managers' willingness to transfer knowledge. Thus, I test whether the policy of offering an award for sharing knowledge has an effect on managers' sense of ownership

[12] My theory does not explicitly state the main effect of status recognition on managers' willingness to transfer but rather argues for an interaction effect between knowledge sourcing and status recognition. As prior research has documented the positive effect of awards on contribution to the public good of knowledge (Gallus 2017), my theory assumes that the presence of an award will have a positive main effect on managers' willingness to transfer knowledge. I indeed find a statistically significant main effect of *Status Recognition* on *Willingness to Transfer Knowledge* ($F = 23.65$, $p < 0.001$). My theory predicts this effect to be such that it reduces the asymmetry in managers' willingness to transfer knowledge that is generated inside *vs.* knowledge that is generated outside of their business unit.

towards knowledge. Recall from the test of H1 that the source of knowledge did not have an effect on managers' psychological ownership of knowledge but managers who assign a high score to psychological ownership are much less likely to transfer the knowledge from their unit. To examine whether the policy of offering an award modifies the effect knowledge sourcing on psychological ownership, I conduct a moderated mediation analysis using the Hayes (2018), model 7, process script for mediation testing with bootstrapping analysis of 5000 samples. Figure 4 depicts the path analysis with *Knowledge Sourcing* as an independent variable, *Willingness to Transfer Knowledge* as a dependent variable, *Psychological Ownership* as a mediator variable, and *Status Recognition* as a moderator variable for the full sample (N = 460). The interaction path of *Knowledge Sourcing* and *Status Recognition* on the mediator *Psychological Ownership* is not significant (path A = 0.13, p = 0.534). The effect of psychological ownership on willingness to transfer is negative and significant (path B = -6.91, $p < 0.001$). The 95% confidence interval for the indirect effect includes 0 (Lower Bound: -3.9884, Upper Bound: 1.9816), indicating moderated mediation is not significant. In addition, as represented in Table 3, the main effect of status recognition on psychological ownership is also not significant (F = 1.44, p = 0.231). The result of these analyses suggests that the possibility to win an award does not seem to change managers' sense of psychological ownership for the knowledge generated by them.

4.3. Additional analyses

4.3.1. Need for knowledge protection

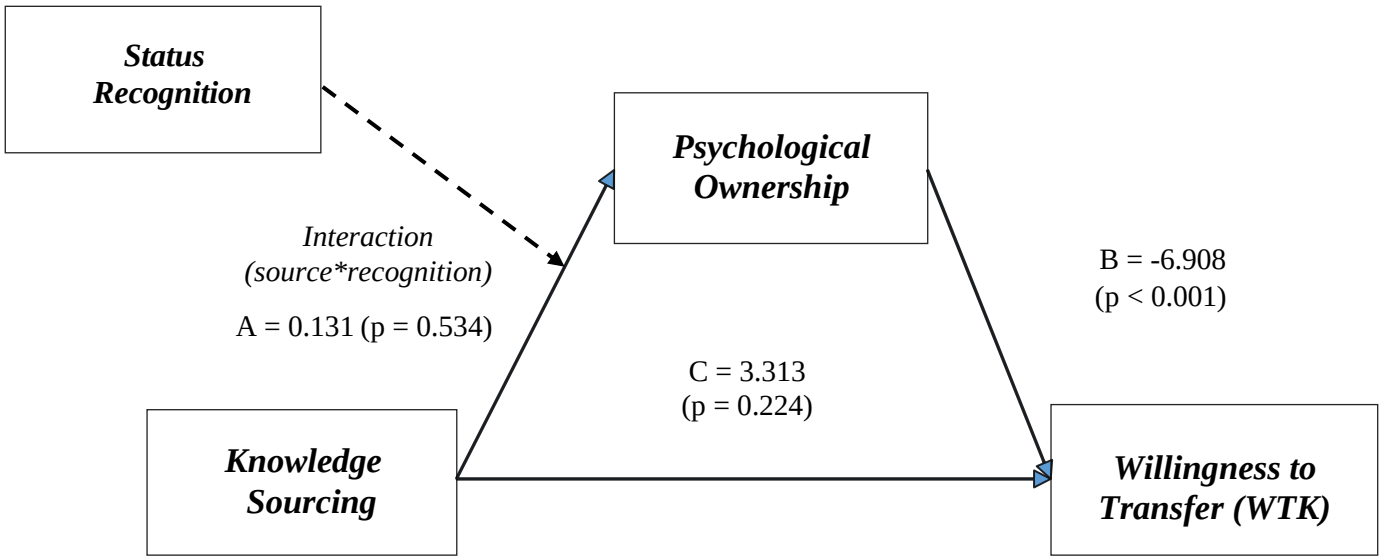
To further understand managers' decision to transfer internal knowledge to a greater extent than external knowledge, I test the mechanism for a process variable, i.e., *Need for Knowledge Protection*. Thus, I test managers' concern about retention of control over knowledge that they share with other members of the organization (Tafkov et al. 2022).

Following Bol and Leiby (2022), I define the need for knowledge protection as managers' desire to take actions that increase safety and self-protection against other competitive people in the organization. I analyze participants' responses to the following item from the post-experimental questionnaire (PEQ): "I feel I need to protect the ideas of my unit from being used by others in my organization" on a scale of 1 (strongly disagree) to 7 (strongly agree). A higher score indicates a stronger desire to safeguard the knowledge by keeping it within the unit (e.g., Arora and Ceccagnoli 2006; Arora, Belenzon, and Patacconi 2021; Qiu and Wang 2018).

Table 4 presents the results of a factorial ANOVA and simple effects tests for *Need for Knowledge Protection*. Simple effects reveal that absent status recognition, participants in the internal knowledge sourcing condition assign a lower score to the item compared to those in the external knowledge sourcing condition (external: 5.16 vs. internal*:* 4.41, $F = 10.06$, $p = 0.001$). Next, I conduct a mediation analysis, using Hayes (2018) model 4 process testing approach, to determine whether the effect of knowledge sourcing on willingness to transfer is mediated by need for knowledge protection. Figure 5 depicts the path analysis with *Knowledge Sourcing* as an independent variable, *Willingness to Transfer Knowledge* as a dependent variable, and *Need for Knowledge Protection* as a mediator variable for the sub-sample of participants in the status recognition absent condition (N = 233). The mediation is significant as knowledge sourcing (path A = -0.75 $p = 0.001$) affects willingness to transfer through need for knowledge protection (path B = -10.31, $p < 0.001$) but not otherwise (path C = -0.22, $p = 0.947$). The 95% confidence interval does not include 0 (Lower Bound: 2.9537, Upper Bound: 12.5264). This result suggests that in the absence of status recognition, business unit managers tend to be more (less) protective about externally (internally) sourced knowledge, resulting in a lower (higher) willingness to transfer knowledge to other business unit managers.

FIGURE 4

Moderated Mediation Analysis for Psychological Ownership and Status Recognition



Confidence interval for the indirect effect of *Knowledge Sourcing and Status Recognition* on *Willingness to Transfer Knowledge* through *Psychological Ownership:*

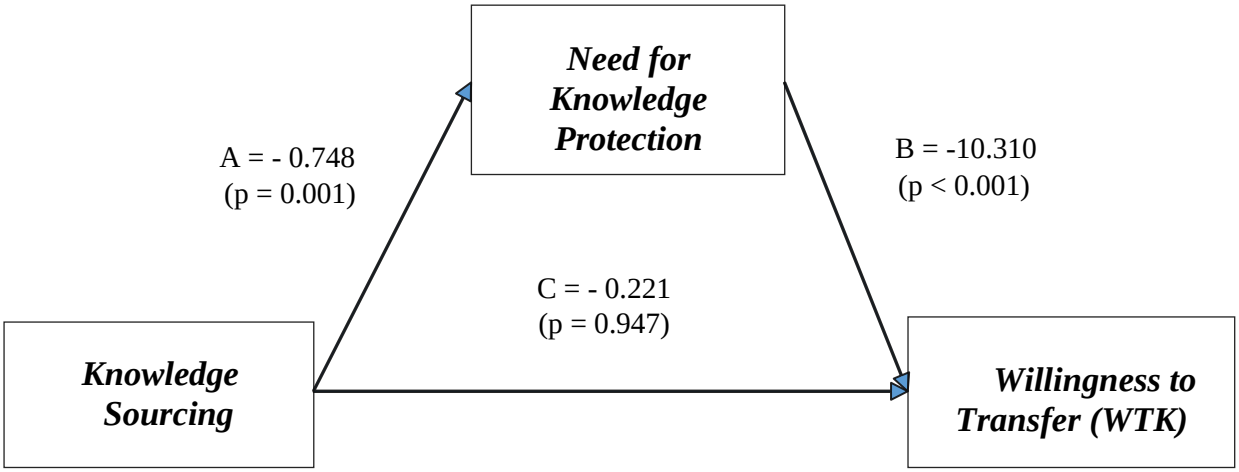
	Lower bound	**Upper bound**
Indirect effect	-3.9884	1.9816
Lower and upper bound represent 95% Confidence Interval (CI).		

Figure 4 presents a moderated mediation for psychological ownership. The reported coefficients in the figure are unstandardized. Path A represents the interaction effect of *Knowledge Sourcing and Status Recognition* on *Psychological Ownership* and Path B represents the effect of *Psychological Ownership* on *WTK*. Path C represents the direct effect of *Knowledge Sourcing* on *WTK* when including the effect of *Psychological Ownership*. The 95% bootstrapped confidence interval for the indirect effect of *Knowledge Sourcing* on *WTK* through *Psychological Ownership* for each effect obtained from drawing 5,000 bootstrapped samples is also reported. A confidence interval that includes zero indicates a non-significant mediation effect.

FIGURE 5

Mediation Analysis for the Need for Knowledge Protection

in the Absence of Status Recognition



Confidence interval for the indirect effect of *Knowledge Sourcing* on *Willingness to Transfer Knowledge* through *Need for Knowledge Protection:*

	Lower bound	**Upper bound**
Indirect effect	2.9537	12.5264
Lower and upper bound represent 95% Confidence Interval (CI).		

Figure 6 reports the mediation analysis for a sub-sample of status recognition absent condition only (N = 233*)*. Path A represents the effect of *Knowledge Sourcing* on *Need for Knowledge Protection* and path B represents the effect of *Need for Knowledge Protection* on *Willingness to transfer knowledge* (*WTK)*. Path C represents the direct effect of *Knowledge Sourcing* on *WTK* when including the effect of *Need for Knowledge Protection*. The 95% bootstrapped confidence interval for the indirect effect of *Knowledge Sourcing* on *WTK* through *Need for Knowledge Protection* for each effect obtained from drawing 5,000 bootstrapped samples is also reported. The reported coefficients in the figure are unstandardized. A confidence interval that does not include zero indicates a significant mediation effect.

TABLE 4

Effect of Knowledge Sourcing and Status Recognition on

Need for Knowledge Protection

Panel A: Analysis of Variance (ANOVA)

Source	df	MS	F	p-value
Knowledge Sourcing	1	3.92	1.21	0.271
Status Recognition	1	70.46	21.73	<0.001
Knowledge Sourcing ×*Status Recognition*	1	36.54	11.27	<0.001
Residual	456	3.24		

Panel B: Simple Effects

Source	Contrast	df	F	p-value
Effect of source (internal vs. external) when recognition absent	-0.72	1	8.88	<0.001
Effect of source (internal vs. external) when recognition present	0.04	1	2.40	0.121
Effect of recognition (present vs. absent) on external knowledge sourcing	-1.34	1	31.05	<0.001
Effect of recognition (present vs. absent) on internal knowledge sourcing	-0.24	1	1.00	0.316

This table reports factorial ANOVA and simple effects for *Need for Knowledge Protection*. Panel A presents ANOVA and Panel B presents follow-up simple effects between conditions. *Need for Knowledge Protection* is measured using the following item in the post-experimental questionnaire on a scale of 1 (strongly disagree) to 7 (strongly agree): I feel I need to protect the ideas of my unit from being used by others in my organization. *Knowledge Sourcing* is manipulated as external knowledge for externally purchased patent and internal knowledge for internally generated in-house patent. *Status Recognition* is manipulated as presence or absence of an award for sharing knowledge. It is considered absent when the firm lacks a policy to offer the award and present when such.

5. Conclusion

Knowledge transfer across business units is an important source of organizational learning (Argote et al. 2000a; 200b). Knowledge created at a business unit level is proprietary and firms can vastly benefit in terms of enhancing innovative capacity by dissemination of such knowledge across multiple units (Tsai 2002; Li and Sandino 2018; 2021). Inter-unit flow of ideas and innovative solutions from one unit to another flattens the learning curve and enables the firm to better exploit resources in other parts of the organization. But as units compete for resources in the internal capital markets, it is in the best interest of managers to safeguard local knowledge and gain status hierarchy in the firm by way of unique knowledge contribution. Knowledge obtained by their units becomes an integral part of managers' identity in the firm which often leads them to restrict knowledge flows although the firm as well as the recipient is likely to benefit from the knowledge shared by them (Abernethy et al. 2004; Argote and Kane 2009; Sandvik et al. 2020; Hugon et al. 2021). The organizational design of multidivisional firms allows managers to create local knowledge and expertise within their units. Performance measurement in such settings can lead to rivalrous competition among managers owing to career-related decisions (Bouwens and van Lent 2007). Decentralized decision making in such firms may lead to information asymmetries across business units and undermine the strength of infra-firm interdependencies and cooperation dependent on knowledge flows (Abernethy et al. 2004; Bouwens, Hofmann, and van Lent 2018; Bushman, Indjejikian, Smith 1995).

Prior research documents a negative relationship between psychological ownership of knowledge and the willingness to share knowledge by employees (Haesebrouck et al. 2021). This research calls for a more nuanced investigation into knowledge sharing based on how and where the knowledge accumulates in distinct parts of a firm. I report the results of an experiment that investigates two specific factors that affect intrafirm knowledge flows.

Specifically, this study examines the effect of knowledge sourcing and status recognition on managers' willingness to make inter-unit knowledge transfers. Contrary to my prediction, I do not find that in the absence of status recognition from corporate headquarters, managers' willingness to transfer internally generated knowledge is lower than their willingness to transfer externally acquired knowledge. However, I find that the effect of knowledge sourcing on managers' willingness to transfer knowledge is weaker when status recognition by corporate headquarters is present than when it is absent. This result suggests that by publicly acknowledging local innovations of managers, firms can achieve knowledge dissemination regardless of the source of knowledge.

The results of this study suggest that managers' sense of psychological ownership towards knowledge may not be affected by whether the knowledge is sourced internally (via in-house R&D) or externally (via the purchase of existing knowledge assets). Yet, I find that managers' sense of control over the knowledge mediates the relationship between knowledge sourcing and knowledge transfer. This result indicates that absent social incentives, managers are willing to share knowledge which originates inside the firm, rather than knowledge that they source from external parties. Managers perceive sharing external knowledge to be risky when firms do not publicly recognize their social status for sharing innovative solutions that are based on knowledge which originates outside the firm boundaries.

I contribute to the sparse yet growing literature in accounting research that investigates the interrelationship between knowledge creation and knowledge transfer (Hwang et al. 2009; Haesebrouck et al. 2018; Berger et al. 2019; Haesebrouck et al. 2021; Tafkov et al. 2022; Wu 2022). I complement this research by examining knowledge sharing decisions at the managerial level. Prior research in accounting, with the exception of Tafkov et al. (2022), has not investigated managerial decisions of knowledge transfer across business units of multi-unit firms. My study disentangles the effects of different *sources* of knowledge on willingness to

transfer knowledge. The results of this study extend our understanding of prior research on investment in knowledge assets and the design of control systems that enable the flow of knowledge resources in the firm. I also contribute to the literature on the design and use of symbolic rewards as a system of non-financial incentives (Kelly, Presslee, and Webb 2017; Cai, Gallani, and Shin 2023). I extend this stream of research by specifically showing how firms can use *awards* to signal trust via recognition of managers to mitigate concerns about losing their position in the knowledge hierarchy of the firm. The findings also point towards some unexamined yet important future directions of research from the perspective of recipient units to accept and absorb knowledge from other competing units inside the firm. As receiving knowledge can signal dependency, lack of innovation initiatives, and lowering of social status, it seems important to study the 'other side' of knowledge transfer in the context of status-enhancing incentives and rewards.

The limitations of my study provide opportunities for future research. Knowledge sourcing involves costly effort and investment of time. This research examines knowledge sourcing using a context-rich setting. Future research can test the effects of sourcing using a real-effort task where managers either invest effort to create the knowledge or buy the knowledge. The findings show that motives to gain status recognition, in the form of awards, influence managers' willingness to share knowledge. Future research can examine the extent to which knowledge sharing is affected by obtaining (not obtaining, or even losing) awards for innovation tournaments setting. Future research can investigate whether and how symbolic rewards influence managers' exploration and exploitation choices to gain prestige in the knowledge-based hierarchy of a firm.

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