This is the peer reviewd version of the followng article:

Knowledge transfer in the context of buyer-supplier relationship exchange: an analysis on supplier’s customers portfolio / Vignola, Marina; Marchi, Gianluca; Balboni, Bernardo. - (2016), p. 82. (Intervento presentato al convegno 32nd Annual IMP Conference – Change and Transformation of Markets, Network and Relationships tenutosi a Department of International Marketing together with Department of Marketing Strategies of Poznan University of Economics and Business nel 30.08-3.09.2016).

N/A
Terms of use:

The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. For all terms of use and more information see the publisher's website.

25/04/2024 09:39

(Article begins on next page)

Knowledge transfer in the context of buyer-supplier relationship exchange: an analysis on supplier's customers portfolio

Vignola M., Marchi G., Balboni B.

Bernardo Balboni
University of Trieste – Department of Economics, Management, Mathematics, and Statistics "Bruno de Finetti"
Research Fellow
Via Valerio 4/1 – 34127 Trieste
Phone: +39 040 558 7927
e-mail: bernardo.balboni@deams.units.it

Gianluca Marchi
University of Modena and Reggio Emilia – Department of Economics Marco Biagi
Full Professor
Viale Berengario, 51 – 41121 Modena
Phone: +39 059 2056864
e-mail: gianluca.marchi@unimore.it

Marina Vignola (corresponding author)
University of Modena and Reggio Emilia – Department of Economics Marco Biagi
Assistant Professor
Viale Berengario, 51 – 41121 Modena
Phone: +39 059 2056948
e-mail: marina.vignola@unimore.it

Abstract
In a context of buyer-supplier relationship exchange, the paper analyzes the role of formal and informal mechanisms to transfer knowledge and the direct and moderating effect of trustworthiness, as relational dimensions, to understand how customer acquires knowledge from its supplier. Results, related to a sample of 105 customers belonging to an Italian medium-sized manufacturer's customer portfolio, show that both formal and informal transfer mechanisms positively impact on knowledge acquisition.Ttrustworthiness moderates positively the effect of informal transfer mechanisms and negatively the effect of formal transfer mechanisms on knowledge transfer.

Keywords: buyer-supplier relationship, knowledge transfer, formal and informal transfer mechanisms, trustworthiness, strategic relationship

Work in progress paper

INTRODUCTION

In long-term buyer-supplier relationships both parties are directly active in the knowledge exchange with their counterparts. Both buying and selling organizations can teach and learn, influence and be influenced (Håkansson & Ingemansson, 2011). The supplier's capacity to provide appropriate information and knowledge to its customers is considered as a fundamental source of value creation (Ulaga & Eggert, 2006). In fact, an industrial firm may significantly improve its knowledge and innovative capabilities by accessing strategic knowledge and capabilities transferred by its supplier through a consolidated relationship (Easterby-Smith et al., 2008). From the customer viewpoint, the potential knowledge transfer includes know-how issues - related to product's and/or service's features, logistical and administrative aspects - and also complex and sticky information (von Hippel, 1998) that can be beneficial for customer to find new solutions for its own market (Håkansson & Ingemansson, 2011).

Transferring knowledge between organizations involves moving pieces of knowledge from one party to another. Many factors may affect the effectiveness and the outcome of the transfer process (Van Wijk et al., 2008), making knowledge transfer a complex phenomenon. Consequently, to understand how to manage the process of inter-organizational transfer of knowledge from supplier to its customer firms, has become one of the most prominent theoretical and managerial issues (Squire et al., 2009).

Prior research examining vertical inter-firm knowledge transfer has analysed almost exclusively relational aspects, mainly focusing on the supplier's knowledge acquisition (Yli-Renko & Janakiraman, 2008) or on interfirm overall knowledge exchange (Squire et al., 2009). Very little is known about the effectiveness of knowledge transfer and acquisition from the customer perspective and the role of both relational context and formal and informal transfer mechanisms (Easterby-Smith et al., 2008). The aim of the analysis is to understand the knowledge transfer process in a supplier-customer relationship focusing on the customer perspective.

More specifically, the purpose of the study is to assess the relevance of relational aspects and transfer mechanisms in stimulating knowledge transfer within a specific supplier's customer portfolio, in which the type of relationship can authentically vary from adversarial to cooperative (Möller & Halinen, 1999). As regards relational context, we analyse the influence of supplier's trustworthiness, emphasizing the causal and moderating impacts of trustworthiness (Jiang et al., 2011; Becerra et al., 2008).

The paper is structured as follows. The following sections propose a short discussion of literature addressing the topic of the role of supplier customer portfolio, transfer mechanisms and inter-firm trustworthiness, and the research hypotheses of the study. The methodology (data collection, sample and measures) are highlighted in the fourth section, while the findings related to a sample formed on a specific customer portfolio of an Italian medium-sized manufacturer are presented in the fifth. Finally, discussion and implications of the findings, and the study's limitations and directions for further research, are examined in the last two sections of the paper

THEORETICAL BACKGROUND

Knowledge transfer from supplier perspective: the role of its customer portfolio

Suppliers provide value for their customer bases in several ways (Möller & Törrönen, 2003; Möller, 2006). Value creation can be expressed through a continuum level of complexity, from standardized core value solutions till a radical innovations characterized by an high-risk

value potential, that requires different level of knowledge transfer toward customers (Möller & Törrönen, 2003). Along this continuum, the supplier's capacity to provide appropriate knowledge to its customers should be considered as a fundamental source of value creation (Ulaga & Eggert, 2006).

Suppliers can pursue different value creation strategies simultaneously on the basis of the prioritization of its customer portfolio (Homburg et al., 2009). Portfolio literature suggests different ways of prioritizing customers into homogeneous subsets on the basis of their actual or potential value (Campbell & Cunningham, 1983; Zolkiewski & Turnbull, 2002; Balboni & Terho, 2016). From supplier perspective, it demands a deep understanding of the customer value creation strategies with different types of customer's subsets. The idea of managing customer relationships as portfolios reflects the aim of optimizing the resources of the firm (Terho, 2009). Customer relationships, in terms of both type and number, can be viewed as resources that suppliers should be able to evaluate and activate on the basis of their capacity to develop customer-specific strategies and to transfer the potential relevance of their solutions. Hence, the management of customer relationships involves effective differentiated resource allocation in order to reach a customer portfolio balance, which can be considered as the main goal of customer portfolio management activities (Terho, 2009).

As an industrial supplier is involved in different types of customer relationships, and respectively in different types of value-creation strategies, there is a need for better understanding of effective knowledge transfer process within the overall customer portfolio (Möller, 2006). In this paper the dyadic exchange relationship, between supplier and customer, will be analysed from the customer perspective taking into consideration a specific portfolio's domain (Möller & Halinen, 1999). This allows to better deepen the effectiveness of industrial supplier knowledge transfer management in respect to each customer within its overall portfolio.

Knowledge transfer from the customer perspective

An industrial customer may significantly improve its knowledge and innovative capabilities by acquiring knowledge from external, through the transfer of knowledge across a consolidated supplying relationship (Inkpen, 2000). The relevance to acquire knowledge from external is due to the fact that, in the actual turbulent business environment, knowledge has become a dominant source of industrial firms' competitive advantage. In fact, knowledge is the basis of the firm's ability to develop new applications and contribute to organization's performance and innovativeness. However, industrial customers face many difficulties to internally develop knowledge or to acquire it through a pure market transaction. These problems increase the opportunity to access relevant knowledge held by suppliers through consolidated relationships.

Knowledge is distinguished between tacit and explicit, where tacit knowledge, which is non-verbalized, intuitive, and experiential knowledge, is more valuable, having the potential for generating greater benefits since it is harder to be imitated and acquired (Nonaka, 1994; Lei et al., 2001; Inkpen, 2000). From a resource-based view of the firm (Barney, 1991; Grant, 1996), tacit knowledge is considered an important basis for competitive advantage. Conversely, explicit knowledge can be coded and transmitted in formal and systematic language (Chen, 2004; Alvarez & Busenitz, 2001).

A significant component of the interfirm transferred knowledge may be tacit and not easily to be codified, since it is often embedded in social relations (Nonaka & Takeuchi, 1995; Cousins & Menguc, 2006), context-specific and hard to formalise and communicate. Its ambiguity makes the interfirm knowledge transfer a complex, costly and slow process (Cohen & Levinthal, 1990; Galbraith, 1990), due to its multifaceted nature and constraints

that limit the firm's ability to deliver and to absorb knowledge, and often knowledge transfer fails (Van Wijk et al., 2008). In fact, there are many factors that may affect the effectiveness and the outcome of the transfer process.

RESEARCH HYPOTHESES

The understanding of how the interfirm knowledge transfer occurs and is managed has been the focus of several studies (see Van Wijk et al., 2008 for a review). Drawing upon the networks literature (e.g. Burt, 2005) and the extended resource- based view (ERBV) of the firm (e.g., Squire et al., 2008), the purpose of this study is to understand the factors that may affect the transfer process from supplier to its customer base, supporting or hindering its speed and efficacy. In particular, these elements are related to two aspects (Van Wijk et al., 2008; Pérez-Nordtvedt et al., 2008): the characteristics of mechanisms used to transfer knowledge (Mason & Leek, 2008); and the characteristics of the relationship between the supplier (as source) and the customer (as recipient), in terms of relational dimensions, such as trustworthiness (Szulanski et al., 2004)

Transfer mechanisms can be distinguished between formal and informal (Mason & Leek, 2008). The formal mechanisms lay on physical forms of indirect communication, such as databases, knowledge repositories, reports, documents, blueprints (Mason & Leek, 2008). These formal mechanisms support the knowledge transfer since they favor the codification of some pieces of knowledge that can be transmitted in formal, systematic language or representation (Lei et al., 2001). The informal mechanisms lay on non-physical forms of direct communication, which include inter-organizational work teams, meeting, social interaction, visiting, people's mobility, transferring experienced personnel (Inkpen, 2000; Mason & Leek, 2008). These informal mechanisms favor the transfer of knowledge which is not easy to be codified (Lei et al., 2001), as the tacit knowledge that can be transferred effectively just by putting people to work together, creating learning spaces, as 'communities of practice' (Wenger, 1999), where to share experiences through practice, direct contact and observation of behaviors (Nonaka & Konno, 1998; Cavusgil et al., 2003; Sammarra & Biggiero, 2008).

Since the interfirm knowledge transfer can involve both tacit and explicit knowledge, the transfer process needs to be supported by both formal and informal knowledge transfer mechanism (Mason & Leek, 2008). Therefore, we propose that:

Hypothesis 1a: *The formal knowledge transfer mechanisms have a positive effect on the entity of knowledge transferred by the supplier to the customer.*

Hypothesis 1b: *The informal knowledge transfer mechanisms have a positive effect on the entity of transferred knowledge by the supplier to the customer.*

As before highlighted, an important part of transferred knowledge resides within the interaction between the members of the organizations involved (Squire et al., 2009).

The transfer of information and knowledge, from supplier to customers, tends to assume the presence of supplier trustworthiness. From the customer perspective, supplier trustworthiness reflects the customer belief that the supplier's promises are reliable and that supplier will fulfill its obligations in the relationship (Lane et al., 2001).

In the context of knowledge transfer, perceived trustworthiness can create a sense of security in the suitable use of knowledge, reducing the uncertainty related to the partner opportunistic behavior (Dhanaraj et al., 2004; Lane et al., 2001; Szulanski, 1995; Becerra et al., 2008; Szulanski et al., 2004; Welter, 2012) and increasing the openness in the relationship (Das & Teng, 1998). When customer believes in supplier trustworthiness, in relation to his

competence, integrity and reliability, customer expects that supplier will behave in his interest, only transferring information that is accurate, important and relevant (Squire et al., 2009). Then, customer should be more open and willing to listen and absorb new knowledge from its supplier (McEvily et al., 2003; Inkpen, 2000; Geneste & Galvin, 2015).
Taking the customer perspective, we then propose that:

Hypothesis 2: *The supplier trustworthiness has a positive effect on the entity of transferred knowledge by the supplier to the customer.*

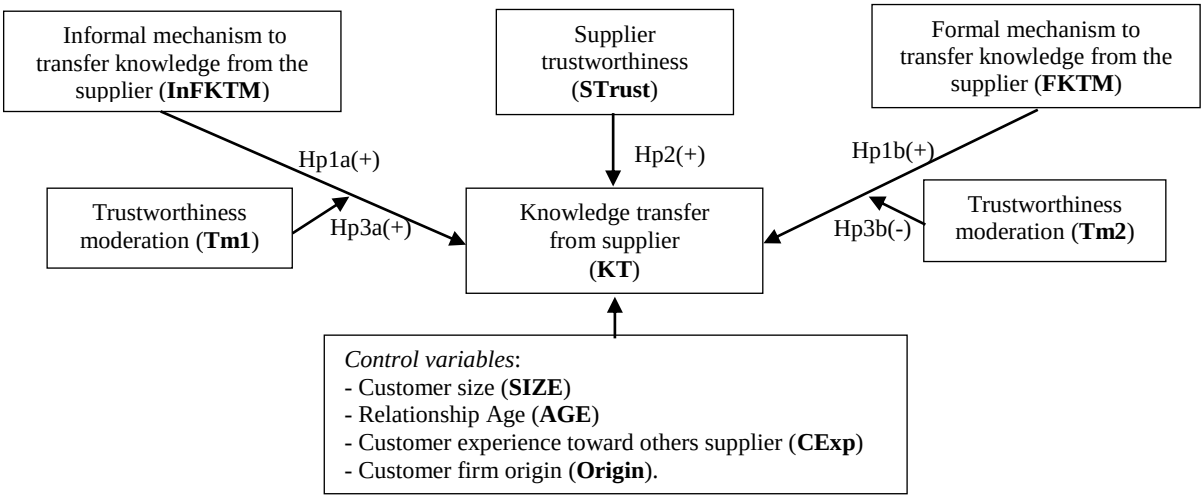
In line with Squire et al. (2009), the role of trustworthiness on knowledge transfer process can be considered not only as a direct but also as a moderating effect. In our study we consider the effect of supplier's perceived trustworthiness on the relation between transfer mechanisms and the amount of knowledge being transferred.
As we discussed before, the main difference between the two types of transfer mechanisms, informal and formal, is the context in which they are used to transfer different kind of knowledge. While the informal mechanisms are strictly based on social interaction (Håkansson & Ingemansson, 2011) and practice and need of direct communication to transfer tacit knowledge (Mason & Leek, 2008), the formal mechanisms are physical tools which don't need close interaction and direct communication to transfer explicit knowledge. In fact, while tacit knowledge is embedded in social relations and transferred mainly through direct contact and direct observation of behavior, explicit knowledge is codified and transferred in formal tools, as written documents (Becerra et al., 2008).
According to Inkpen and Dinur (1998), given that transfer process of tacit knowledge occurs through interaction among individuals, the effectiveness of this process needs an high trust context (Becerra et al., 2008). The perceived supplier trustworthiness can increase the customer confidence in the accuracy and completeness of the knowledge (Inkpen, 2000; Inkpen & Currall, 2004). In this context, customers are more likely to accept knowledge without verification (McEvily et al., 2003), especially when this particular knowledge is based on supplier experience, as the case of tacit knowledge. Therefore, it is reasonable to suppose that, when supplier is considered trustworthy, the amount of tacit knowledge transferred through informal mechanisms is higher (Inkpen & Dinur, 1998; Lubatkin et al., 2001). Consequently, even though informal transfer mechanisms increases the tacit knowledge transfer, their impact will be even greater when the other party is considered trustworthy (Squire et al., 2009).
In the case of formal mechanisms used to transfer explicit knowledge, its use can be effective independently of the individuals involved in the exchange, since codified knowledge, needs less effort in communication and interaction to be successfully transferred (Szulanski & Cappetta, 2003). According to Dhanaraj et al. (2004), explicit knowledge, which requires low socialization in the transfer process, is less connected to supplier's trustworthiness. Then we can argue that formal mechanisms, which imply low social interaction, are less dependent on supplier trustworthiness to transfer explicit knowledge. Furthermore, given that tacit knowledge is considered more valuable than explicit knowledge (Geneste & Galvin, 2015; Pérez-Nordtvedt et al, 2008) for competitive advantage, the transfer of tacit knowledge is more relevant than explicit knowledge for knowledge recipient. When the other party is trustworthy for his competence and credibility, we can suppose that the level of tacit knowledge acquired through informal mechanisms based on closed interaction is greater than explicit knowledge acquired through formal mechanisms based on physical tool (Levin & Cross, 2004). Therefore, although formal transfer mechanisms increases the explicit knowledge transfer, when the parties are considered trustworthy the amount of knowledge that is being transferred is lower.

Based on this reasoning, we propose the following hypotheses:

Hypothesis 3a: *The relationship between informal knowledge transfer mechanisms and transferred knowledge is strengthened when supplier trustworthiness is high.*
Hypothesis 3b: *The relationship between formal knowledge transfer mechanisms and transferred knowledge is weakened when supplier trustworthiness is high.*

Figure 1 shows the theoretical model and our research hypotheses.

Figure 1 – The theoretical model



METHODOLOGY

Data collection and sample

In order to analyse supplier's knowledge contribution to its customer base, we conduct a survey on a specific customer portfolio of an Italian medium-sized manufacturer of milking systems solutions. This portfolio is composed by nearly 250 established relationships with customers firms: Original Equipment Manufacturers (OEMs) and technical dealers. About 77% of the customer portfolio is composed by foreign firms located in 70 countries and more, with which the Italian supplier firm realizes more than 90% of total sales revenue. Overall, 105 customer firms accepted to collaborate to our survey, with a return rate of 42% of the customer portfolio. The 105 supplier–buyers dyadic relationships are the object of our study and form the sample we used for the analysis.
To collect data we used the questionnaire technique. The structured questionnaire, with items based on a seven-point Likert scale, was divided into two sections: the first covered questions regarding the customer firm's profile (related to location of company's headquarters; company sales revenue, number of employees and value of total supply for 2014). The second section was related to the effectiveness of the knowledge transferred from the supplier.
In line with Liu et al. (2009) suggestion, the Italian version of the questionnaire was translated in English, Russian, Spanish and Portuguese. Next, four linguistic experts back translated each foreign version again in Italian to compare every back translated versions with the original one, to guarantee uniformity meaning between the four versions and the original version. After to have corrected some inconsistencies, we submitted on line the final

versions between February and June 2015. To identify the key informant and to verify his/her correct profile to ensure data validity, respondents were selected according to several criteria (Liu et al., 2009): how long the informant have been involved in purchase activities (on average, 13 years), have worked for the current firm, and have been engaged in purchasing activity for this company (on average, 13 and 10 years respectively). Of the respondents, 65% were either the CEO or a member of the board of directors; while the remaining 35% were executives of supply department, accountant, or technician. The resulting key informant profile offered reliable information for our study.

The potential for non-response bias was checked by comparing the characteristics of the respondents with those of the original population sample: t-statistics for the number of employees, sales revenue and total supply were all statistically insignificant, suggesting that there are no significant differences between the respondent and non-respondent groups.

Furthermore, in order to check the possibility of common method bias (Scott & Bruce 1994), we employed Harman's one-factor test using principal component analysis of all the items. The single factor accounts only for 28% of the variance, excluding the possibility of common method bias.

The sample is mainly composed by small- medium sized firms (78% of the sample), with less than 50 employees and 11 million of turnover in average. About 77% of sample firms have a size smaller than the Italian supplier size, and on average, they acquire from Italian supplier 15% of their total purchases. The average age of the relationship is five years and more (only for the 35% of the sample the age is between 1-5 years). The 78% of the firms investigated are foreign customers, mainly located in Western Europe, Eastern Europe and Far East (22%, 18% and 12% of sample, respectively), while the others are located in North and South America, Russia, China, Oceania, Middle East and North Africa.

Measurements model and analysis

The model constructs that we used were developed on the basis of the existing inter and intra-firms knowledge transfer literature and adapted to the current study (table 1).

The transferred knowledge (KT), related to market and product-process knowledge, is measured by a 13-items scale borrowed from Maurer et al. (2011) and Tsang (2002). The two variables related to informal and formal transfer mechanisms are originally operationalized respectively by an eight and six-items scale, both derived from Mason and Leek (2008), Sammarra and Biggiero (2008), Inkpen (2000) and Squire et al. (2009). Finally, supplier's trustworthiness, described by three dimensions – benevolence, credibility and competence – is originally operationalized by a nine-items scale adapted from scales of Jiang et al. (2011) and Becerra et al. (2008).

Control variables. Although no specific hypotheses were developed, we controlled for four variables that might be associated with knowledge transfer: customer experience (CExp), supplier-customer relationship age (AGE), customer firm size (SIZE) and customer firm origin (Origin).

The customer experience (CExp) refers to the customer firm's experience in interfirm collaborations, that can refine the skills necessary for managing, monitoring, and acquiring new knowledge from relationships (Simonin, 1999). Customer experience (CExp) was operationalized by a two-item scale adapted from that of Inkpen (2000) and Simonin (1999).

The longevity of the relationship (AGE) supports the growth of collaborative experience and a better reciprocal understanding that may favor the transferred knowledge. To measure the relationship age, respondents were asked to indicate the number of years for which their company had been engaged in the relationship with supplier. Customer firm size (SIZE) can approximate the customer's capacity to absorb knowledge from the supplier. The variable is

measured by the natural logarithm of the number of customer firm employees. Finally, customer firm origin (Origin) is measured by a dummy variable that distinguishes between international (1) and Italian (0) customer firms.

Before testing the hypotheses, we assessed the psychometric properties of the multi-item scales used to measure our variables. Confirmatory factor analysis was performed, using Lisrel 8.7 program, to purify the scales and to verify whether the indicators, grouped according to theoretical assumptions, are valid measures (Bagozzi & Yi 2012). We used the covariance matrix as input and the Maximum Likelihood fitting function as our estimation procedure (Steenkamp & Van Trijp 1991). Indicators whose standardized coefficients (λ) were below 0.4 and whose student t-test statistic was lower than 1.96 were removed. We then dropped one item from Trustw scale ("when customer makes important decisions, the supplier is sincerely concerned about customer good results"), and two item respectively from the InKTM scale ("informal meetings between the general managers of the two companies" and "meeting during exhibitions") and FKTM scale ("training activities" and "newsletters and social networks").

We assessed the overall goodness of fit of the purified measurement model with this combination of indexes: Chi-Square 741.140; Df 486; Chi-Square/Df< 1,52; NFI 0.93; NNFI 0,97; CFI 0,97; IFI 0,97; RMSEA 0,071, SRMR 0,066.

Table 1 displays the final set of items used for the analysis.

Table 1 – Measures used in the study: The constructs' reliability and validity

Questionnaire items *(1= Not at all; 7= Completely)*	**Standardised factor loading**	**R^2 value**	**t-value**	**Mean**
Transferred knowledge from the supplier, in relation to …(**KT**) (*Cronbach'α =0,964; CR=0,964; AVE=0,678*)				
1. dealings with the final market	0,848	0,719	10,73	3,96
2. identification of final market opportunities	0,831	0,691	10,40	4,00
3. sales' methods to final customers	0,916	0,840	12,21	3,59
4. customer services	0,849	0,720	10,74	3,96
5. consumer purchase behaviour	0,900	0,810	11,83	3,63
6. competitors' behaviour	0,816	0,665	10,10	3,80
7. final market distribution channels	0,921	0,848	12,31	3,56
8. supply market	0,827	0,683	10,31	3,69
9. potential business or production partners	0,859	0,738	10,95	3,84
10. market infrastructures (for example logistic and transport systems)	0,793	0,629	9,68	3,37
11.Italian business regulations and laws	0,682	0,466	7,86	2,91
12. product technological know-how	0,609	0,371	6,80	4,61
13. technological know-how concerning the manufacturing process of the end customer	0,793	0,628	9,68	3,80
How often the following tools are used by customer personnel for acquiring knowledge by supplier				
Informal knowledge transfer mechanism (InKTM) (*Cronbach'α =0,918; CR=0,919; AVE=0,656*)				
1.regularly planned meetings	0,857	0,735	10,76	2,79
2. meetings called when necessary	0,782	0,611	9,34	3,47
3.seminars and workshops (for example, open days)	0,859	0,738	10,80	2,51
4. team-work involving both companies	0,824	0,680	10,12	3,14
5. social activities (events, parties, dinners, anniversaries, etc.)	0,770	0,593	9,14	2,57
6. business visits at the supplier company	0,761	0,580	8,99	3,44
Formal knowledge transfer mechanism (FKTM) (*Cronbach'α =0,849; CR=0,848; AVE=0,583*)				
7. product descriptions. information booklets. company reports	0,721	0,520	8,16	4,46
8. clips (demo about business products)	0,796	0,634	9,38	3,78
9. databases and data in general	0,811	0,657	9,63	3,24
10. specialized magazines suggested or printed by the supplier	0,722	0,523	8,19	3,44
Supplier's trustworthiness (TRUSTW) (*Cronbach'α =0,954; CR=0,959; AVE=0,746)*				
1. When customer shares its problems with the supplier, the supplier responds with understanding	0,796	0,633	9,73	5,34
2. Customer is confident that the supplier will never make decisions that could affect negatively the customer	0,702	0,493	8,16	4,95
3. This supplier is open-minded in dealing with customer	0,866	0,749	11,08	5,66
4. This supplier is honest in dealing with customer	0,884	0,781	11,47	5,76

5. This supplier's competence in performing their job is good	0,924	0,854	12,38	5,90
6. Customer feels confident about the supplier's skills	0,916	0,839	12,20	5,97
7. The supplier is believed to be trustworthy in what it tries to do.	0,952	0,906	13,07	5,91
8. The supplier is provided with the necessary knowledge to make a very good job	0,843	0,711	10,63	5,90
Control variable				
Customer experience (CExp) (*Cronbach'α =0,686; CR=0,700; AVE=0,546*)				
1. Customer has a high number of usual suppliers	0,588	0,358	5,92	5,49
2. Customer has very good experience in learning how to acquire knowledge and competencies from its usual suppliers	0,857	0,734	10,60	5,52

The purified measurement model shows good internal consistency, given that the Cronbach's α is higher than .849 (exceeding the benchmark criterion of 0.7, expect CExP variable, α=0,686), and good discriminant validity, since the composite reliability (CR) and the average variance extracted (AVE) are respectively higher than .700 (Bagozzi & Yi 2012) and .546. Finally, the squared correlation between each pair of constructs (Table 2), the highest of which is .53, is less than the AVE for each individual construct, ranging from .55 to .75, providing evidence of the discriminant validity of the proposed constructs (Fornell & Larcker, 1981). Thus, the constructs possess adequate convergent and discriminant validity.
The model variables are evaluated as score mean of observed items (table 2).

Table 2 – Descriptive statistics and Pearson's correlation matrix *(in brackets, the squared correlation coefficient)*

	Mean	S.D.	1	2	3	4	5	6	7
1.KT	3,75	1,46							
2.InKTM	2,99	1,64	,559**(.31)						
3.FKTM	3,73	1,62	,599**(.36)	,730**(.53)					
4.TRUSTW	5,68	1,34	,422**(.18)	,216*(.05)	,352**(.12)				
5.CExP	5,50	1,30	.184(.03)	.105(.01)	.088(.01)	.189(.04)			
6.AGE	3,40	0,89	,198*	.165	,236*	,338**	,255**		
7.SIZE	2,75	1,72	.126	.029	.03	.014	.107	.008	
8.Origin	.78	.42	.159	,435**	,402**	.054	-.087	-.072	.058

** α < 0.01; * α < 0.05; n. observation: 105

RESULTS

To test our hypotheses, a hierarchical multiple regression analysis was performed (Table 4), in order to control for groups of variables and examine their contribution to R^2 for every model. In the first model we considered the four control variables and the two knowledge transfer mechanisms; in the second the trustworthiness was jointly assessed; and finally, in the third model we added the two interaction effects between trustworthiness and informal and formal knowledge transfer mechanisms. To this end, we created two interaction variables – TRUSTW x InKTM and TRUSTW x FKTM – adopting the method of Marsh et al. (2004). Observed items has been previously mean-centered to reduce the potential problem of multicollinearity that exists when analyzing interaction effects (Cohen, 2003). The variance inflation factor (VIF) test underlines that the multicollinearity between the predictor variables is not a problem (VIF is equal to or less than 2.87, well below the recommended cutoff point of 4).
We found mixed support for our hypotheses (Table 3).
In the first model, the four control variables and the two kind of knowledge transfer mechanisms explain the 43% of the amount of variance in knowledge transfer. While all the control variables are insignificant, both informal and formal mechanisms have a significant and positive effect on knowledge transfer, supporting Hypothesis 1a and 1b, even though the formal mechanisms shows a greater impact (β=.426, T-value: 3.701 α=.000) than the informal mechanisms (β=.293, T-value: 2.549, α=.012). In the second model, where the

effects of the two transfer mechanisms and the trustworthiness are combined, we found that trustworthiness has a positive influence (β=.243, T-value: 2.951, α=.002) on knowledge transfer. Furthermore, informal transfer mechanisms shows a better predictive power observed in the first model (β=.314, t-value: 2.829, α=.006), while formal transfer mechanisms lose part of their effect (β=.338, t-value: 2.949, α=.004), compared to the first model. In the third model, we added the two interaction terms (Table 4) to test the moderator effect of trustworthiness.

Table 3 – Hierarchical multiple regression (t-value in brackets)

	Dependent Variable		
	KT		
Control Variables	Model 1	Model 2	Model 3
Size	.103(1.339)	.104(1.409)	.105(1.436)
Age	.016(.194)	-.042(-.519)	-.037(-.442)
CExp	.089(1.107)	.063(.816)	.097(1.255)
Origin[a]	-.138(-1.565)	-.131(-1.549)	-.140(-1.652)[b]
Independent Variables			
InKTM	.293**(2.549)	.314**(2.829)	.307**(2.819)
FKTM	.426***(3.701)	.338**(2.949)	.352**(3.055)
TRUSTW		.243**(2.951)	.230*(2.627)
Moderator effect of trustworthiness			
TRUSTWxInKTM			.285*(2.439)
TRUSTWxFKTM			-.256*(-2.097)
R^2*(R^2 adjusted)*	.430(.395)	.477(.439)	.509(.462)
F-value	12.306***	12.621***	10.924***
ΔR^2 (model n - model n-1)		.047	.032
F -test of ΔR^2		8.707**	3.085*

[a] 1= Foreign Customers; 0=Italian customers; *** α <.001; ** α <.01; *α <.05; [b] α =.102; N. observations 105

As suggested by Baron and Kenny (1986), the moderator hypothesis is supported if the interaction term is significant. In our study, we find that the two interactions are significant in influencing knowledge transfer (ΔR^2=.032, α <.05). In particular, the interaction between TRUSTW and InKTF on knowledge transfer is significant and positive (β=.285, T-value: 2.439, α=.017). This means that the InKTF–KT relation is stronger when the supplier trustworthiness is high, showing a positive moderation of trustworthiness on the relation between formal transfer mechanisms and knowledge transfer (Hypothesis 3a). In contrast, the interaction between FKTM and TRUSTW on knowledge transfer is significant but negative (β=-.256, T-value: -2.097, α=.039). Therefore, the FKTM–KT relation is weaker when the supplier trustworthiness is high. Thus, Hypothesis 3b is supported.

The moderating effects of trustworthiness are depicted graphically in Figures 2a and 2b (see Appendix A), using the procedure suggested by Aiken and West (1991).

Firstly, high levels of trustworthiness (Figure 2a) are associated with higher levels of knowledge transfer when InKTF increases; while low levels of trustworthiness are associated with lower levels of knowledge transfer when InKTF increases.

Secondly, when TRUSTW is high (Figure 2b), knowledge transfer decreases as FKTF increases; while, when TRUSTW is low, knowledge transfer increases as FKTF increases.

Finally, we found that the four control variables (SIZE, AGE, CExp and Origin) do not influence knowledge transfer in all the regression models.

DISCUSSION AND IMPLICATIONS

Knowledge transfer is an important part of the exchange within buyer-seller relationship (Håkansson & Ingemansson, 2011). To deepen our understanding about how a supplier is able to transfer knowledge to its customer base, the present study examined the role of

knowledge transfer mechanisms and trustworthiness in effectively transferring knowledge from a customer's perspective.

Results showed that both informal and formal knowledge transfer mechanisms are important in favoring the knowledge transfer from a specific supplier to its customer base, in line with others studies (e.g., Mason & Leek, 2008). In particular, formal mechanisms have a greater influence on knowledge transfer than informal mechanisms. Since the interfirm knowledge transfer involves both tacit and explicit knowledge, this result confirms the relevant role of both types of transfer mechanisms in raising the amount of knowledge. In fact, while formal mechanisms support the transfer of explicit knowledge, the informal mechanisms favor the acquisition of tacit knowledge. Thus, the supplier must be able to transfer the potential relevance of its solution to its customer base using both formal and informal knowledge mechanisms (Möller, 2006).

When supplier trustworthiness is considered, we found that this relational dimension has a positive direct effect on knowledge transfer. In line with others studies (Geneste & Galvin, 2015) our result confirms that when customers rely on supplier's credibility, competence, and benevolence, they are more confident of the accuracy and completeness of the knowledge and more opened to receive and acquire it. According to Squire and colleagues (2009), trustworthiness plays not only a direct but also an indirect effect on knowledge transfer process, modifying the impact of both formal and informal mechanism, although in different manner.

When supplier is perceived trustworthy, customer is much more incline towards closely interaction with its supplier and to share its experience and practice. The involvement of customer in intense and direct communication with the supplier enhances the acquisition of knowledge, that is especially tacit and experiential based.

Conversely, in the context of high supplier trustworthiness, the amount of explicit knowledge that is transferred through formal mechanisms (written documents, reports, database) decreases. This occurs because customer firm is more interested in the acquisition of tacit knowledge through direct interaction, given that tacit knowledge is more relevant and valuable than explicit knowledge (Geneste & Galvin, 2015; Pérez-Nordtvedt et al., 2008).

The different moderating role that trustworthiness plays on the relationship between the two types of transfer mechanisms and the amount of transferred knowledge reinforces the idea that informal and formal mechanisms, although jointly used in the daily practice, are different channels through which different kind of knowledge, respectively tacit and explicit, can be transferred between parties involved in a consolidated relationship.

Our findings also offer some interesting insights for the management of knowledge to transfer to each customer within the overall portfolio.

First, marketing managers should be aware of positive impacts that the adoption of both formal and informal mechanisms has on customer's acquired knowledge. In the management of knowledge transfer, different kinds of mechanisms should be accurately selected in order to make a balanced decision about the right amount and the type of knowledge that should be transferred to each customer accordingly to their actual and potential value.

Second, it provides to industrial firm an helpful framework to selectively allocate their efforts devoted to customer's knowledge transfer accordingly to customer-specific knowledge and trustworthiness (Mason & Leek, 2008).

When the level of mutual knowledge is still narrow, supplier should invest more in formal transfer mechanisms that enable to transfer codified knowledge (Mason & Leek, 2008). In this relational context, customer doesn't completely rely on supplier competence and credibility; therefore, codified knowledge has to be preferred when transmitting information about solutions and services provided by the supplier. In a relational context characterised by higher trustworthiness, supplier manager should instead focuses his efforts on improving the

level of interpersonal communication with the customer firm in order to transfer tacit knowledge that cannot be shared in a codified form (Squire et al., 2009). At the same time, his investment on formal transfer mechanisms should be reduced, since the recipient is less interested to this kind of explicit knowledge.
As knowledge transfer represents a cost for the supplier in terms of managerial time, attention, and efforts (Pérez-Nordtvedt et al., 2008), the tailoring of customer-specific knowledge transfer mechanisms becomes essential to better activate value creation strategies.

LIMITATIONS AND DIRECTIONS FOR FURTHER RESEARCH

Our study suffers from some limitations that suggest new directions for further research.
Firstly, the sample used for this study is relatively small. Even though the analysis conduct on a single customer portfolio is not a limitation, to address the small sample issue further research can compare different customer bases to improve the generalization of our findings.
Secondly, although informal and formal knowledge transfer mechanisms are two different types of mechanisms, which can be jointly used to enhance the amount of transferred knowledge, their separation can be problematic (Mason & Leek, 2008). According to Hargadon (1998) formal and informal transfer mechanisms can be linked: the use of one can support the use of the other. Thus, another avenue for future research may be the analysis of their interaction.
Third, in our study we have considered trustworthiness as a unidimensional construct. Nevertheless, it is frequently conceptualized as a multidimensional construct (Becerra et al., 2008): namely, competence, benevolence and credibility based trustworthiness. Thus, future research should test whether each of these dimensions shows a different moderating effects.
Finally, in our study we considered only trustworthiness as specific relational dimension. Further research should more carefully investigate the direct and moderating effect of others relational dimensions, such as relationship strategic importance (Tsang, 2002) and cultural and organizational distance (Lane et al., 2001).

References

Aiken, L. S., & S. G. West, 1991, *Multiple regression: Testing and interpreting interactions*. London: Sage

Alvarez S.A. & Busenitz L.W., 2001, The entrepreneurship of resource-based theory, *Journal of Management*, 27:6, 755–775.

Bagozzi R. P., & Yi Y., 2012, Specification, evaluation, and interpretation of structural equation models, *Journal of the Academy of Marketing Science*, 40:1, 8–34.

Balboni B., & Terho H., 2016, Outward-looking and future-oriented customer value potential management: The sales force value appropriation role, *Industrial Marketing Management*, 53:2, 181-193.

Barney J.B., 1991, Firm resources and sustained competitive advantage, *Journal of Management*, 17:1, 99–120.

Baron R. M., & Kenny D. A., 1986, The moderator mediator variable distinction in social psychological-research: Conceptual, strategic, and statistical considerations, *Journal of Personality and Social Psychology*, 51:6, 1173–1182.

Becerra M., Lunnan R., & Huemer L., 2008, Trustworthiness, Risk, and the Transfer of Tacit and Explicit Knowledge Between Alliance Partners, *Journal of Management Studies*, 45:4, 691–713

Burt R.S., 2005, *Brokerage and Closure: An Introduction to Social Capital*. Oxford: Oxford University Press.

Campbell N., & Cunningham M., 1983, Customer analysis for strategy development in industrial markets, *Strategic Management Journal*, 4:4, 369–80.

Cavusgil S. T., Calantone R. J. & Zhao Y., 2003, Tacit knowledge transfer and firm innovation capability, *Journal of Business and Industrial Marketing*, 18, 6–21.

Chen C., 2004, The effects of knowledge attribute, alliance characteristics, and absorptive capacity on knowledge transfer performance, *R&D Management*, 34:3, 311–321.

Cohen, J., 2003, *Applied multiple regression/correlation analysis for the behavioral sciences*. Mahwah, NJ: Lawrence Erlbaum Associates.

Cohen W. M. & Levinthal D. A., 1990, Absorptive capacity: a new perspective on learning and innovation, *Administrative Science Quarterly*, 35, 128–152.

Cousins P. D. & Menguc B., 2006, The implications of socialization and integration in supply chain management, *Journal of Operations Management*, 24, 604–620.

Das TK & Teng B-S., 1998, Between trust and control: Developing confidence in partner cooperation in alliances, *Academy of Management Review*, 23:1, 491–512.

Dhanaraj C., Lyles M. A., Steensma H. K. & Tihanyi L., 2004, Managing tacit and explicit knowledge transfer in IJVs: the role of relational embeddedness and the impact on performance, *Journal of International Business Studies*, 35, 428–442.

Easterby-Smith M., Marjorie A., Lyles M. A., & Tsang E. W. K., 2008, Inter-Organizational Knowledge Transfer: Current Themes and Future Prospects, *Journal of Management Studies*, 45:4, 678–690.

Fornell C., & Larcker D. F., 1981, Evaluations structural equation models with unobservable variables and measurement error, *Journal of Marketing Research*, 18:1, 39–50.

Galbraith C., 1990, Transferring core manufacturing technologies in high-technology firms, *California Management Review*, 32, 56–70.

Geneste L., & Galvin P., 2015, Trust and knowledge acquisition by small and medium-sized firms in weak client–firm exchange relationships, *International Small Business Journal*, 33:3, 277–298.

Grant R.M., 1996, Towards a knowledge based theory of the firm, *Strategic Management Journal*, 17(winter special issue), 109–122.

Hargadon A., 1998, Firms as knowledge brokers, *California Management Review*, 40, 209–28.
von Hippel, E., 1998, Economics of product development by users: the impact of "sticky" local information, *Management Science*, 44:5, 629-44.
Homburg C., Steiner V. V. & Totzek, D., 2009, Managing Dynamics in a Customer Portfolio. *Journal of Marketing*, 73:5, 70–89.
Håkansson, H., & Ingemansson, M., 2011, Construction companies and how they acquire knowledge through business interaction, *The IMP Journal*, 5:2, 67-78.
Inkpen A. C., & Dinur A., 1998, Knowledge management processes and international joint ventures, *Organization Science*, 9, 454–68.
Inkpen A. C., 2000, Learning through joint ventures: a framework of knowledge acquisition. *Journal of Management Studies*, 37:7, 1019–43.
Inkpen A. C., & S. C. Currall, 2004, The coevolution of trust, control, and learning in joint ventures, *Organization Science*, 15, 586–599.
Jiang Z., Henneberg S.C., & Naudè P., 2011, The importance of trust vis-a` -vis reliance in business relationships: some international findings, *International Marketing Review*, 8:4, 318–339.
Lane P. J., Salk J. E., & Lyles M. A., 2001, Absorptive capacity, learning, and performance in international joint ventures, *Strategic Management Journal*, 22:12, 1139–1161.
Lei D. J., Slocum W. J., & Pitts R. A., 2001, Building cooperative advantage: managing strategic alliances to promote organizational learning, *Journal of World Business*, 32:3, 203–23.
Levin D.Z., & Cross R., 2004, The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer, *Management Science*, 50:11, 1477–1490.
Liu, Y., Y. Luo and T. Liu, 2009, Governing buyer–supplier relationships through transactional and relational mechanisms: Evidence from China, *Journal of Operations Management*, 27: 294–309.
Lubatkin M., Florin J., & Lane P., 2001, Learning together and apart: a model of reciprocal interfirm learning. *Human Relations*, 54, 1353–82
Marsh H. W., Wen Z., & Hau K.-T., 2004, Structural equation models of latent interactions: Evaluation of alternative estimation strategies and indicator construction. *Psychological Methods*, 9:3, 275–300.
Mason K., & Leek S., 2008, Learning to build a supply network: an exploration of dynamic business models, *Journal of Management Studies*, 45:4, 759–84.
Maurer I., Bartsch V., & Ebers M., 2001, The Value of Intra-organizational Social Capital: How it Fosters Knowledge Transfer, Innovation Performance, and Growth, *Organization Studies*, 32:2, 157–185.
McEvily B., Perrone V., & Zaheer A., 2003, Trust as an organizing principle, *Organization Science*, 14:1, 91–103.
Möller K., 2006,. Role of competences in creating customer value: A value-creation logic approach, *Industrial marketing management*, 35:8, 913-924.
Möller K. K., & Halinen A., 1999, Business relationships and networks: Managerial challenge of network era. *Industrial Marketing Management*, 28:5, 413–427.
Möller K. K., & Törrönen P., 2003, Business suppliers' value creation potential: A capability-based analysis, *Industrial Marketing Management*, 32:2, 109-118.
Nonaka I., 1994, A dynamic theory of organizational knowledge creation. *Organization Science*, 5, 14–37.
Nonaka I., & H. Takeuchi, 1995, *The Knowledge Creating Company*, Oxford: Oxford University Press

Nonaka I., & Konno N., 1998, The concept of “ba”, *California Management Review*, 40, 40–54

Pérez-Nordtvedt L., Kedia B.L., Datta D.K., & Rasheed A.A., 2008, Effectiveness and Efficiency of Cross-Border Knowledge Transfer: An Empirical Examination, *Journal of Management Studies*, 45:4, 714-744.

Sammarra A., & Biggiero L., 2008, Heterogeneity and specificity of inter-firm knowledge flows in innovation networks, *Journal of Management Studies*, 45:4, 785–814.

Scott S.G., & Bruce, R.A., 1994, Determinants of innovative behavior: A path model of individual innovation in the workplace, *Academy of Management Journal*, 37:3, 580-607.

Simonin B.L., 1999, Ambiguity and the process of knowledge Transfer in strategic alliances, *Strategic Management Journal*, 20:7, 595–623.

Squire B., Cousins P. D., & Brown S., 2009, Cooperation and Knowledge Transfer within Buyer–Supplier Relationships: The Moderating Properties of Trust, Relationship Duration and Supplier Performance, *British Journal of Management*, 20:4, 461–477.

Steenkamp J. M., & Van Trijp H. C. M., 1991, The use of LISREL in validating marketing constructs. *International Journal of Research in Marketing*, 8:4, 283–299.

Szulanski G., 1995, Unpacking stickiness: an empirical investigation of the barriers to transfer best practice inside the firm, *Academy of Management Journal*, Best Paper Proceedings, 437–41.

Szulanski G. & Cappetta R., 2003, *Stickiness: conceptualizing, measuring, and predicting difficulties in the transfer of knowledge within organizations*. In Easterby-Smith, M. and Lyles, M. A. (Eds), Handbook of Organizational Learning and Knowledge Management. Oxford: Blackwell, 513–34.

Szulanski G., Cappetta R. & Jensen R. J., 2004, When and how trustworthiness matters: knowledge transfer and the moderating effect of causal ambiguity, *Organization Science*, 15, 600–13.

Terho H., 2009, A measure for companies’ customer portfolio management. *Journal of Business-to-Business Marketing*, 16:4, 374–411.

Tsang E. W. K., 2002, Acquiring knowledge by foreign partners from international joint ventures in a transition economy: learning-by-doing and learning myopia, *Strategic Management Journal*, 23:9, 835–54.

Ulaga W., & Eggert A., 2006, Value-based differentiation in business relationships: Gaining and sustaining key supplier status, *Journal of marketing*, 70:1, 119-136.

Van Wijk R., Jansen J. P. & Lyles M. A., 2008, Inter- and intra-organizational knowledge transfer: a meta-analytic review and assessment of its antecedents and consequences, *Journal of Management Studies*, 45:4, 815–838.

Welter F., 2012, All you need is trust? A critical review of the trust and entrepreneurship literature. *International Small Business Journal*, 30:3, 193–212.

Wenger E., 1999, *Communities of Practice. Learning, Meaning and Identity*. New York: Cambridge University Press

Yli-Renko, H., & Janakiraman, R., 2008, How Customer Portfolio Affects New Product Development in Technology-Based Entrepreneurial Firms, *Journal of Marketing*, 72: 5, 131-148.

Zolkiewski J., & Turnbull P., 2002, Do relationship portfolios and networks provide the key to successful relationship management? *Journal of Business and Industrial Marketing*, 17:7, 575–597.

Appendix A - The moderating effects of trustworthiness

Figure 2a – The positive effect of trustworthiness on informal mechanisms-knowledge transfer relationship

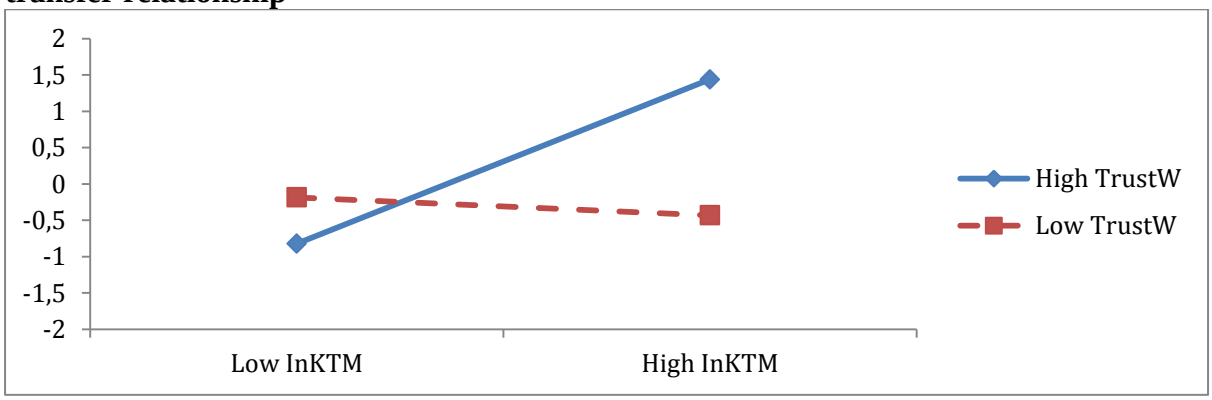
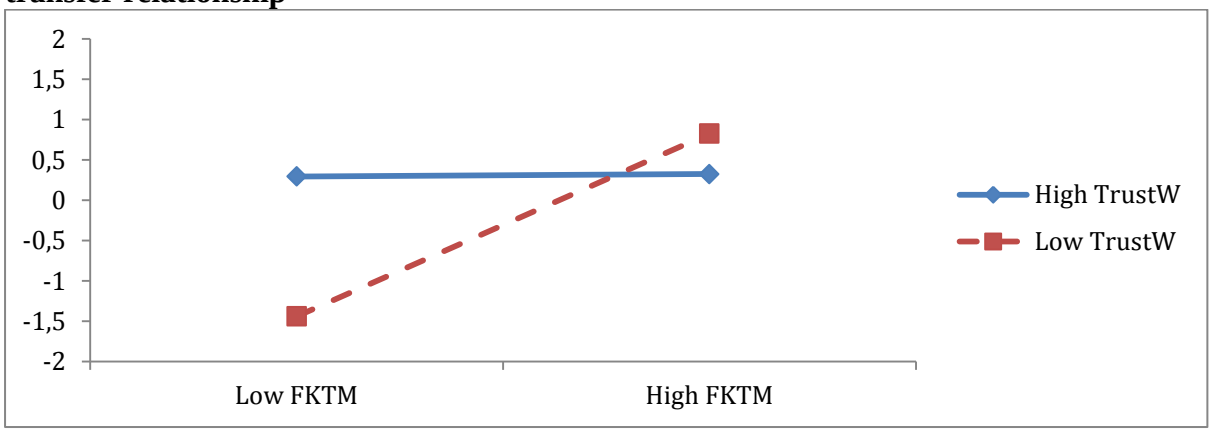



Figure 2b – The negative effect of trustworthiness on formal mechanisms-knowledge transfer relationship