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**Individual Ambidexterity and Knowledge Transfer Effectiveness:
The Mediating Role of Trust**
— **An Analysis on Individuals in Working Teams**

Master's Thesis

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ABSTRACT

Knowledge, as a strategic asset, lays the foundation for organizational core competences and sustainable development (Feldman & Martin, 2005). Existing researches on ambidexterity and knowledge transfer mostly position on the organizational level. Thus, there is a paucity of research linking the interpersonal knowledge transfer to individual ambidexterity. Meanwhile, trustworthiness is described as an ambidextrous individual competence (Hafkesbrink, Bachem, & Kulenovic, 2012), as well as an antecedent or mediator of knowledge transfer effectiveness (Levin & Cross, 2004; Brachos et al., 2007). In this vein, individual ambidexterity's influence, its interrelation with trust, and its influence on knowledge transfer effectiveness will be interesting and worth exploring.

This study addresses this gap in the literature by providing an in-depth understanding of the direct and indirect relationships among ambidexterity, trust, and perceived usefulness of knowledge. The goal of the study is to answer the question: whether individual ambidexterity enables a better knowledge transfer outcome through perceived trustworthiness.

Based on a cross-industry empirical survey targeting at individuals in working teams, the author examined a model of dyadic knowledge transfer, and got the following results. First, individual ambidexterity is positively associated with knowledge transfer effectiveness. Second, individual ambidexterity is positively associated with the benevolence-based trust and competence-based trust. Third, individual ambidexterity influences knowledge transfer effectiveness through trust in the competence of knowledge sources. Contrary to competence-based trust, benevolence-based trust does not mediate the relationship between ambidexterity and knowledge transfer effectiveness. The findings provide fruitful implications for theory and practice.

Keywords: Knowledge transfer effectiveness, Trust, Individual ambidexterity

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Index of Abbreviation

AVE	Average Variance Extracted
BBT	Benevolence-Based Trust
CA	Cronbach's Alpha
CIs	Confidence Intervals
CR	Composite Reliability
CBT	Competence-Based Trust
CFA	Confirmatory Factor Analysis
EXPL	Exploitation
IA	Individual Ambidexterity
Ind	Indirect Effect
M&S	Marketing and Sales
PUK	Perceived Usefulness of Knowledge
R&D	Research and Development
Signif.	Significance
Skew	Skewness
Kurt	Kurtosis

1 Introduction

Knowledge, as a strategic asset, lays the foundation for organizational core competences and sustainable development (Feldman & Martin, 2005). A recurring challenge, however, for organizations is that how to promote knowledge transfer effectively within organizations (Argote et al., 2000; Szulanski, 1996). Organizational knowledge is created due to the combination and exchange among employees (Nahapiet & Ghoshal, 1998). Thus individual, as the basic vehicle of knowledge transfer, is an important actor in effective knowledge transfers. As Wang and Noe (2010) suggest, investigating influences of individual factors (i.e. individual characteristics, individual competences, and interpersonal relationships) on knowledge transfer is a promising avenue for future research. This study addresses this gap in the literature by exploring the influence of individual ambidexterity on knowledge transfer effectiveness.

Ambidexterity is closely related to knowledge transfer, particularly in organizational learning, because learning is an active way to facilitate knowledge transfer effectiveness. Exploration and exploitation represent two primary competing activities in knowledge transfers (March, 1991). The capacity to demonstrate exploration and exploitation simultaneously (Tushman & O'Reilly, 1996) has been a widely accepted definition of ambidexterity in the field of knowledge transfer. Even though ambidexterity is an organizational feature, it embodies itself in individual actions (Gibson & Birkinshaw, 2004). Hence, individual ambidexterity, as an individual competence, can be a crucial predictor of the effectiveness of knowledge transfer.

Although studies on knowledge transfer and organizational ambidexterity are burgeoning (Lavie, Stettner, & Tushman, 2010), insights into the relationships between ambidexterity and knowledge transfer on the individual level are scarce (Raisch et al., 2009). More interesting, most of existing relevant research pays attention to the logic that knowledge-related activities affect ambidexterity, rather the other way around. Specifically, the logic of earlier research is that effective knowledge-related activities render a high level of organizational ambidexterity, leading to positive effects on business performance. They, however, neglect a fact that ambidexterity can, in turn, generate influences on knowledge transfer. In this case, let us think about it the other way around. Does individual ambidexterity affect the effectiveness of knowledge transfer?

Grounded on the social network theory, ties among individuals within social networks make for knowledge transfer, and improve the value of shared information (Reagans & McEvily, 2003; Cross & Cummings, 2004). Ambidextrous individuals who tend to cooperate and build linkages with others are more likely to trust others, leading to the development of ties and relationships. In this sense, perceived trustworthiness can be a crucial link bridging the gap between individual ambidexterity and interpersonal knowledge transfer. Therefore, if one is to examine knowledge transfer effectiveness, the individual competence ambidexterity and its effects on different forms of trust can be fresh lenses to observe this issue.

To address the gaps above, the current study aims to provide an in-depth understanding of the direct and indirect relationships among individual ambidexterity, trust, and knowledge

transfer effectiveness. I am particularly interested in whether ambidextrous knowledge recipients are more likely to perceive knowledge received as useful and why they are. Furthermore, I investigate the mechanism that whether individual ambidexterity enables a better knowledge transfer outcome through perceived trustworthiness. Taken as a whole, the research question in this paper is the following:

How does individual ambidexterity influence knowledge transfer effectiveness through perceived trustworthiness?

More specifically, I concentrate on the knowledge that improves the performance of a knowledge recipient's work. Further, this study focuses on the effectiveness of interpersonal knowledge transfer. Yet, neither the propensity to seek out relevant knowledge, nor the willingness to share knowledge is the focal point of this current study.

As for perceived trustworthiness, I have chosen to focus on two dimensions of trust proposed by Mayer, Davis and Schoorman (1995): benevolence and competence, without considering the last dimension: integrity. I concur with Levin and Cross (2004) that the influence of a person's adhering to a set of good principles consistently on the usefulness of knowledge is unclear. It is difficult to distinct the influence of integrity and that of benevolence on the usefulness of knowledge in some cases. For instance, knowledge recipients cannot tell much difference in these two cases: someone out to harm them and someone honest and consistent about an intention to harm them (Levin & Cross, 2004).

This current study will add to the emerging dialogue on knowledge transfer in three important ways. Firstly, the study fills the void of knowledge transfer by finding the positive effect of an individual capacity ambidexterity on interpersonal knowledge transfer effectiveness. Secondly, through summarizing and measuring the ambidextrous individual behavior, the research sheds light on how individual ambidextrous activities influence perceived trustworthiness, as well as perceived usefulness of knowledge. Thirdly, this paper investigates the role of perceived trustworthiness as a mechanism whereby individual ambidexterity enables effective knowledge transfer.

The remainder of the paper is structured as follows. In the next section, a critical review of both ambidexterity literature and knowledge transfer literature is present. Then, the theoretical framework and hypotheses underlying the research model as displayed in Fig. 1 are developed. In the methodology part, research design, data analysis methods, validity and reliability of measures, and bias tests are shown. Subsequently, the empirical results of this research are outlined, followed by a discussion and implications section. Finally, limitations and suggestions for further research are summarized.

2 Literature review

This section discusses the primary insights of the existing literature into this topic. I first clarify the scope and nature of knowledge transfer and ambidexterity, to understand the role of ambidexterity in knowledge sharing outcomes. Subsequently, I summarize the main findings of the prior literature referring to individual ambidexterity and its influence on trust. Finally, I outline the existing research results with regard to the mediating role of trust in knowledge transfer.

2.1 Ambidexterity and knowledge transfer

Knowledge transfer refers to the movement of knowledge between different individuals, units, divisions, or organizations (Szulanski, Cappetta, & Jensen, 2004). This knowledge movement includes “both the sharing of knowledge by the knowledge source and the acquisition and application of knowledge by the recipient” (Wang & Noe, 2010, p.117). In this vein, the focus of knowledge transfer effectiveness lies in either cognitive development (Daft & Weick, 1984) or behavioral change (Nelson & Winter, 1982).

Knowledge transfer happens among and within distinct organizational entities including individuals, communities, and units (Newell et al., 2002). Theoretical justify for studying the interrelation between ambidexterity and knowledge transfer effectiveness is based on theories of ambidexterity and organizational learning. Given the intersection of these two fields, exploration refers to those knowledge transfer activities that identify and assimilate knowledge, while exploitation refers to those knowledge transfer activities that

transfer and utilize existing knowledge and skills (Kostopoulos & Bozionelos, 2011; Hafkesbrink, Bachem, & Kulenovic, 2012). Recent, studies linking ambidexterity to knowledge-transfer related activities mainly pay attention to the influence of knowledge sharing, knowledge management or knowledge initiatives on organizational innovation or business performance. Im and Rai (2008) argue that the ambidexterity of knowledge sharing: conducting exploration and exploitation simultaneously leads to relationship performance gains. Moreover, their finding suggests that ambidextrous management of the relationship and ontological commitment both promote knowledge sharing. For innovative ambidexterity, Kamasak and Bulutlar (2010, p.306) observe that knowledge collecting had a significant effect on all types of innovation and ambidexterity. Different from knowledge collecting, either in-group or out-group knowledge donating does not have any effect on exploratory innovation. Additionally, knowledge donating inside the group promotes exploitative innovation and ambidexterity. Other previous ambidexterity research indicates that diverse and complimentary assets and knowledge, as well as integration capacity and knowledge transfer all play a significant role in facilitating ambidexterity (Andriopoulos & Lewis, 2010; Beckman, 2006).

Managing paradoxes of ambidexterity and knowledge transfer activities happens not only in top management, but across organizational levels such as subsidiaries, teams and individuals (Gibson & Birkinshaw, 2004; Kortmann, 2012). A body of knowledge-related researches on the individual level has focused on influences of different factors i.e. interpersonal characteristics, individual characteristics, and motivational factors on the

knowledge sharing behavior (Wang & Noe, 2010). There is, however, a paucity of research that examines the relationships between individual capacity and knowledge transfer. Prior knowledge transfer theories have supported that the amount of transferred knowledge and the effectiveness of knowledge transfer will be influenced by the characteristics of participants, including motivation and absorptive capability (Mowery et al., 1996; Lane, Salk and Lyles, 2001). For example, an ambidextrous individual (e.g. ambidextrous managers) will refine and renew their knowledge, skills, and expertise (Floyd & Lane, 2000; Hansen et al., 2001; Mom, van den Bosch, & Volberda, 2009). Likewise, Hobus and Busch (2011) state that ambidextrous individuals possess the competence: knowledge brokerage that enables them to integrate and mesh up knowledge from various knowledge sources. In addition, by learning and achieving convergence efficiently through communication with others, individuals with the capability of integrating opinions tend to learn from others (Berson et al., 2006; Lubatkin et al., 2006).

2.2 Ambidexterity and trust

In view of the relationship between ambidexterity and trust, prior research has mapped only a portion of the domain. To my knowledge, existing studies on trust and ambidexterity are scarce, no matter on the organizational level, or on the individual level. Along with the three context factors: stretch, discipline, and support, trust can facilitate contextual ambidexterity of organizations. Trustworthiness of organizations can be developed, if employees feel that resources are allocated objectively and with fairness (Ghoshal & Bartlett,

1994; Gibson & Birkinshaw, 2004). In this stream of literature, researchers indicate that trust is conducive to building organizational ambidexterity.

As for individual ambidextrous competencies, trustworthiness also has been considered as one of social competencies (Hafkesbrink et al., 2012). They categorize individual competences as three different dimensions: exploitation, exploration, and ambidextrous competences. In ambidextrous competences, trustworthiness, capacity for cooperation/team work, as well as willingness and capability to transfer knowledge are of value for managing paradoxical activities: exploration and exploitation.

2.3 Trust and knowledge transfer

Researchers have investigated the influence of trust in interpersonal relationships on the knowledge sharing behavior (Robinson, 1996). Although trust is taken as one of important aspects of organizational context, its role regarding knowledge transfer still calls for more attention and exploration (Wang & Noe, 2010).

Trust has been examined as a predictor or mediator of knowledge transfer (e.g. Levin & Cross, 2004; Brachos et al., 2007; Lin, 2007b). Existing researches have shown that source trustworthiness makes for knowledge sharing across units (Szulanski et al., 2004). Likewise, Hafkesbrink, Bachem and Kulenovic (2012) suggest that trustful organization culture is a necessary condition for sharing significant changes, integrating new and known knowledge, balancing innovation, and daily operation. In addition, affect-based and cognition-based trust are positively related to knowledge sharing at the dyadic and at the

team level (Mooradian, Renzl, & Matzler, 2006; Wu et al., 2007). Further, specific three dimensions of trustworthiness: capacity, benevolence, and integrity have been further examined (Levin et al, 2002; Levin & Cross, 2004; Bakker et al., 2006). In this respect, researchers have not reached a consensus about the roles of trust. Levin et al. (2002, 2004) suggest that benevolence-based and competence-based trust both facilitate the receipt of useful knowledge. Competence-based trust is more important than benevolence-based trust to knowledge transfer, when shared knowledge is highly tacit. In contrast, Bakker et al. (2006) find different results about the role of trust. They state that, benevolence-based trust can be a poor explainer of knowledge transfer, while considering team membership. Competence-based trust results in less knowledge sharing among team members, while integrity-based trust improves the willingness of knowledge sources to share knowledge with team members.

3 Theoretical framework and hypotheses

3.1 Knowledge transfer effectiveness

“Making knowledge available is not equal to knowledge transfer” (Brachos et al., 2007, p.32). By following the view of Nelson & Winter (1982) and Argote & Ingram (2000), I employ the definition of effective knowledge transfer that knowledge transfer can be taken as effective, only when received knowledge is actually used by the receiving part, and this use leads to changes in their behavior. That is to say, only if experience of one unit influences another unit through changing its behavior or mental model, an effective knowledge transfer actually occurs (Nelson & Winter, 1982; Argote & Ingram, 2000; Brachos et al., 2007). In this vein, taking “perceived usefulness of knowledge” as a proxy of knowledge transfer effectiveness is reasonable, which has been extensively used by researchers, for instance, Menon and Varadarajan (1992), Levin and Cross (2004), and Brachos et al., (2007).

As explained by Brachos et al. (2007), perceived usefulness of knowledge refers to the degree to which knowledge transferred is considered as “meaningful, accurate, valid, and innovative” (p.33). Similarly, Szulanski (1996) defines this construct as the degree to which knowledge transferred facilitates or hinders different respects of project outcomes, including project efficiency and effectiveness. More specifically, efficiency mainly involves project budget and time, while effectiveness covers project quality, value and performance. Drawing upon prior literature, I adopt “perceived usefulness of knowledge” as a proxy of knowledge transfer effectiveness.

Having specified the perspective of knowledge transfer effectiveness, I tap into various influences of the two particular individual factors: individual ambidexterity and perceived trustworthiness in the following parts.

3.2 Individual ambidexterity and knowledge transfer effectiveness

Technically, ambidextrous individuals are those possessing the capability to coordinate and integrate trade-offs (i.e. exploration and exploitation) in light of context demands (Tushman and O'Reilly, 1996; Gibson & Birkinshaw, 2004; Rothaermel & Alexandre, 2009), no matter by shifting between these two or by pursuing both simultaneously.

Three relevant attributes of ambidextrous individuals are proposed and clarified in existing research: (1) they can host contradictions (Smith & Tushman, 2005); (2) they are multi-taskers (Floyd & Lane, 2000; Gibson & Birkinshaw, 2004); (3) they continuously refine and renew their knowledge, skills and expertise (Floyd & Lane, 2000; Hansen et al. 2001). More specifically, the trade-off in knowledge acquaintance mainly resides in the two learning activities: exploitation or exploration. These two activities are competing in collective and individual resources including time, energy and materials. Individuals who can manage these two paradoxical activities simultaneously are expected to have better performance in knowledge transfer. In the knowledge domain, exploitation enables individuals to capitalize on the similar and relevant knowledge more efficiently (Rosenkopf & Nerkar, 2001), while exploration allows individuals to continually renew their knowledge stock, introduce external knowledge and invent new knowledge (Levinthal & March, 1993).

Subsequently, ambidextrous individuals have more chances to access external knowledge through working at multiple tasks and connecting with people from different fields, and hence more likely to get useful knowledge. Thirdly, ambidextrous individuals have more intrinsic motivation to hunt for new knowledge and skills. They would like to think “out of box” and build internal linkages (Gibson & Birkinshaw, 2004). These actions give them more possibilities to attain insight and inspiration from knowledge, especially from certain seemingly unrelated and trivial knowledge, leading to a higher level of perceived usefulness of knowledge. Hence, I hypothesize:

H1: Individual ambidexterity is positively associated with perceived usefulness of knowledge.

3.3 Individual ambidexterity and trust in benevolence and competence

Trust can be defined as a set of beliefs about the other party (trustee), and the willingness to depend on the other party (trustee), both of which lead trustors to assume that trustees will have positive consequences for themselves (Mayer et al., 1995; Gabbay & Leenders, 2003). Specifically, benevolence-based trust and competence-based trust are two focal points of prior studies of trust. In the team context, benevolence-based trust is the belief that knowledge sources (team members) will benefit, or at least will not harm trustors. Competence-based trust is the willingness to depend on team members and to believe skills and expertise of teammates. These two dimensions are separable and vary independently. A

case in point is the fact that one can trust a team member to be benevolent, but not trust him to be competent for the task, and vice versa (Bakker et al, 2006).

Linking trust to ambidexterity, we can notice that ambidextrous individuals seem to be active trust builders who are more likely to generate trust in knowledge sources. As Gibson and Birkinshaw (2004) put it, ambidextrous individuals are cooperative. They are always looking to seek out opportunities to combine their efforts with others. Their strong propensity of cooperation indicates that ambidextrous individuals have more trust in one's benevolence and competence than peers without ambidexterity have. Also, ambidextrous individuals are brokers. They are always looking to build internal linkages (Gibson & Birkinshaw, 2004). This character shows that ambidextrous individuals are more likely to believe that other people will do good to them. Hence, I hypothesize:

H2a: Individual ambidexterity is positively associated with benevolence-based trust.

H2b: Individual ambidexterity is positively associated with competence-based trust.

3.4 Individual ambidexterity and knowledge transfer effectiveness: the mediating role of trust

Why do ambidextrous individuals tend to perceive knowledge they received as useful in knowledge transfers? I suggest that ambidexterity is helpful, because it leads to more trust. Many scholars have demonstrated the importance of trust in team work. Nichani and Hung (2002, p.51) note that “without trust, members would hoard their knowledge and experience,

and would not go through the trouble of sharing with or learning from others”. A body of prior literature has suggested that effective knowledge transfer is marked by a high level of mutual trust and trustworthiness among individuals (Tsai & Ghoshal, 1998; Von Krogh, Ichijo & Nonaka., 2000; Newell et al., 2002).

To further analyze these relationships, the two specific types of trust: benevolence-/competence-based trust were studied separately. The well-known investigation conducted by IBM institution reveals that knowledge transfer is more possible to actually occur, only when the knowledge seekers view the knowledge source as being both benevolent and competent (Levin et al., 2002). Levin and Cross (2004) note that benevolence-based trust has a positive mediating influence on the link between tie strength and the receipt of useful knowledge. They state that benevolence-based trust does matter, because the recipients’ worry about being harmed results in the reluctance of learning from external knowledge. As for competence-based trust, they believe that knowledge seekers are more willing and likely to absorb and follow suggestions from the party that they trust their expertise and skills. Hence, I hypothesize:

H3a: The link between individual ambidexterity and perceived usefulness of knowledge is mediated by benevolence-based trust.

H3b: The link between individual ambidexterity and perceived usefulness of knowledge is mediated by competence-based trust.

Overall, Fig.1 comprises all hypotheses and provides a conceptual model of dyadic-level knowledge transfer.

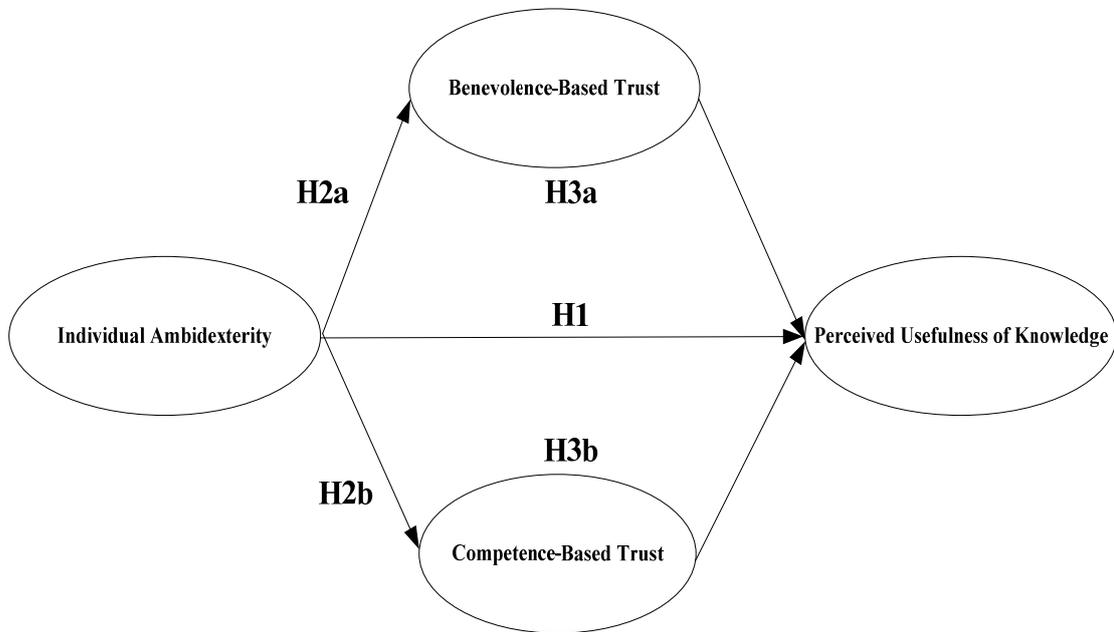


Fig.1 Conceptual model

4 Methodology

4.1 Survey design and data collection

The data were collected by a structure on-line survey with closed questions. The study focuses on cross-industry fulltime employees. In addition, I specially targeted employees working in teams, because the specific shared team task can make individuals better judge the usefulness of knowledge, comparing with general work tasks. To make sure Chinese respondents understand the questions correctly and to predict the validity and reliability of constructs, I employed two measures. On the one hand, the questionnaire was designed in two languages: English and Chinese. Respondents can choose the language by their preferences. On the other hand, the questionnaire was validated by a pretest. Following the four-stage approach suggested by Churchill (1979), I employed the four steps to pretest the survey. First, professors and peer students reviewed the questionnaire in which the initial scales and questions are based on prior validated instruments. Second, I interviewed seven practitioners who were selected based on their work experience and representation of target groups (i.e. staff and managers). In the third phase, I refined the construct definitions and relevant items, according to the feedback of interviewers. Some words were replaced to make the Chinese questions translated from the English items easy to understand. Last, a pilot study including a small sample (N=40) of the target group was conducted. Through analyzing the pretest result, I adjusted and removed questions that were redundant.

Overall, the survey resulted 256 responses. I discarded 55 because of the systematic missing answers and inaccurate information (i.e. the lack of individual identification etc.). In

essence, the final sample comprises 201 individual samples working in 65 teams. Table 1 embraces the profile of respondents.

Table 1 Profile of respondents

Function of Teams	Sample Numbers (N=201)	Percentage
Research & Development	83	41.3%
Marketing & Sales	41	20.4%
Operations	77	38.3%
Rank		
Employees	136	67.7%
Managers	65	32.3%

4.2 Data analysis method

To test the proposed model directly, I used a regression-based path analysis by PROCESS provided by Preacher and Hayes (2008). PROCESS is “a versatile computational tool for observed variable mediation, moderation, and conditional process modeling” (Hayes & Preacher, in review; Hayes, under contract). PROCESS can not only estimate the coefficients of the model by means of OLS regression or maximum likelihood logistic regression, but also assess direct and indirect effects in mediation and mediated moderation models, conditional effects in moderation models, as well as conditional indirect effects in moderated mediation models (Hayes, 2013).

To test the proposed mediation effect, I followed the bootstrapping method (with 1000 interactions) suggested by Preacher, Rucker and Hayes (2007). Compared with Sobel test, the advantages of bootstrapping is evident, because the application of bootstrapping confidence intervals (CIs) makes it possible to solve power problems caused by asymmetric and non-normal sampling distributions of indirect effects (Mackinnon, Lockwood, &

Williams, 2004; Cole, Bruch & Walter, 2008). As for the well-known multistep approach proposed by Baron and Kenny (1986), methodologists have questioned the necessity of the correlation between initial variables and the outcome (Shrout & Bolger, 2002). As an example, the step 1 that the direct effect from the initial predictor X to the outcome Y must be significant is not essential any longer in developing mediation (Kenny, Kashy, & Bolger (1998, p. 260). Therefore, bootstrapping method is appropriate for testing mediation to overcome shortcomings of other approaches.

In general, PROCESS is a computation tool that makes for estimating the indirect effect, with a normal theory test (i.e. the Sobel test) and with a bootstrap method to obtain confidence intervals. By exposing the direct and indirect relationships among variables, it displays the multistep procedure proposed by Baron and Kenny as well (Cole et al., 2008).

4.3 Measure and validation

The measurement of variables is grounded on the multiple-item method. Each item is based on a seven-point Likert scale, ranging from 1 to 7 with different indices. Items all come from published scales.

Dependent variable: perceived usefulness of knowledge. The scale captures the extent of usefulness of knowledge perceived by team members. I adapted eight items from Levin and Cross (2004) to create the scale of perceived usefulness of knowledge. The eight-item scale covers both task efficiency and task effectiveness. With regard to task efficiency, time and budget were considered. As for effectiveness, customer satisfaction, quality, team

overall performance and individual value were taken into account. Respondents were required to assess the potential usefulness of knowledge they received in the work (1= “extremely negative influence” to 7= “extremely positive influence”).

Independent variable: individual ambidexterity. I measured individual ambidexterity, in terms of exploration and exploitation, with seven items for each. In addition, all the items were adopted from Mom, van den Bosch, and Volberd (2009). The seven-item scale Exploration captures the extent to which individuals engaged in work related exploratory activities last year. The other seven-item scale Exploitation measures the extent to which individuals worked at exploitative activities last year. Items were measured from (1= “to a very small extent” to 7= “to a very large extent”). To measure the interaction between exploitation and exploration, I followed the way used by Mom, van den Bosch, and Volberd (2009): multiplying the two variables together to create the measure of individual ambidexterity.

Mediators: benevolence-based trust and competence-based trust. Following Levin and Cross (2004), I assessed trust in terms of benevolence-based trust and competence-based trust, with five items. The first three items form the first dimension of trust: benevolence-based trust, which were also used by Mayer and Davis (1999). The last two items measuring the competence-based trust are the two top loading items used in McAllister’s research (1995). Brachos et al., (2007) also employed them in their study.

Control variables. In all analyses, I statistically controlled for respondents’ age, tenure and rank in the firm, education, the knowledge nature they received in team work, team

function and team size.

Individual characteristics. First, I controlled for age and tenure in the firm, to assess effects of experience. Inasmuch as they positively relate to the increasing level of specialization, I would like to expect that they have negative influences on perceived usefulness of knowledge. Second, increasing levels of education may have an unclear influence on the effectiveness of knowledge transfer. A possible reason is that respondents with high education can have a high cognitive capability to process and learn knowledge (Papadakis et al., 1998), and then might not find additional useful knowledge to learn from others (Levin & Cross, 2004). To control for educational effects, I included two dummy variables. One reflects employees with bachelor's degrees, and the other reflects employees with master's or higher degrees. The employees whose highest education is below the bachelor's level were grouped as the reference. Third, the position in the firm might influence upon the recipients' expertise and knowledge stock. Given that individuals in higher rank (i.e. managers) are typically expected to be more informed and ambidextrous than people in lower level (i.e. normal employees) (Floyd & Lane, 2000; O'Reilly & Tushman, 2004), I would like to assume that people with high rank in firm would be more likely to find additional useful knowledge. I included one dummy variable reflecting the manager group, making normal employees as the reference group.

Team characteristics. Along with individual factors, team characteristics were also controlled for their latent influences. First, I expected that knowledge types, knowledge transfer frequency and volume might differ across different functional areas. To control for

the effects of functional areas, I created two dummy variables: one for research and development (R&D), one for marketing and sales (M&S), making operations as the reference group. Then, following the prior research, I controlled for team size, as it has consequences on the effectiveness of knowledge transfer (Brachos et al., 2007). To control for team size effects, I included the natural log of the number of team members within a team. Last, knowledge characteristic is one of affecting factors of knowledge transfer. Tacit knowledge has a negative influence on knowledge transfer effectiveness, because of the inherent and irreducible uncertainty in its underlying knowledge components, sources, and interaction mechanisms (Brachos et al., 2007). I employed a three-item scale that captures the extent of tacit knowledge (Levin & Cross, 2004). The survey items are present in Appendix A.

4.4 Construct validity and reliability

Following Hulland (1999), I assessed the construct validity and reliability in terms of three respects: item reliability, convergent validity, and discriminant validity.

Item reliability. Given that all constructs in this survey were adapted from the published scales, I conducted confirmatory factor analysis (CFA) by LISREL 8.70 on all items pertaining to endogenous variables: exploration, exploitation, benevolence-based trust, competence-based trust, and perceived usefulness of knowledge. Then I checked for the item reliability.

To ensure a satisfactory extent of item reliability, items with a loading less than 0.70

were excluded from the analysis (Carmines & Zeller, 1979). The resulting factor loadings are present in Table 2. As can be seen, factor loading for each retained item is greater than 0.7, except for two items: EXPL5 in *Exploitation* (0.66), and PUK7 in *Perceived Usefulness of Knowledge* (0.63). For the item EXPL5, I retained it since it is a crucial component of exploitation. To ensure the symmetry of exploitation and exploration, I retained EXPL5, despite of its loading below 0.7. For the item PUK7, I also kept it due to the definition of the scale: *Perceived Usefulness of Knowledge*. As a proxy of knowledge transfer effectiveness, “perceived usefulness of knowledge” is supposed to evaluate the positive or negative influence of knowledge on key aspects of the project’s outcome as much as accurate (Levin & Cross, 2004). The time that this task took is, definitely, one of necessary criteria of the project’s success. I therefore retained this item. Based on Chin, Gopal and Salisbury (1997), if items locate in their intended constructs with the loading of 0.6 or more, the convergent validity is acceptable.

Apart from the reliability assessment of main variables, I also examined the item reliability of the control variable: tacit knowledge by calculating the value of Cronbach’s alpha. I deleted the third item because of its low reliability, leading to a sharp rise of the scale’s Cronbach’s alpha ($\alpha = 0.81$).

Table 2 Items factor loadings

Construct	Item	Loading
Exploration (Mom, van den Bosch, & Volberda, 2009)	To what extent, did you, last year, engage in work related activities that can be characterized as follows:	
	Searching for new possibilities with respect to products/services, processes, or markets.	0.86
	Evaluating diverse options with respect to products/services, processes, or markets.	0.84
	Focusing on strong renewal of products/services or processes.	0.81
	Activities of which the associated yields or costs are currently unclear.	-
	Activities requiring quite some adaptability of you.	-
	Activities requiring you to learn new skills or knowledge.	-
	Activities that are not (yet) clearly existing company policy.	-
Exploitation (Mom, van den Bosch, & Volberda, 2009)	To what extent, did you, last year, engage in work related activities that can be characterized as follows:	
	Activities of which a lot of experience has been accumulated by yourself.	-
	Activities which you carry out as if it were routine.	-
	Activities which serve existing (internal) customers with existing services/products.	-
	Activities of which it is clear to you how to conduct them.	0.73
	Activities primarily focused on achieving short-term goals.	0.66
	Activities which you can properly conduct by using your present knowledge.	0.86
	Activities which clearly fit into existing company policy.	-
Benevolence-Based Trust (Levin & Cross, 2004)	Prior to seeking information/advice from this person on this task,	
	I assumed that he or she would always look out for my interests.	0.77
	I assumed that he or she would go out of his or her way to make sure I was not damaged or harmed.	0.83
	I felt like he or she cared what happened to me.	0.74
Competence-Based Trust (Levin & Cross, 2004)	Prior to seeking information/advice from this person on this task,	
	I believed that this person approached his or her job with professionalism and dedication.	0.86
	Given his or her track record, I saw no reason to doubt this person's competence and preparation.	0.71
Perceived Usefulness of Knowledge (Levin & Cross, 2004) (Brachos et al., 2007)	The information/advice I received made (or is likely to make) the following contribution to:	
	Client satisfaction with the task.	0.80
	The team's overall performance.	0.91
	The task's value to my team.	0.84
	This task's quality.	0.88
	This task's coming in on budget or closer to coming in on budget.	0.76
	Reducing costs on the task.	-
	Shortening the time this task took.	0.63
	My being able to spend less time on the task.	-

Note: Items were dropped due to the reliability issue.

The fit indices are the following: $\chi^2/d.f.=1.67$, IFI=0.97, CFI=0.97, NFI=0.94, RMSEA=0.058). The result indicates that data meet the five-factor model well (Hooper, Coughlan & Mullen, 2008). In addition, I also combined the two types of trust into the same factor, leading to a four-factor model. The fit indices of the four-factor model are not as good as the five-factor model ($\chi^2/d.f.=2.18$, IFI=0.95, CFI=0.95, NFI=0.92, RMSEA=0.077). These additional results confirm the convergent and discriminant validity of scales.

Convergent validity. Following Perols, Zimmermann and Kortmann (2013), I examined convergent validity of the scales by means of Cronbach's Alpha (CA), composite reliability (CR), and average variance extracted (AVE). As present in Table 3, results of the scale reliability all exceed acceptable value (e.g. $\alpha \geq 0.7$, $CR \geq 0.7$, and $AVE \geq 0.5$) (Nunnally, 1978; Fornell & Larcker, 1981; Bagozzi & Yi, 1988).

Discriminant validity. Following Chin (1998), I examined the discriminant validity by means of checking whether the square root of each measure's AVE is greater than its correlation coefficients with the other measures. As shown in Table 3, all scale meets the criterion. In sum, the measured constructs in the study show good reliability, convergent validity, and discriminant validity.

Table 3 Properties of measurement scales

Construct	CA	CR	AVE	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Exploration	0.88	0.88	0.71	0.84*												
2 Exploitation	0.79	0.80	0.57	0.03	0.75*											
3 BBT	0.88	0.83	0.62	0.42	0.25	0.78*										
4 CBT	0.76	0.77	0.62	0.22	0.18	0.56	0.79*									
5 PUK	0.92	0.92	0.65	0.12	0.30	0.33	0.39	0.81*								
6 Age	1.00	1.00	1.00	0.12	0.08	0.12	0.10	0.04	1.00*							
7 Tenure in Firm	1.00	1.00	1.00	0.10	0.10	0.08	0.06	0.01	0.74	1.00*						
8 Education: Bachelor's	1.00	1.00	1.00	0.01	0.04	-0.07	0.02	0.00	-0.11	-0.08	1.00*					
9 Education: Master's or Higher	1.00	1.00	1.00	0.05	-0.06	0.07	-0.02	0.04	0.04	-0.07	-0.84	1.00*				
10 Hierarchical Level	1.00	1.00	1.00	0.13	0.13	0.12	0.04	0.08	0.25	0.24	0.06	-0.05	1.00*			
11 Function: R&D	1.00	1.00	1.00	0.01	-0.10	-0.02	0.03	-0.12	0.04	0.02	-0.22	0.26	-0.17	1.00*		
12 Function: M&S	1.00	1.00	1.00	0.10	0.09	0.05	0.00	0.03	0.03	0.02	0.19	-0.21	0.15	-0.43	1.00*	
13 Team Size (log)	1.00	1.00	1.00	0.02	-0.10	0.00	0.02	-0.06	0.24	0.17	0.07	-0.04	0.03	0.09	-0.02	1.00*
14 Tacit Knowledge	0.81	-	-	0.01	-0.08	-0.19	-0.26	-0.32	-0.07	-0.07	0.08	-0.06	-0.17	0.14	-0.05	0.01

Notes: CA: Cronbach's Alpha; CR: Composite Reliability; AVE: Average Variance Extracted; BBT: Benevolence-Based Trust; CBT: Competence-Based Trust; PUK: Perceived Usefulness of Knowledge.

** Value on the diagonal is the square root of AVE.*

Tacit knowledge as a control variable was not included in the integrated confirmatory analysis.

4.5 Common method bias

As the survey data were collected from one informant at the same time, common method bias may be a concern of the study (Podsakoff et al., 2003; Perols, Zimmermann, & Kortmann, 2013). To avoid the bias caused by common method variance, I employed three methods in the survey design. (1) Independent and dependent variables were allocated to different sections of the survey, which makes respondents not easy to find the internal logic of the survey. (2) A short introduction, explanation, or scene description to each scale was

added to each section. Specifically, the survey focused on individual conditions through measuring the last year work of respondents, while in the second section: perceived usefulness of knowledge, I located the scenario to their team context. The change of scenario reduces the possibility of common method variance. (3) Following Grewal et al. (2010) and Kortmann (2012), I used various formats across distinct sections of the survey. For example, different indices including “completely wrong/completely right” and “strongly agree/strongly disagree” were adopted to measure the seven-point Likert scales. In addition to the three-step survey design, I assessed common method bias by using Harman’s (1967) single factor test. The test result shows that the initial strongest factor (without rotation) took for 30.54% of the total variance, whereas five factors with an eigenvalue greater than 1.00 explained 72.04%. It means that no single factor emerged from a factor analysis of question items. In this vein, I can state that the common method bias is not the main threaten to the study results.

4.6 Nonresponse bias

As Dillman (2000) defined, nonresponse bias occurs when the result of people who respond to a survey is different from sampled individuals who did not respond. In order to assess non-response bias, I tested the difference between early and late respondents. Following Li and Calantone (1998) and Kortmann (2012), I compared the first 75% of respondents (N=151) as early respondents and the last 25% of respondents as late respondents (N=50) by using the Mann-Whitney U Test. The test results are non-significant,

indicating that there are no significant differences between early and late respondents. Hence, I assume that non-response bias is not a main threaten to the study. The results of the test are presented in Table 4.

Table 4 Results of the Mann-Whitney U Test

	Early Respondents Mean (SD)	Late Respondents Mean (SD)	Mann-Whitney U Test
Exploration	3.633 (1.482)	3.130 (1.569)	0.080
Exploitation	4.574 (1.181)	4.654 (1.095)	0.982
Benevolence-Based Trust	4.306 (1.062)	4.185 (1.094)	0.672
Competence-Based Trust	4.973 (1.068)	4.685 (0.963)	0.097
Perceived Usefulness of Knowledge	5.197 (1.040)	5.157 (0.962)	0.530

Notes: SD=Standard Deviation. N=201.

5 Analysis and results

5.1 Mean, standard deviations, skewness and correlations

Before testing the hypotheses, I took the following steps. First, I replaced missing values of 201 responses through maximum likelihood imputation with the aid of HOTDECK, a SPSS macro implementing hot deck imputation on missing data (Myers, 2011). Then I conducted normality tests to assess whether the variables: exploration, exploitation, individual ambidexterity, benevolence-based trust, competence-based trust and perceived usefulness of knowledge were normally distributed. By assessing the variables' skewness, kurtosis, and histograms, it became apparent that the distribution was approximately normal for each variable. Although the data did not completely follow symmetric bell-shaped curves, I assume that the data will tend to distribute normally with the rise of sample size. The results of skewness and kurtosis are presented in Table 5. Third, I tested item reliability, convergent validity, and discriminant validity of each scale, and excluded the items with low factor loadings. Then values of Cronbach's alpha and composite reliability all exceed 0.7, and the values of AVE are above 0.5, meaning the reliability of each scale is good (see Table 3). Last, I computed the mean of each scale and created five new variables. They are individual ambidexterity (a product of exploration and exploitation), benevolence-based trust, competence-based trust, perceived usefulness of knowledge, and tacit knowledge (control variable). To control for effects from other variables, I included nine control variables to the model, in which five of them are dummy variables. The first dummy variable reflects employees with bachelor's degrees, and the

second reflects employees with master's or higher degrees. The employees whose highest education is below the bachelor's level were grouped as the reference. The third dummy variable is hierarchical level, reflecting managers, and making normal employees as the reference group. The rest two dummy variables are about functional areas. R&D, M&S these two dummy variables were created, while the operation category (i.e. administration, quality control, and human resource management etc.) was taken as the reference group. Finally, I took the natural logarithmic transformation of a team's number of full-time employees.

Table 5 summarizes means, standard deviations, skewness, kurtosis, and correlations for all variables in this study. An inspection of the correlations suggests that four variables: individual ambidexterity, benevolence-based trust, competence-based trust, and perceived usefulness of knowledge are related to each other, significantly and positively. Further, the linear correlations between independent variables are between 0.29 and 0.56, less than 0.8, indicating that multicollinearity will not be the main concern of the study (Emory & Cooper, 1991). Besides, tacit knowledge is negatively related to perceived usefulness of knowledge ($r=-0.32$, $p<0.01$), competence-based trust ($r=-0.26$, $p<0.01$) and benevolence-based trust ($r=-0.19$, $p<0.01$). The other control variables are not significantly correlated to the dependent variable: perceived usefulness of knowledge.

Table 5 Means, standard deviations, skewness, kurtosis, and correlations

Variable	Mean	SD	Skew	Kurt	Pearson correlation												
					1	2	3	4	5	6	7	8	9	10	11	12	
1 Age	27.73	4.62	-	-	1.00												
2 Tenure in Firm	3.00	2.93	-	-	0.74**	1.00											
3 Education: Bachelor's	0.47	0.50	-	-	-0.11	-0.08	1.00										
4 Education: Master's or Higher	0.45	0.50	-	-	0.04	-0.07	-0.84**	1.00									
5 Hierarchical Level	0.32	0.47	-	-	0.25**	0.24**	0.06	-0.05	1.00								
6 Function: R&D	0.41	0.49	-	-	0.04	0.02	-0.22**	0.26**	-0.17**	1.00							
7 Function: M&S	0.20	0.40	-	-	0.03	0.02	0.19	-0.21**	0.15*	-0.43**	1.00						
8 Team Size (log)	2.13	0.69	-	-	0.24**	0.17*	0.07	-0.04	0.03	0.09	-0.02	1.00					
9 Tacit Knowledge	3.83	0.99	-	-	-0.07	-0.07	0.08	-0.06	-0.17*	0.14	-0.05	0.01	1.00				
10 Individual Ambidexterity	16.13	8.64	0.17	0.34	0.13	0.13	0.06	-0.01	0.16*	-0.03	0.15*	-0.03	0.00	1.00			
11 Benevolence-Based Trust	4.27	1.06	0.02	0.00	0.12	0.08	-0.07	0.07	0.12	-0.02	0.05	0.00	-0.19**	0.48**	1.00		
12 Competence-Based Trust	4.90	1.05	-0.23	0.15	0.10	0.06	0.02	-0.02	0.04	0.03	0.00	0.02	-0.26**	0.29**	0.56**	1.00	
13 Perceived Usefulness of Knowledge	5.19	1.02	-0.59	0.38	0.04	0.01	0.00	0.04	0.08	-0.12	0.03	-0.06	-0.32**	0.22**	0.33**	0.39**	1.00

Notes: ** $p < 0.01$; * $p < 0.05$. $N = 201$.

SD=Standard Deviation; Skew= Skewness; Kurt= Kurtosis.

Individual Ambidexterity is the product of exploration (Mean=3.50; SD=1.52; Skew=0.111; Kurt=-0.647) and exploitation (Mean=4.60; SD=1.16; Skew=-0.021; Kurt=-0.618).

5.2 Analytical strategy and results

As emphasized in section 4.2, I employed a regression-based path analysis by using PROCESS (Preacher & Hayes, 2008). To test the proposed mediation effects, I followed the bootstrapping method suggested by Preacher, Rucker and Hayes (2007). Based on Nevitt and Hancock (1998), bootstrapping was used as an alternative to test the statistical significance of the parameter estimates. The results in the study are based on bootstrapping with 1000 samples.

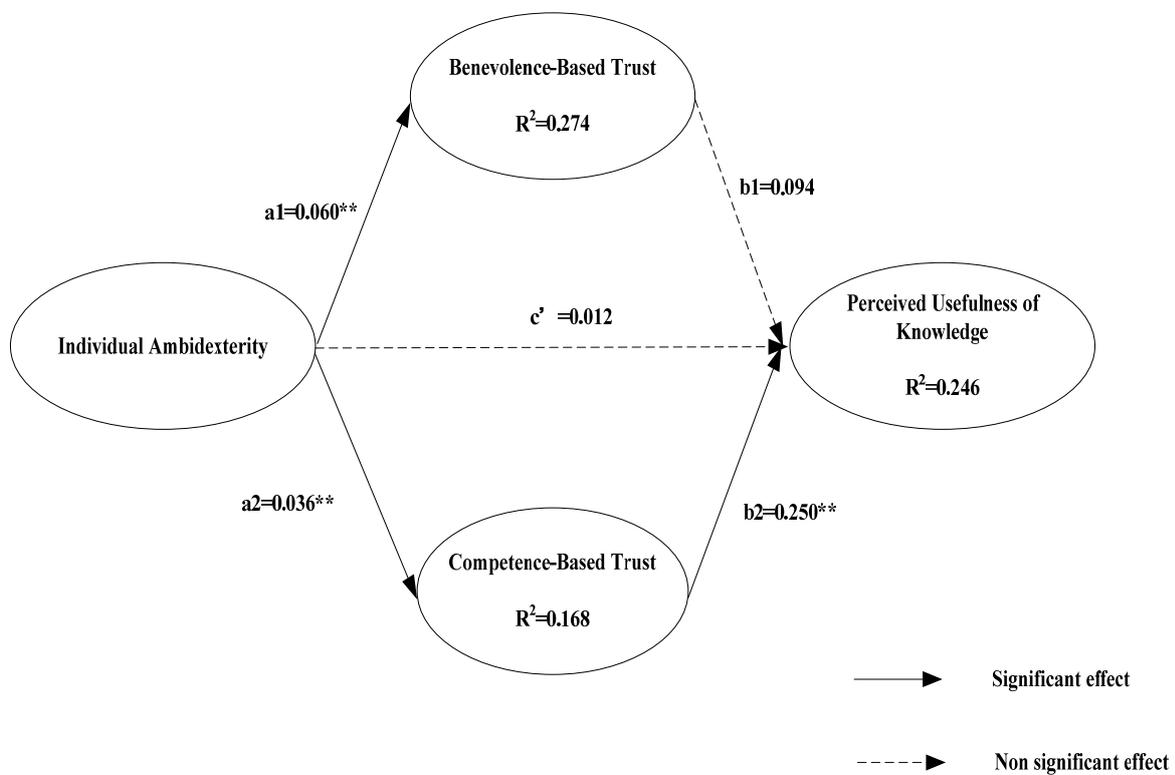
Among the control variables, the full model 4 in Table 6 shows that only tacit

knowledge is significantly and negatively related to perceived usefulness of knowledge, while the rest is not significantly related to perceived usefulness of knowledge.

5.2.1 Mediation tests

Table 6 outlines regression results for Hypotheses 1-3. Generally, model 1, 2, 3 and 4 reveal the multistep mediation procedure. Hypothesis 1 (H1) predicted that individual ambidexterity is positively associated with knowledge transfer effectiveness. H2 predicted that individual ambidexterity is positively associated with two types of trust, benevolence-based trust (H2a) and competence-based trust (H2b), respectively. As depicted in Table 6, the coefficients for individual ambidexterity in model 1-3 were positive and significant, supporting H1 ($B=0.026$; $t=3.236$; $p<0.01$), H2a ($B=0.060$; $t=7.534$; $p<0.01$) and H2b ($B=0.036$; $t=4.353$; $p<0.01$). Hypothesis 3 (H3) proposed that the link between individual ambidexterity and perceived usefulness of knowledge is mediated by benevolence-based trust (H3a), and competence-based trust (H3b). For H3a, results suggest that benevolence-based trust does not have a significant effect on perceived usefulness of knowledge ($B=0.094$; $t=1.175$; $p=0.24>0.05$). Sobel test, which is grounded on the normal distribution, obtains the same result (Sobel $z=1.151$, $p=0.25>0.05$). The bootstrap result also demonstrates it, with a bootstrapped 95% CI around the indirect effect (Ind1) containing zero (LLCI=-0.003, ULCI=0.015), without supporting H3a. In contrast, the indirect effect of competence-based trust was observed, in support of H3b ($B=0.250$; $t=3.256$; $p=0.00<0.05$). This positive indirect effect (0.009) is statistically significant. Sobel test confirms the

significantly indirect effect (Sobel $z=2.564$, $p=0.01<0.05$). The bootstrap result also demonstrates it, with a bootstrapped 95% CI around the indirect effect (Ind2) not including zero (LLCI=0.004, ULCI=0.017). Notably, the direct path (direct effect $c' = 0.012$, $t=1.305$, $p>0.05$) is not statistically significant after incorporating the indirect paths, suggesting a full mediation of competence-based trust. Fig.2 provides an overview of the results.



Notes: $**p<0.01$.

Indirect effect (Ind1): Individual Ambidexterity→Benevolence-Based Trust→Perceived Usefulness of Knowledge

Indirect effect (Ind2): Individual Ambidexterity→Competence-Based Trust→Perceived Usefulness of Knowledge

Fig.2 Results

Table 6 Regression results for mediation

	Model 1		Model 2		Model 3		Model 4	
Outcome	Perceived Usefulness of Knowledge		Bevolence-Based Trust		Competence-Based Trust		Perceived Usefulness of Knowledge	
Predictor	B	P	B	P	B	P	B	P
Intercept	5.826	0.000	3.801	0.000	4.916	0.000	4.241	0.000
Individual Ambidexterity	0.026	0.001	a1→ 0.060	0.000	a2→ 0.036	0.000	c'→ 0.012	0.193
Bevolence-Based Trust							b1→ 0.094	0.242
Competence-Based Trust							b2→ 0.250	0.001
Tacit Knowledge	-0.316	0.000	-0.200	0.004	-0.297	0.000	-0.223	0.002
Age	0.010	0.664	0.015	0.496	0.025	0.288	0.003	0.896
Tenure in Firm	-0.010	0.690	-0.020	0.562	-0.027	0.467	-0.006	0.868
Education: Bachelor's	0.208	0.436	-0.206	0.430	-0.042	0.877	0.238	0.352
Education: Master's or Higher	0.230	0.394	-0.060	0.822	-0.182	0.512	0.281	0.277
Hierarchical Level	-0.035	0.822	0.025	0.872	-0.117	0.464	-0.008	0.956
Team Size (log)	-0.078	0.448	0.025	0.802	0.018	0.867	-0.084	0.388
Function: R&D	-0.219	0.166	-0.017	0.912	0.131	0.419	-0.250	0.099
Function: M&S	-0.151	0.425	-0.072	0.698	-0.097	0.616	-0.120	0.507
Model R²	0.165	0.000	0.274	0.000	0.168	0.000	0.246	0.000
Soble Test for indirect effect		Effect	SE	Z	P			
Bevolence-Based Trust		0.006	0.005	1.151	0.250			
Competence-Based Trust		0.009	0.004	2.564	0.010			
Bootstrap results for indirect effect		Effect	SE	LLCI	ULCI			
Bevolence-Based Trust		0.006	0.005	-0.003	0.015			
Competence-Based Trust		0.009	0.003	0.004	0.017			
		Effect	SE	t	P	LLCI	ULCI	
Total Effect of Ambidexterity on PUK (a1*b1+a2*b2+c')		0.026	0.008	3.236	0.001	0.010	0.042	
Direct Effect of Ambidexterity on PUK (c')		0.012	0.009	1.305	0.193	-0.006	0.029	

Notes: N=201. PUK: Perceived Usefulness of Knowledge.

Unstandardized regression coefficients are reported.

Bootstrap sample size=1000, CI=95%.

Ind1: Indirect effect of Individual Ambidexterity on PUK through Benevolence-Based Trust = $a1*b1 = 0.060*0.094 = 0.006$

Ind2: Indirect effect of Individual Ambidexterity on PUK through Competence-Based Trust = $a2*b2 = 0.0362*0.2496 = 0.009$

Direct effect of Individual Ambidexterity on PUK = $c'=0.012$

Total effect of Individual Ambidexterity on PUK = Indirect effect + Direct effect = $a1*b1+a2*b2+c' = 0.006+0.009+0.012=0.026$

5.2.2 Post hoc analysis

Following Mom, van den Bosch and Volberda (2009), ambidexterity is conceptualized as a multidimensional construct comprising of the two paradoxical activities: exploration and exploitation. To understand the specific role of these two non-substitutable activities in perceived usefulness of knowledge, I followed Prieto, Revilla and Rodriguez (2007) and applied a cluster analysis. In this study, I employed a Ward's hierarchical method by using Euclidean Distance and an agglomeration schedule to observe the number of clusters and the initial seeds. Then a K-means analysis was used to group individuals.

Table 7 Results of cluster analysis of ambidextrous individuals (K-means)

	Highly Ambidextrous Individuals	Exploitation-Based Individuals	Lowly Ambidextrous Individuals
Exploration	4.84(0.89)	2.27(0.88)	2.53(0.97)
Exploitation	4.71(1.00)	5.60(0.71)	3.46(0.63)
N	90	54	57

Notes: Standard Deviation are reported in brackets. N=201.

The features of three clusters based on the final centers of K-means analysis are displayed in Table 7. What is interesting is the non-existence of individuals with low emphasis on exploitation. A possible explanation for it is the strong cumulative nature of both explicit and scientific knowledge. In this study, most knowledge shared within teams is relatively explicit (Mean of tacit knowledge=3.83). Along with it, 41.3% of respondents are members of R&D teams. The two characteristics of sample teams illustrate that exploitation is good for the acquirement of explicit and/or scientific knowledge.

Table 8 ANOVA results for effects of exploration/exploitation configuration on perceived usefulness of knowledge

Cluster	Knowledge Transfer
Lowly Ambidextrous Individuals (Cluster 3)	4.75(1.12)
Exploitation-Based Individuals (Cluster 2)	5.33(0.92)
Highly Ambidextrous Individuals (Cluster 1)	5.40(0.93)
F (Signif.)	7.98**

*Notes: ** denotes $p < 0.01$. Standard Deviation are reported in brackets.*

Next, the relationships between exploration/exploitation and perceived usefulness of knowledge were analyzed within each cluster. Table 8 indicates the means of three clusters and ANOVA test for the segmented configurations. Employees in highly ambidextrous group were the best performing in knowledge transfer (Cluster 1), followed by exploitation-based group (Cluster 2) and lowly ambidextrous group (Cluster 3). Furthermore, the mean differences between lowly ambidextrous group and the other two groups are statistically significant, while the mean difference between highly ambidextrous group and exploitation-based group is not statistically significant. The reason for it can be that most of jobs for normal employees are regular and alignment. In other words, only a few top managers need to work on exploratory and exploitative activities at the same time (Smith & Tushman, 2005). That is why ambidexterity of employees in the study just reached the middle level. In this case, the essence difference of ambidexterity between “highly ambidextrous group” and “exploitation-based group” is small, which results to the similar level of knowledge transfer effectiveness. Last, the ANOVO F test is statistically significant, which suggests that the three groups have different levels of perceived usefulness of knowledge ($F=7.98, p<0.01$).

6 Discussion and implications

In general, this study attempts to explore the mediating role of perceived trustworthiness in the relationship between individual ambidexterity and knowledge transfer effectiveness. By using “perceived usefulness of knowledge” as a proxy of knowledge transfer effectiveness, the research answers the following three questions: (1) How does individual ambidexterity affect the level of perceived usefulness of knowledge? (2) How does individual ambidexterity influence the level of benevolence-based trust, and that of competence-based trust? (3) Do two types of perceived trustworthiness: benevolence-based trust and competence-based trust mediate the relationship between ambidexterity and perceived usefulness of knowledge? The hypotheses were formulated with the idea that ambidextrous individuals are more likely to take received knowledge as useful through a higher level of perceived trust in benevolence and competence of knowledge sources.

Overall, the research results are congruent with the initial assumptions, with one exception. The following section discusses the research findings, firstly presenting the results of the relationship between ambidexterity and perceived usefulness of knowledge, followed by the influence of ambidexterity on perceived trustworthiness, ending with the mediating effects of benevolence-/competence-based trust on the link between ambidexterity and knowledge transfer effectiveness.

6.1 Individual ambidexterity and knowledge transfer effectiveness

Following Levin and Cross (2004) and Brachos et al. (2007), I employed the construct “perceived usefulness of knowledge” as a crucial proxy of knowledge transfer effectiveness. As I expected, the result of data analysis shows that individual ambidexterity is positively associated with perceived usefulness of knowledge. In other words, ambidextrous individuals are more likely to think that the knowledge they received is useful. It is a creative leap to link ambidexterity to knowledge transfer effectiveness on the individual level, because no one to my knowledge has investigated it as a predictor of knowledge transfer effectiveness. It provides an alternative way of explaining why ambidextrous individuals have better knowledge transfer effectiveness.

Ambidexterity is composed of exploration- and exploitation performance criteria. The findings of post hoc analysis denote that individuals low in both exploration and exploitation performance take less shared knowledge as useful, compared with the other two groups: the highly ambidextrous group, and the exploitation-based group. In addition, for explicit knowledge, exploitation-based individuals, compared with highly ambidextrous individuals, do not make a big difference at the level of perceived receipt of useful knowledge. Although the post hoc results here cannot suggest that whether exploitation capacity is as important as ambidexterity to knowledge transfer effectiveness, it shows a future research avenue that researchers can specialize the specific influences of these two activities separately on knowledge transfer effectiveness.

6.2 Individual ambidexterity and perceived trustworthiness

Also, the study result adds to the trust theory by showing that ambidextrous individuals are more likely to trust other people as benevolent and competent. These findings demonstrate the interrelation between ambidexterity and perceived trustworthiness. Prior trust literature notes that trustworthiness as an ambidextrous individual competence is of value. The results support that ambidexterity, in turn, enables a higher level of trust in people's good wills and professional capabilities. A possible explanation is that ambidextrous individuals have more chances to communicate and cooperate with other members, leading to the development of relationships/ties. Built on the social network theory, strong ties enable a higher level of trust in others (Tsai & Ghoshal, 1998; Levin & Cross, 2004). Levin et al. (2002, p.2) also find that "trust can develop even when there was only infrequent interaction between individuals (weak ties)". In this vein, the study bridges the gap between constructs related to ambidexterity and trust, and offers a new insight into their relationships.

6.3 Individual ambidexterity, trust and knowledge transfer effectiveness

In contribution to the knowledge transfer and ambidexterity literature, this study addresses this question: why does individual ambidexterity facilitate knowledge transfer effectiveness? The missing link is competence-based trust. Echoing the call for more studies on the influence of trust on knowledge transfer (Wang & Noe, 2010), the study uncovers the mediating effect of the benevolence-/competence-based trust on the relationship between

ambidexterity and perceived usefulness of knowledge.

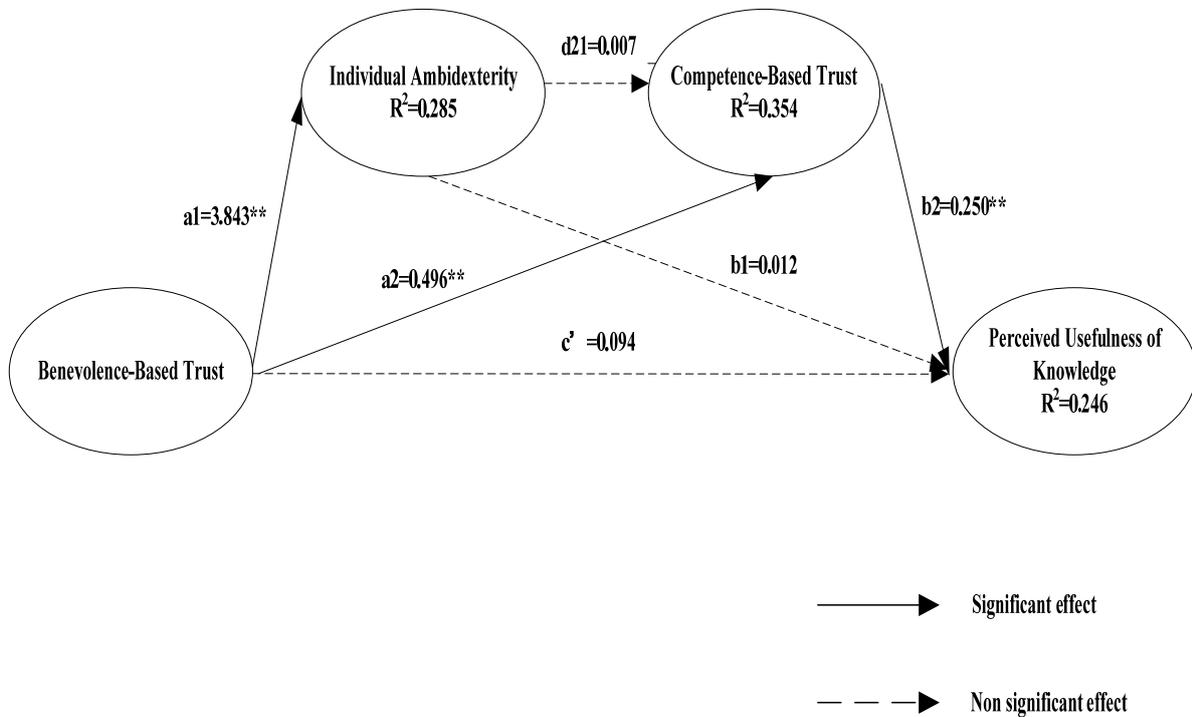
This empirical study leads to a somewhat surprising discovery: individual ambidexterity influences knowledge transfer effectiveness through the competence-based trust developed by knowledge recipients. It is worth noting that competence-based trust fully mediates the relationship between ambidexterity and perceived usefulness of knowledge. This finding about the full mediating role of competence-based trust gives us a better understanding of the relationship between ambidexterity and perceived usefulness of knowledge.

In contrast, benevolence-based trust has no mediating role in the same relationship, suggesting that different dimensions of trust play distinct roles in the same relationship. This finding may seem surprising at first, but it makes sense. There are two possible explanations for it. On the one hand, in the context of working teams, benevolence-based trust has been built and maintained in a relatively high level, due to the teamwork and shared goals. This result concurs with the finding that trust in benevolence is secondary to membership (Bakker et al., 2006). Bakker et al. (2006) find that in new product development (NPD) teams, benevolence-based trust does not explain knowledge sharing at the significant level, because the reasons for knowledge sharing within teams are shared-goals and the common intention to share knowledge, to make knowledge available to others, and finally to create new knowledge.

On the other hand, benevolence-based trust can be an antecedent to ambidexterity, as argued in the prior literature (Gibson & Birkinshaw, 2004). In doing so, I assume that

individuals who regard the organizational culture as trustful tend to be more ambidextrous. Then those ambidextrous members are more likely to believe knowledge sources' expertise, thereby perceiving knowledge accessed as valuable. To test this assumption, I examined the serial mediation model by PROCESS again. The result of the optional model supports the hypothesis that benevolence-based trust is an antecedent of individual ambidexterity. A strong sense of trust among team members significantly facilitates individual ambidexterity ($B=3.843$, $t=7.534$, $p<0.01$, $R^2=0.285$). The bootstrap result also supports it (LLCI=2.837, ULCI=4.849). In regards to the relationship between benevolence-based trust and perceived usefulness of knowledge, results are outlined as follows. First, benevolence-based trust is positively related to perceived usefulness of knowledge ($B=0.269$, $t=4.213$, $p<0.01$, LLCI=0.143, ULCI=0.394). When considering the mediating effect of individual ambidexterity, benevolence-based trust does not impact perceived usefulness of knowledge through ambidexterity (i.e. $BBT \rightarrow IA \rightarrow PUK$) at a significant level (indirect effect₁=0.044, LLCI=-0.025, ULCI=0.132). Further, indirect effect of benevolence-based trust on perceived usefulness of knowledge through individual ambidexterity and competence-based trust in serial (i.e. $BBT \rightarrow IA \rightarrow CBT \rightarrow PUK$) is not statistically significant (indirect effect₂=0.006, LLCI=-0.007, ULCI=0.029). Finally, benevolence-based trust impacts perceived usefulness of knowledge through competence-based trust (i.e. $BBT \rightarrow CBT \rightarrow PUK$) at the significant level (indirect effect₃=0.124, LLCI=0.056, ULCI=0.213). In conclusion, benevolence-based trust plays a role in perceived usefulness of knowledge only when competence-based trust also exists. Moreover, competence-based trust fully mediates

the relationship between benevolence-based trust and perceived usefulness of knowledge (direct effect $c' = 0.094$, $t = 1.175$, $p = 0.242$, $LLCI = -0.064$, $ULCI = 0.253$). The results are depicted in Fig.3.



Notes: ** $p < 0.01$. $N = 201$.

Unstandardized regression coefficients are reported.

Indirect effect1 (Ind1): Benevolence-Based Trust \rightarrow Individual Ambidexterity \rightarrow Perceived Usefulness of Knowledge = $a1 * b1 = 3.8428 * 0.0115 = 0.044$

Indirect effect2 (Ind2): Benevolence-Based Trust \rightarrow Individual Ambidexterity \rightarrow Competence-Based Trust \rightarrow Perceived Usefulness of Knowledge = $a1 * d21 * b2 = 3.8428 * 0.0065 * 0.2496 = 0.006$

Indirect effect3 (Ind3): Benevolence-Based Trust \rightarrow Competence-Based Trust \rightarrow Perceived Usefulness of Knowledge = $a2 * b2 = 0.4959 * 0.2496 = 0.124$

Direct effect of Ambidexterity on PUK = $c' = 0.094$

Total effect of Ambidexterity on PUK = Indirect effect + Direct effect

= Ind1 + Ind2 + Ind3 + Direct effect = $a1 * b1 + a2 * b2 + a1 * d21 * b2 + c'$

= $0.044 + 0.006 + 0.124 + 0.094 = 0.269$

Fig.3 Results of alternative model

6.4 Additional implications for theory

Beyond the contributions to the knowledge transfer literature, the present analysis makes additional contributions to the ambidexterity theory. First, whether ambidextrous managers may exist, or whether exploration and exploitation exclude each other at the individual level of analysis, still cause a lot of debates (Gupta et al., 2006). This paper confirms the finding of Mom, van den Bosch, and Volberda (2009) that individuals can achieve and balance exploration and exploitation to some extents. Furthermore, the survey that covers junior managers and normal employees expands the existing ambidexterity literature through the finding that not only managers above the middle level can be ambidextrous, but also employees in the low rank.

6.5 Implications for practice

Assuming knowledge transfer will continue to be a critical basis for competitive advantages in firms (Argote & Ingram, 2000), the work at hand holds significance for practitioners. First, the positive relationship between ambidexterity and different forms of perceived trustworthiness indicates the importance of selecting ambidextrous employees in building different forms of trust within organizations. Second, in line with Levin & Cross (2004), the central role of competence-based trust in knowledge transfer has been supported in the study. To enhance the effectiveness of knowledge transfer, managers should cultivate an appropriate environment in which employees get the chance to develop competence-based trust. For example, executives should bring people together, to create

chances that knowledge seekers can experience the professional work style, know the expertise of knowledge sources, and understand the principle of approaches. Third, the finding has shown that benevolence-based trust does not have any mediating effect on perceived usefulness of knowledge, but has a positive effect on individual ambidexterity. It is also positively related to competence-based trust. The role specialization of different types of trust can help executives pinpoint the specific points where trust-building strategies and investments are more likely to be rewarded. Last but not least, the finding of post hoc analysis confirms that lowly ambidextrous individuals think knowledge they received is significantly less useful than those who are exploitation-based or highly ambidextrous individuals. In this sense, organizations at least should focus on cultivating exploitation-based capacity of employees to promote the effectiveness of knowledge transfer, when employees are not ambidextrous.

7 Limitations and future research

There are some limitations to this study and consequently potential future research directions. First, some limitations in measures deserve attention. For measurement of knowledge transfer effectiveness, I have assumed that the knowledge transfer within teams is effective, if the knowledge recipients perceive knowledge shared is helpful for the project outcome. This behavioral view is narrow because of the lack of measurements on cognitive changes (Huber, 1991; Levin & Cross, 2004). With regard to the measure instruments of ambidexterity, these items translated from English are far from being perfect in the context of Chinese business. Although I employed the construct of individual ambidexterity developed by Mom, van den Bosch, and Volberda (2009), and took many actions to ensure the accuracy of translation, the reliability of some items are poor based on the CFA analysis. This concurs with the view that ambidexterity is a capability that neither fully nor easily measurable (Prieto et al., 2007). Another possible reason is that the construct is not well fit for Chinese business context, because of cultural differences between the East and the West. As a result, I hope that future research can solve these issues by adding instruments on cognitive changes, and by tailoring measures to target groups with different cultural backgrounds.

Another concern of this study resides in the methods I used. In regard of survey implementation, the sample size is relatively small (N=201), which might have reduced the significance of results. As for the assumption of normal distribution for OLS, I can only state that the distribution of data in all five constructs is relatively normal. Yet for ambidexterity, a multiplicative interaction of exploration and exploitation, it will not distribute normally, even if the two variables distribute normally. With these limitations in mind, future research can

use partial least squares (PLS) approach which does not need multivariate normal data or large sample sizes (Chin, 1988) to examine the findings of this study.

Third, the current study cannot tell exactly that the non-significant influence of benevolence-based trust on perceived usefulness of knowledge is caused by team membership or by the alternative relationship, because of the lack of multilevel analysis. Accordingly, future research can apply multilevel analysis in this issue, for instance, the indirect effect of team-level trust on the relationship between individual ambidexterity and interpersonal knowledge transfer. In addition to conducting the cross-level analysis, future research might pay attention to different organizational levels, including teams, units, and organizations. As emphasized in the literature review section of the paper, ambidexterity can be an organizational character, and knowledge can flow across the whole organization. Therefore, different levels of analysis might introduce new insights into this topic.

Finally, I limited the focus of this paper by exploring the mediating effects of perceived trustworthiness on the relationship between individual ambidexterity and knowledge transfer outcome. Although it brings valuable discovery to this relationship, future studies can take the roles of moderators into account. Based on the results of control variables, knowledge character negatively correlates to perceived usefulness of knowledge. Future research can include the interaction effect of knowledge character. Other knowledge transfer related factors can also be included to explore their moderating effects.

8 Conclusion

This paper has chosen to explore the two new fields of ambidexterity and knowledge transfer to closer examination. The first and second section provides readers with a general background of ambidexterity, trust, and knowledge transfer. We have seen that prior literature is concentrated on organizational ambidexterity and knowledge transfer within or across firms. Conceptual and empirical analyses about these two domains: individual ambidexterity and interpersonal knowledge transfer are scarce. From the view of organizational learning theory, the linkage of ambidexterity and knowledge transfer effectiveness manifests in the two seemingly paradoxical activities: exploration and exploitation. The individual capacity to simultaneously and synchronously pursue exploration and exploitation is expected to facilitate knowledge transfer effectiveness. In parallel, trustworthiness is described as an ambidextrous individual competence (Hafkesbrink et al., 2012), which is also taken as an antecedent or mediator of knowledge transfer effectiveness (Levin & Cross, 2004; Brachos et al., 2007). Inspired by the internal linkage of the three subjects, I attempted to uncover their interesting relationships to expand the current interpersonal knowledge transfer literature.

Responding to the call that the influence of individual factors on knowledge transfer needs further exploration (Wang & Noe, 2010), this research provides a cross-industry empirical survey, examining direct and indirect relationships among individual ambidexterity, perceived trustworthiness and corresponding effectiveness of knowledge transfer. The research design follows the approach of Levin and Cross (2004), as I sought to identify the mediating role of two forms of trustworthiness (benevolence-/competence-based trust) in the relationship of individual ambidexterity and knowledge transfer effectiveness among

employees. The empirical study concentrates on the knowledge that improves the performance of a knowledge recipient's work. Further, this study focuses on the effectiveness of dyadic knowledge transfer, instead of the propensity to seek out knowledge sources, or the willingness to share knowledge. To measure the effectiveness of knowledge transfer, "perceived usefulness of knowledge" is used as a proxy (Levin & Cross, 2004; Brachos et al., 2007). The target group of the online survey is individuals working in teams, as the shared task and the common goal within a team make for the judgment of useful knowledge.

As indicated, the results of empirical analysis are consistent with the hypotheses, with one exception. First, individual ambidexterity is positively associated with knowledge transfer effectiveness. Second, individual ambidexterity is positively associated with the benevolence-based trust and the competence-based trust developed by knowledge recipients. Most importantly, individual ambidexterity influences knowledge transfer through the competence-based trust in knowledge sources. It is worth noting that competence-based trust fully mediates the relationship between individual ambidexterity and perceived usefulness of knowledge. Contrary to competence-based trust, benevolence-based trust does not mediate the relationship between individual ambidexterity and perceived usefulness of knowledge. As for the results of alternative model, we can note that benevolence-based trust plays a significant role in building individual ambidexterity and competence-based trust. Benevolence-based trust impacts perceived usefulness of knowledge mainly through the contribution to competence-based trust. To sum up, competence-based trust is the key predictor of perceived usefulness of knowledge. Both individual ambidexterity and benevolence-based trust influence perceived usefulness of knowledge through the factor:

competence-based trust. Individual ambidexterity and benevolence-based trust have reciprocity.

As a contribution to theory, this research demonstrates the role of competence-based trust as a mechanism whereby individual ambidexterity enables effective knowledge transfer. Therefore, if managers wish to enhance knowledge transfer effectiveness, competence-based trust can be a breakthrough to make a difference. As for benevolence-based trust, it is a condition of knowledge transfer, even though it does not show a significantly direct effect on perceived usefulness of knowledge, when considering the effect of competence-based trust. Furthermore, the study provides evidence that ambidextrous individuals indeed tend to believe knowledge sources' competence, leading to a higher level of identification of useful knowledge. Ambidextrous individuals, thereby, are likely to have better performance in identifying, assimilating and applying knowledge received. In doing so, selecting ambidextrous individuals as participants could improve knowledge transfer effectiveness.

Last but not least, post hoc analysis enlightens us that for people working in teams, exploitation-based individuals and ambidextrous individuals have the similar level of perceived usefulness of knowledge. This implies that when cultivating ambidexterity is difficult, executives can temporarily concentrate efforts on building exploitation capability, which renders a relatively effective knowledge transfer. As individual capacity improves, efforts should turn to the cultivation of exploration capacity. In doing so, organizations can make full use of individual ambidexterity in knowledge transfer, through the competence-based trust.

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Appendix: Survey items

Construct	Item
Exploration (Mom, van den Bosch, & Volberda, 2009)	To what extent, did you, last year, engage in work related activities that can be characterized as follows:
	Searching for new possibilities with respect to products/services, processes, or markets.
	Evaluating diverse options with respect to products/services, processes, or markets.
	Focusing on strong renewal of products/services or processes.
	Activities of which the associated yields or costs are currently unclear.
Exploitation (Mom, van den Bosch, & Volberda, 2009)	Activities requiring quite some adaptability of you.
	Activities requiring you to learn new skills or knowledge.
	Activities that are not (yet) clearly existing company policy.
	To what extent, did you, last year, engage in work related activities that can be characterized as follows:
	Activities of which a lot of experience has been accumulated by yourself.
Benevolence-Based Trust (Levin & Cross, 2004)	Activities which you carry out as if it were routine.
	Activities which serve existing (internal) customers with existing services/products.
	Activities of which it is clear to you how to conduct them.
	Activities primarily focused on achieving short-term goals.
	Activities which you can properly conduct by using your present knowledge.
Competence-Based Trust (Levin & Cross, 2004)	Activities which clearly fit into existing company policy.
	Prior to seeking information/advice from this person on this task, I assumed that he or she would always look out for my interests.
Perceived Usefulness of Knowledge (Levin & Cross, 2004) (Brachos et al., 2007)	I assumed that he or she would go out of his or her way to make sure I was not damaged or harmed.
	I felt like he or she cared what happened to me.
	Prior to seeking information/advice from this person on this task, I believed that this person approached his or her job with professionalism and dedication.
	Given his or her track record, I saw no reason to doubt this person's competence and preparation.
	The information/advice I received made (or is likely to make) the following contribution to:
Tacit Knowledge (Levin & Cross, 2004)	Client satisfaction with the task.
	The team's overall performance.
	The task's value to my team.
	This task's quality.
	This task's coming in on budget or closer to coming in on budget.
	Reducing costs on the task.
	Shortening the time this task took.
	My being able to spend less time on the task.
Tacit Knowledge (Levin & Cross, 2004)	Was all this information/ advice sufficiently explained to you in writing (in writing reports, manuals, e-mails, faxes, etc.)?
	How well documented was the information/advice that you received from others?
	What type of information/ advice you get in the task?