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Intention d'apprendre et diversité des partenaires : effets simples et combinés sur le transfert de connaissances entre alliés

Hamid Mazloomi Khamseh

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Hamid Mazloomi Khamseh. Intention d'apprendre et diversité des partenaires : effets simples et combinés sur le transfert de connaissances entre alliés. Gestion et management. Institut National Polytechnique de Lorraine, 2010. Français. NNT : 2010INPL017N . tel-01754455

HAL Id: tel-01754455

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NANCY UNIVERSITE
INSTITUT NATIONAL POLYTECHNIQUE DE LORRAINE

**ECOLE DOCTORALE SCIENCES ET INGENIERIE DES RESSOURCES,
PROCEDES, PRODUITS, ENVIRONNEMENT (RP2E)**

ÉQUIPE DE RECHERCHE SUR LES PROCESSUS INNOVATIFS (ERPI)

THESE

*Présentée et soutenue publiquement le 30/04/2010
pour l'obtention du grade de Docteur de l'INPL*

(Spécialité: GENIE DES SYSTEMES INDUSTRIELS)

par

Hamid MAZLOOMI KHAMSEH

**Intention d'apprendre et diversité des partenaires:
Effets simples et combinés sur le transfert de
connaissances entre alliés**

Directeur de thèse : Dominique R. JOLLY
Co-directrice de thèse : Laure MOREL-GUIMARAES

Professeur, SKEMA Business School
Professeur, Equipe de Recherche sur
les Processus Innovatifs (INPL)

Composition du jury :

Président du jury : Tarek KHALIL

Professeur, *Nile University* au Caire,
Egypte

Rapporteurs : Pierre DUSSAUGE

Professeur, HEC Paris, (Paris VII)

Emmanuel JOSSERAND

Professeur, HEC Genève

Examineurs : Vincent BOLY,

Professeur, Equipe de Recherche sur
les Processus Innovatifs (INPL)

***A ma chère famille,
avec toute mon affection***

REMERCIEMENTS

*Mes premiers remerciements s'adressent à mon directeur de recherche **M. Dominique Jolly**, professeur à SKEMA Business School pour avoir accepté de me diriger patiemment. Il a toujours su m'encourager au moment où j'en avais besoin et le fait qu'il croit en mes capacités bien plus que moi-même a toujours été une source de réconfort dans les moments d'incertitude qui rythment tout travail de recherche.*

*J'adresse mes remerciements les plus chaleureux à **Mme. Laure Morel-Guimarães**, professeur à l'ERPI (Equipe de Recherche sur les Processus Innovatifs) à l'ENSGSI (Ecole Nationale Supérieure en Génie des Systèmes Industriels) et codirectrice de cette thèse, pour tous les précieux conseils qu'elle m'a donnés et pour son soutien dans les démarches administratives à Nancy qu'elle a toujours fait à ma place.*

*Je voudrais remercier les rapporteurs de cette thèse **M. Pierre Dussauge**, professeur à HEC Paris, et **M. Emmanuel Josserand**, professeur à HEC Genève, pour l'intérêt qu'ils ont porté à mon travail. J'exprime ma gratitude envers **M. Pierre Dussauge** pour les commentaires qu'il m'a donné durant mes travaux de recherche à différentes occasions. Ses commentaires ont enrichi mes travaux de recherche et ont changé considérablement ma façon de penser.*

*J'associe à ces remerciements **M. Tarek Khalil**, professeur à l'Université de Miami et fondateur de l'Association Internationale de Management de la Technologie (IAMOT) et **M. Vincent Boly**, professeur à l'ERPI pour avoir accepté d'examiner mon travail.*

*Je remercie **M. Lionel Nesta**, chercheur au centre de recherche en économie de SciencesPo, au Département de Recherche sur l'Innovation et la Concurrence de l'Observatoire Français des Conjonctures Economiques (OFCE-DRIC), qui a notamment contribué à ma compréhension des problèmes liés à l'analyse statistique des données. En outre, je lui suis reconnaissant de l'accueil, de la patience, et de la disponibilité dont il a fait preuve pour discuter certains des aspects techniques du sujet, mais aussi, pour résoudre les difficultés que j'ai rencontrées avec l'utilisation des modèles économétriques.*

*Je tiens à exprimer ma reconnaissance à **M. Toke Reichstein** pour son accueil chaleureux à Copenhagen Business School (CBS). Le séjour a été trop bref et précipité à mon goût, mais riche d'enseignements, aussi bien sur le plan théorique que pratique.*

*Je souhaite également remercier le personnel de SKEMA Business School pour son accueil chaleureux. A cet égard, je tiens à exprimer ma reconnaissance à sa directrice générale, **Mme. Alice Guilhon**, pour les efforts qu'elle a réalisés afin que j'achève mon travail dans les meilleures conditions possibles.*

*Il est difficile d'exprimer ma gratitude envers mes parents. Ma réussite est la vôtre. Merci à toi maman pour tes prières. Merci à toi papa pour tes encouragements. Vous êtes le vrai sens de l'amour et de la patience. Merci à mes deux chères sœurs, **Lida** et **Maryam** pour tous les mots doux et encourageants que vous m'avez adressé même quand vous étiez dans les situations stressantes. Merci à **Amir**, mon grand frère, qui contrairement à moi, est toujours à coté de ma famille en Iran et son soutien est toujours apaisant dans la vie de ma famille et rassurant pour moi qui suis toujours loin d'eux.*

*Enfin, je remercie particulièrement, mon épouse **Maryam** notamment pour sa patience face à l'instabilité de mes états d'âmes au cours de cette période.*

Que les autres, tous les autres, me pardonnent si, par manque de place, ils ne sont pas cités ici...

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Résumé étendu de la thèse

1) Introduction

L'importance croissante de l'apprentissage organisationnel et son effet sur la performance des entreprises ont motivé les chercheurs pour travailler sur les antécédents et les conséquences du transfert de connaissances entre les organisations et dans les organisations. Kogut (1988) propose trois théories expliquant la formation des alliances. Il suggère qu'au-delà de la théorie du coût de transaction et celle du comportement stratégique, l'apprentissage organisationnel peut être considéré comme une raison d'être des alliances. Cette idée a été développée et choisie par un ensemble des chercheurs et les concepts de transfert inter-organisationnel de connaissance (TIC) et des alliances d'apprentissage sont devenus objets d'études de plus en plus traités des recherches sur les alliances. (e.g: Hamel, 1991; Mowery, Oxley, & Silverman, 1996; Simonin, 1999; Inkpen, 2002). Malgré cet effort, la compréhension du *comment* et du *où* cet apprentissage inter-organisationnel se réalise reste relativement moins exploré (Inkpen, 2002; Inkpen & Tsang, 2007).

Le transfert de connaissances est un processus par lequel les acteurs organisationnels -équipe, unité, organisation- échangent et reçoivent de la connaissance et sont influencés par l'expérience de l'un et de l'autres (Wijk, Jansen, & Lyles, 2008). Ce transfert se manifeste par des changements dans les bases de connaissances ou par des modifications dans la performance de celui et celle qui reçoit la connaissance (Argote, Ingram, Levine, & Moreland, 2000). Ce concepts a été étudié plusieurs fois sous des appellations variées comme transfert de connaissances (Mowery et al. 1996; Tsai, 2001), partage de connaissances (Hansen, 1999; Tsai, 2002), flux de connaissance (Gupta et Govindarajan, 2000; Schulz, 2001) et acquisition de connaissances (Darr, Argote et Epple, 1995; Lyles et Salk, 1996).

La littérature dans le domaine de la recherche sur l'alliance propose plusieurs déterminants pour le TIC, entre autres: les facteurs liés à la nature de la connaissance comme l'ambiguïté (Simonin, 1999), ceux liés aux comportements relationnels des partenaires comme la confiance (Inkpen & Currall, 1998; Smith, Carroll, & Ashford, 1995), et la protection des connaissances (e.g. Norman, 2002; Simonin, 2004). Des caractéristiques dyades comme le chevauchement des bases de connaissance des partenaires, la similarité de leurs secteurs

d'activités (Mowery et al, 1996) et la capacité relative d'absorption (Lane et Lubatkin 1998) ont aussi beaucoup attirées l'attention des chercheurs. (Pour une revue exhaustive des déterminants du TIC c.f. Easterby-Smith, Lyles et Tsang, 2008; Van Wijk, Jansen et Lyles, 2008, Mazloomi Khamseh et Jolly, 2008).

Malgré ces efforts croissants, la variété des contributions au TIC et à la caractérisation de ces déterminants met en évidence des conclusions mitigées. Inkpen (2002) reconnaît ce manque total de contributions. Cependant, partant du constat qu'on a aujourd'hui une base solide de recherches sur les déterminants du TIC, il propose de favoriser les travaux théoriques et empiriques qui intègrent les perspectives diverses et qui établissent des liens entre les variables (Inkpen, 2002. p 277).

Dans ce travail de recherche en mettant l'accent sur l'apprentissage organisationnel, nous étudierons l'apprentissage inter-organisationnel sur la base de deux éléments essentiels: l'intention d'exploration et la disponibilité des nouvelles connaissances à apprendre de la part des partenaires. De plus, nous mettrons un accent particulier sur l'interaction existant entre ces deux aspects afin de montrer son importance. Cette interaction met en lumière les différents types d'alliances exploratoires, qui sont notamment basés sur les notions de profondeur commune de la recherche et sur l'étendue commune du champ d'exploration (Katila & Ahuja, 2002).

En ce sens, les trois éléments essentiels du TIC que nous développerons dans ce travail de recherche sont: l'intention d'explorer, l'existence de nouveautés et le type d'approche d'exploration. Ces trois éléments sont représentés par trois variables: l'intention d'apprendre, la diversité des partenaires et l'interaction existant entre les deux variables précédentes.

Grant et Baden-Fuller (2004) ont proposé une approche pour classifier les alliances selon deux catégories générales : les alliances d'exploration et celles d'exploitation. Selon eux, la création de la connaissance est le résultat des alliances d'exploration. Ils proposent aussi que l'amélioration des bases des connaissances actuelles est la conséquence des alliances d'exploitation. Dans la même veine, nous argumentons :

- que plus une alliance est exploratoire, plus il y a des TIC et donc un apprentissage inter-organisationnel, et
- que les alliances qui sont moins exploratoires (i.e. les alliances d'exploitation) causent moins de transfert de connaissances.

Etant donné que la diversité des partenaires élargit la disponibilité de nouvelles connaissances et donc le processus d'apprentissage, nous la considérons, dans notre recherche, comme représentative d'un degré de nouveauté.

Nous pensons qu'un premier niveau d'interaction entre ces deux aspects que constituent l'étendue du champ de recherche (c'est-à-dire la diversité des partenaires) et le niveau intentionnel d'explorer la connaissance particulière du partenaire, peut être interprété comme un champ possible de recherche pour explorer de nouvelles idées. Un second niveau d'interaction peut-être considéré entre l'intention d'explorer et la similarité des partenaires (c'est-à-dire un niveau très bas de diversité). Ce dernier peut induire un effet d'échelle d'apprentissage à travers un processus d'accumulation de l'expérience similaire afin de trouver de nouvelles idées et des apprentissages communs.

Une première contribution de ce travail de recherche réside dans la confirmation empirique de la thèse soutenue par de Grant et Baden-Fuller (2004). Ces derniers ont argumenté que l'intention d'explorer d'une entreprise a un impact positif sur le TIC. Une seconde contribution de nos travaux est liée à la mise en évidence de l'importance partielle que constitue la nouveauté pour le TIC. En effet, nous montrons que la relation existant entre la diversité des partenaires et le TIC est une fonction courbe (U inversé). Finalement, une dernière contribution porte sur la démonstration que dans le cas de l'existence de similarités entre les partenaires, l'intention d'explorer a un impact positif sur le TIC.

Dans ce document de recherche nous présenterons respectivement, le contexte théorique de la recherche, le modèle développé et les hypothèses sous-jacentes, la démarche méthodologique et les résultats empiriques obtenus. Nous concluons par une discussion et les perspectives de recherche.

2) Bases théoriques de la recherche: Exploration, Nouveauté et Etendue de l'exploration

Au cours de ces travaux, March (1991) s'est intéressé à la dichotomie Exploration / Exploitation et à son intérêt dans la réalisation d'un apprentissage organisationnel. Ce dernier a notamment montré que si l'exploitation engage les ressources existantes, l'exploration va prendre en compte des ressources nouvelles. Dans cette partie de ce travail de recherche, nous allons développer trois éléments constitutifs de la dichotomie exploration et exploitation, à savoir l'*input*, le processus et l'*output*, afin de clarifier leurs définitions qui seront notamment prises en compte pour la suite de notre recherche. Cependant, nous basant sur une littérature récente, nous assumerons à l'issue de cette partie que les ressources existantes peuvent aussi contribuer à l'exploration et que l'accès à de nouvelles ressources et connaissances peuvent

aussi servir pour l'exploitation. Nous mettrons in fine l'accent sur l'effet modérateur de ces deux types de ressources (Existante / Nouvelle) et leurs impacts sur la nature des *outputs* du processus d'exploration.

2.1) Exploitation des ressources existantes vs. Exploration de nouvelles ressources.

March (1991) argumente que dans les activités d'exploitation, l'entreprise utilise ses ressources existantes et que l'apprentissage se réalise par amélioration et raffinement des capacités et des technologies existantes. Par conséquent, la productivité augmente. Par contre, dans les activités d'exploration, l'entreprise cherche à créer de nouvelles capacités, technologies ou des nouveaux produits. « ...l'essence d'exploitation c'est le raffinement et l'extension des compétences, technologies et paradigmes... [et] l'essence d'exploration est l'expérimentation par des nouveaux alternatives » (March, 1991, p. 85)¹. Baum, Li et Usher (2000) suggèrent quand à eux que l'exploitation résulte d'un apprentissage par une recherche locale, un raffinement expérientiel, une sélection et une réutilisation de routines existantes. Par contre, l'exploration résulte d'un apprentissage obtenu à travers une modification des ressources, des expérimentations et des jeux planifiés (Baum et al 2000, 768)².

En ce sens il existe un processus d'apprentissage dans l'exploitation.

En effet, même si une organisation ne pratique que des réplifications d'actions passées, elle accumule des expériences et contribue tout de même à sa courbe d'apprentissage³. Ce dernier point va dans le sens de Gupta et ses collègues qui affirment qu'il n'existe pas de réplification parfait, et donc qu'un apprentissage se crée aussi mineur soit-il (Gupta, Smith, & Shalley, 2006, p. 694)⁴.

Ces différents travaux nous amène à conclure que même dans les activités qui utilisent des ressources et des connaissances existantes, il y a un phénomène d'apprentissage. Ce dernier n'est donc pas limité aux activités qui engagent des ressources et des compétences nouvelles.

2.2) Exploration et Exploitation: deux processus différents.

¹ "The essence of exploitation is the refinement and extension of existing competencies, technologies and paradigms....The essence of exploration is experimentation with new alternative"

² "Exploitation refers to learning gained via local search, experiential refinement, and selection and reuse of existing routines. Exploration refers to learning gained through processes of concerted variation, planned experimentation, and play"

³ Learning Curve

⁴ "There is no such thing as perfect replication. There is always some learning, even if it is relatively little and serves only to reduce variation around the historical mean"

Afin d'analyser le rôle de l'exploration et de l'exploitation dans le contexte d'alliance, une attention particulière doit être portée sur les trois éléments constitutifs de cette dichotomie, comme suggéré précédemment: *Input*, *Processus* et *Output*.

Nous essayons de montrer par la suite, de façon plus détaillée, sur les *inputs* concernent les ressources et les connaissances à fournir au processus d'exploration et d'exploitation, et que les *outputs* concernent le type d'apprentissage et son originalité, et en fin que le processus s'intéresse aux activités à exécuter pour obtenir un *output*. Ainsi nous pouvons définir ces termes de la façon suivante:

- *Output*: le résultat de l'exploitation est un apprentissage qui conduit à une amélioration de la connaissance existante. Le résultat de l'exploration est une nouvelle connaissance, nouveau produit ou nouvelle ressource (McGrath, 2001). En ce sens, l'*output* de l'exploration ajoute de nouvelles connaissances dans la base de connaissances de l'entreprise.
- *Processus*: L'apprentissage exploratoire est la conséquence d'activités comme: la recherche, la prise de risque, la flexibilité, la découverte, l'innovation (March, 1991), la création (Spender, 1992), la poursuite de nouvelle connaissance (Levinthal & March, 1993), la variété et le jeu (Baum et al 2000, 768), la reconfiguration, la recombinaison et le redéploiement (Fleming, 2001; Rosenkopf & Nerkar, 2001). L'exploitation est par contre la conséquence d'activités moins risquées comme l'amélioration, le raffinement, la sélection, la production, l'implémentation, l'exécution (March, 1991), l'application (Spender, 1992), l'usage et le développement de choses déjà apprises (Levinthal & March, 1993).
- *Input*: le troisième aspect de cette dichotomie concerne la source de la connaissance et les ressources engagées dans le processus pour créer un *output* de type exploitation ou exploration. Selon March, l'exploration est le résultat des activités d'expérimentation et de découverte sur des ressources nouvelles (ressources au-delà de la base de connaissances de l'organisation). Ceci induit que l'entrée de processus d'exploration doit être une connaissance ou une ressource *nouvelle*. Par contre, l'exploitation est définie par des activités d'exploitation des ressources et des connaissances *actuelles* de l'organisation (e.g. March, 1991). Les derniers travaux portant sur cette dichotomie montrent que, quel que soit le type des *inputs* pour le

processus, c'est la nature des activités du processus (exploratoire et exploitation) et la nouveauté du résultat obtenu qui comptent pour caractériser un apprentissage comme étant de type exploration ou exploitation. A titre d'exemple, Rosenkopf et Nerkar (2001) qualifient l'exécution d'activités de type exploratoire sur des ressources et des connaissances actuelles d'une organisation comme étant une exploration locale. Fleming (2001) quant à lui catégorise la connaissance développée à partir de la recombinaison de connaissances actuelles comme étant une exploration. Sur la même longueur d'onde, une application simple de nouvelles connaissances peut être considérée comme une exploitation car elle n'exige aucune activité expérimentale ou manipulation de type exploratoire (Spender, 1992).

2.3) Effet modérateur des inputs sur le résultat du processus d'exploration

Nous avons vu précédemment que les activités d'une organisation sont soit de type exploration, soit de type exploitation. Les deux conduisent à des apprentissages. Nous avons aussi suggéré que ce sont le type d'activité et la nouveauté du résultat qui qualifient le type d'apprentissage. De plus, nous avons suggéré que la nouveauté des ressources et des connaissances n'est pas forcément le déterminant de l'exploration. Nous voulons dire par là, que dans l'absence d'une intention d'explorer, même si les nouvelles connaissances et les ressources sont disponibles, le type d'apprentissage ne peut être une exploration. Autrement dit, la nouveauté des ressources et des connaissances appliquées dans le processus d'apprentissage ne détermine pas obligatoirement l'exploration. A noter aussi qu'un point est à ce jour moins discuté dans la littérature d'apprentissage organisationnel, l'effet modérateur de la nouveauté des éléments dans l'exploration. C'est pourquoi nous allons tenter de clarifier le rôle de la nouveauté des *inputs* dans le processus d'exploration.

Comme nous l'avons déjà argumenté, le processus d'exploration et la nouveauté du résultat caractérisent l'exploration. Nous avons aussi argumenté que la nouveauté des connaissances et des ressources (*inputs*) n'est pas uniquement un déterminant d'exploration. Une question se pose alors ici: si une organisation a l'intention d'exercer des activités de type exploratoire (processus) afin d'arriver à des connaissances et des produit nouveaux, le niveau de nouveauté des *inputs* a-t-il un impact sur le résultat d'exploration? Cette question a attiré l'attention de chercheurs dans le domaine de l'apprentissage organisationnel, l'un des principaux travaux concernant cette question a été rédigé par Katila et Ahuja (2002). Ils considèrent

l'exploration comme un processus de recherche par lequel l'organisation essaie de trouver des solutions, des produits et des connaissances nouveaux. Se référant à la définition de l'exploration selon March (1991) dans laquelle les nouvelles connaissances et ressources sont des *inputs* nécessaires pour l'exploration. Ces auteurs argumentent que la disponibilité des nouvelles connaissances fait grandir l'étendue du champ¹ des connaissances impliquée dans le processus d'exploration.

Les ressources et les connaissances impliquées dans l'expérimentation peuvent être recombinaisonnées avec d'autres éléments lors du processus d'exploration ce qui augmente le nombre d'alternatives possibles. Par conséquent, le potentiel de nouveauté des solutions et des connaissances développés sera positivement affecté (Katila & Ahuja, 2002; Fleming & Sorenson, 2001). En ce sens, l'étendue du champ d'étude des connaissances peut modérer l'efficacité du processus en jeu lors de la création de connaissances nouvelles. Cet aspect particulier du processus d'exploration mérite donc d'être étudié. Katila et Ahuja (2002) ne négligent pas non plus la pratique d'activités d'exploration sur des connaissances actuelles de l'organisation. Ils montrent qu'exercer des activités exploratoires sur la base de connaissances actuelles d'une entreprise peut être considéré comme une « profondeur d'exploration² » ayant aussi un impact positif sur le développement de nouveau produit (à noter que les auteurs ont mis en évidence que au bout d'un certain temps cet impact positif venait à diminuer³). Autrement dit, le travail de Katila et Ahuja (2002) ne montre pas seulement l'effet modérateur de la nouveauté des *inputs* sur le résultat d'exploration, mais aussi il montre que les *inputs* courants peuvent contribuer au processus d'exploration.

¹ Search Scope

² Search Depth

³ Inverted U shape

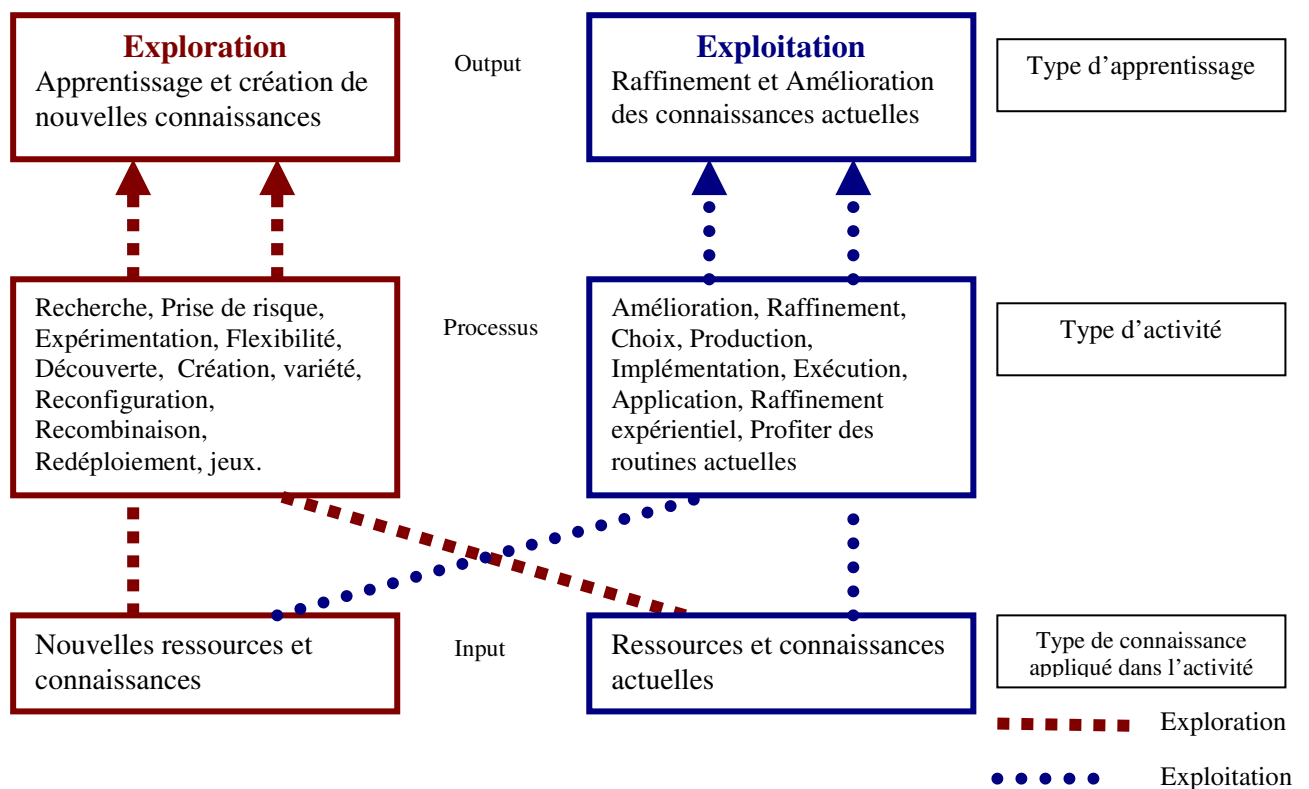


Figure F.1) Trois dimensions importantes de l'exploration et de l'exploitation

La figure F.1 présente de façon simplifiée la dichotomie d'exploration et d'exploitation. Elle montre notamment que le type d'activité concerné ainsi que leurs résultats respectifs sont différents pour l'exploration et l'exploitation. De plus, conformément à ce que nous avons argumenté, le type de ressources et de connaissances en *input* de ces deux types d'apprentissage ne sont pas unique. Ils peuvent être appliqués dans chacun de ces deux processus.

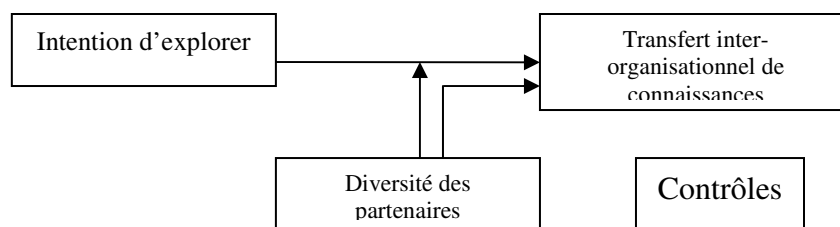
Dans cette recherche, nous suivons l'argument de Gupta, Smith et Shalley (2006) qui montrent que plus les ressources pour suivre les deux approches d'apprentissage sont limitées, plus grande est la possibilité pour que l'une ou l'autre s'exprime d'une façon exclusive (p697)¹. C'est pourquoi nous considérons également que l'exploration et l'exploitation sont deux extrêmes d'un continuum. Nous développerons nos hypothèses sur ce postulat.

Si nous rapportons l'ensemble des travaux précédemment présenté au contexte de l'alliance, nous proposons d'étudier dans un premier temps la présence de l'intention d'explorer des

¹ "the scarcer the resources needed to pursue both exploration and exploitation, the greater the likelihood that the two will be mutually exclusive"

partenaires dans une alliance et son influence sur le TIC, puis de considérer dans un second temps, la diversité des partenaires - sans prendre en compte une intention particulière d'explorer des partenaires- comme étant à la fois une source de nouveauté et une capacité d'absorption. De telle manière, plus les partenaires sont similaires, plus la capacité relative d'absorption est élevée; plus ils sont différents l'un de l'autre, plus le niveau de nouveauté fourni par les partenaires est élevé. Enfin, nous étudierons l'interaction existant entre ces deux variables : intention d'explorer et diversité des partenaires sur le TIC. En d'autres termes, nous en reviendrons à considérer l'impact de la diversité des partenaires sur la relation entre le niveau de l'intention d'exploration et le TIC (Figure 2).

Figure F.2) Cadre de la recherche



3) Hypothèses de recherche

3.1) *Intention d'exploration et TIC*

Les alliances sont des arrangements voulus entre des entreprises indépendantes qui sont concernées par un échange, une mise en commun, un développement conjoint d'une technologie, de produits et services (Gulati, 1998) et un moyen précieux pour l'exploration et l'exploitation (Lavie & Rosenkopf, 2006). Le développement de l'apprentissage à partir de sources externes ajoute de nouvelles connaissances dans la base de connaissances existante, c'est pourquoi ce phénomène a été souligné plusieurs fois dans la littérature de stratégie et d'apprentissage organisationnel (Hamel, 1991; Mowery et al., 1996; Simonin, 1999; Inkpen, 2002). La connaissance peut être transférée à partir des réservoirs de connaissances (Argote et al., 2000) des partenaires. La connaissance peut aussi être le fruit du rapatriement d'une connaissance développée lors d'une alliance vers l'entreprise parent.

Une entreprise et son partenaire ayant des bases de connaissances séparées, l'activité d'exploration de la part de l'entreprise aura pour objectif la recherche, la découverte, et l'analyse des ressources et des connaissances du partenaire afin de les recombinaison avec sa propre base de connaissances, contrairement aux activités d'exploitation qui sont orientées vers l'amélioration, l'exploration est une recherche voulue, une expérimentation. Il s'agit donc d'une interaction ouverte, favorisant les flux d'information afin de tester des alternatives nouvelles et de créer de nouvelles combinaisons dans l'espace de connaissances. Ainsi, les partenaires ayant l'intention d'explorer ont plus tendance à exercer des activités exploratoires favorisant le développement de nouvelles connaissances. Au contraire, dans le cas d'alliances d'exploitation, il n'y a aucune intention d'explorer (ni pour exercer des activités exploratoire ni pour explorer les nouveaux *inputs*) puisque le but de ces dernières est une application directe et efficace de connaissances existantes. Donc, même si les partenaires mettent en commun les ressources et des connaissances différentes, en cas d'absence d'intention d'explorer, il n'y a pas de transfert significatif de connaissances (Grant & Baden-Fuller, 2004).

Plus une alliance est exploratoire, plus les partenaires essaient de profiter des bases de connaissances de l'un et de l'autre par recherche, échange d'information, partage de connaissances, création conjointe, et par comparaison entre leurs différentes expériences passées. Autrement dit, les entreprises recherchent par l'exploration de connaissances externes à favoriser un apprentissage interactif.

Les alliances moins exploratoires - qui sont plus de type exploitation- affectent la base de connaissances d'une autre manière car elles favorisent un apprentissage par amélioration et par enrichissement des connaissances actuelles sans internaliser la connaissance de partenaires.

Étant donné que nous considérons l'exploration et l'exploitation comme deux extrêmes d'un continuum (Gupta et al., 2006), nous formulons notre première hypothèse de la façon suivante.

Hypothèse 1. Plus les partenaires sont motivés pour explorer, plus le transfert de connaissances entre eux sera intense.

3.2) Diversité des partenaires

L'importance de la diversité des partenaires trouve sa trace dans plusieurs contextes (Boschma, 2005). Cette variable a pris deux dimensions majeures dans la littérature d'alliance et d'apprentissage: La nouveauté et la capacité d'absorption.

L'idée de nouveauté a été développée au travers de deux courants de pensées très proches : a) la nouveauté dans les ressources et les connaissances des partenaires, b) la capacité relative d'absorption.

Selon les théories basées sur les ressources, l'hétérogénéité des ressources cause des différences de performance entre les entreprises (Penrose, 1959). Certaines recherches se concentrent sur le type d'alliances et le type de valeur créée en étudiant l'hétérogénéité des partenaires ou des ressources partagées. Ce courant de recherche présente deux critères pour la classification des alliances: la diversité des ressources partagées et la diversité des profils des partenaires. Le premier classe les alliances en deux catégories dans lesquelles les partenaires sont similaires en termes de ressources et de connaissances partagées, soit différents et se complètent mutuellement. Cette dichotomie a été présentée selon plusieurs appellations: Echelle vs Lien¹ (Hennart, 1988), Additive vs Complémentaire (Dussauge & Garrette, 1999), Partage des coûts vs Partage des compétences (Sakakibara, 1997), Complémentaire vs Supplémentaire (Das & Teng, 2000).

Le second critère ne prend pas seulement en compte la diversité des ressources partagées, mais considère aussi la diversité des profils des partenaires, appelé: endogamie vs exogamie (Jolly, 2005). Ces courants de recherches fondées sur des dichotomies étudient la notion de complémentarité et de similarité des partenaires.

Un accent particulier est cependant porté sur le degré d'hétérogénéité créé par des ressources complémentaires qui sont partagées par les partenaires. De ce point de vue, plus les partenaires appartiennent à une même industrie, plus l'hétérogénéité favorisera à la complémentarité. Par exemple, (Dussauge, Garrette, & Mitchell, 2000) suggèrent que le niveau de transfert de connaissances est plus élevé dans des alliances de liens que dans des alliances d'échelle. Ils font valoir que les alliances de liens dans lesquelles les partenaires partagent différentes capacités sont plus susceptibles d'être restructurées en raison de l'apprentissage au fil du temps. Hill et Hellriegel (1994) affichent également la complémentarité comme étant la mesure par laquelle les partenaires d'une joint venture apportent les compétences distinctives et non-redondantes dans le partenariat (Hill & Hellriegel, 1994, p. 595).

Comme indiqué plus haut, dans la littérature sur l'apprentissage organisationnel, le concept de nouveauté a été reconnu comme étant la source d'idées de connaissances nouvelles qui favorise l'apprentissage et les performances d'innovation de l'entreprise. (Sampson, 2007) et Nooteboom et ses collègues (Nooteboom, Haverbeke, Duysters, Gilsing, & Oord, 2007) constatent que la diversité des partenaires a un effet significatif sur le nombre de brevets délivrés par les entreprises grâce à la nouveauté dans les connaissances et les ressources technologiques fournies par le partenaire. Ils constatent que plus les partenaires ne sont pas similaires, moins l'entreprise est innovante après l'alliance. Ils ont de plus observé que l'augmentation de la diversité des technologies des partenaires conduit à de meilleures performances d'innovation de l'entreprise, mais que cette relation induit une diminution du rendement. Ce dernier point met en lumière la deuxième dimension à prendre en compte lorsque l'on étudie la diversité des partenaires, à savoir, la capacité d'absorption que nous allons examiner ci-dessous.

Les connaissances externes que l'entreprise obtient généralement à partir de son environnement extérieur est une collection de fragments de la connaissance potentiellement utile. Ces éléments de connaissance fragmentée ne deviendront utiles pour développer de nouvelles connaissances et solutions que lorsque l'entreprise développera des capacités complémentaires pour assimiler et intégrer la nouveauté dans des routines organisationnelles (Winter, 1984). Cette capacité est appelée la capacité d'absorption. Cohen et Levinthal (1990) ont introduit ce concept comme étant la capacité de l'entreprise à identifier, assimiler et exploiter la connaissance de l'environnement externe. Le niveau de l'expérience antérieure de l'entreprise dans les connaissances liées est identifié comme un facteur clé de la caractérisation de la capacité d'absorption. La définition de Cohen et Levinthal suppose que la capacité d'absorption de l'organisation est "absolue". En d'autres termes, la capacité d'absorption de l'organisation est la même, indépendamment de la situation (Alvarez & Busenitz, 2001). Toutefois, Lane & Lubatkin (1998) soutiennent que la capacité d'absorption de l'organisation pourrait être relative au contexte ou à la situation actuelle de l'organisation. Selon eux, la capacité d'une entreprise pour apprendre d'une autre entreprise est déterminée conjointement par des caractéristiques relatives aux deux entreprises. Dans une étude sur les alliances entre les entreprises de biotechnologie et les entreprises pharmaceutiques, ils re-conceptualisent la capacité d'absorption comme une variable au niveau de l'alliance et ils montrent que les mesures de similarité -appelées la capacité relative d'absorption- peuvent

¹ Scale vs. Link

mieux expliquer la capacité d'apprentissage dans les alliances. L'idée sous-jacente au concept de capacité relative d'absorption est que l'apprentissage est déterminé par l'équilibre entre les partenaires de l'alliance en termes de ressources, bases de connaissances et caractéristiques organisationnelles. Ils suggèrent que la similitude des bases de connaissances des partenaires et que la similitude de leur organisation sont positivement liées à l'apprentissage inter organisationnel favorisé par l'alliance. Plusieurs travaux ont également reconnu le rôle prépondérant d'une similarité des bases de connaissances entre les deux unités pour favoriser l'efficacité du transfert de connaissances inter-unités (Mowery et al., 1996; Szulanski, 1996; Nooteboom et al., 2007). La similitude d'organisation fait également partie de ce concept. Elle montre la correspondance entre l'entreprise et ses partenaires dans la transformation des connaissances et de l'information acquises (Lane & Lubatkin, 1998) et dans la facilité de communication (Szulanski, 1996; Simonin, 1999)¹.

Ces deux dimensions de la diversité, déterminent conjointement l'efficacité du transfert de connaissances entre une entreprise et son partenaire par l'obtention d'un compromis entre la diversité de nouveaux éléments et la capacité de l'entreprise à les comprendre, les décoder, les transformer et les intégrer dans son fonctionnement au quotidien. Partant du constat qu'une diversité croissante des partenaires peut induire une diminution du niveau de capacité relative d'absorption de nouveaux éléments de connaissances, nous assumons que la relation existant entre la diversité des partenaires et l'efficacité du transfert de connaissances interentreprises est une fonction courbe (U inversé).

Il convient de noter que la relation courbe entre la diversité du profil technologique des partenaires et la performance innovative a été observée par l'analyse des bases de brevets (Sampson, 2007; Nooteboom et al., 2007) tandis que dans cette recherche, nous utilisons l'enquête pour étudier l'efficacité du transfert de connaissances interentreprises et la diversité des partenaires.

C'est pourquoi nous suggérons que :

Hypothèse 2: la diversité des partenaires et le transfert interentreprises de connaissances (TIC) est une relation courbe.

A noter que la diversité des partenaires est un concept mobilisé au niveau de l'alliance, alors

¹ La proximité de la stratégie d'entreprise des partenaires semble avoir des impacts positifs sur le transfert de connaissances interentreprises (Darr & Kurtzberg, 2000) parce qu'il fait référence à la similitude des problèmes

que l'efficacité du transfert de connaissances interentreprises est prise en compte au niveau de l'entreprise.

3.3) Effet interactif de la diversité des partenaires et exploration.

Alors que les hypothèses 1 et 2 se concentrent sur les effets de l'intention d'explorer des partenaires et de la diversité interentreprises sur l'efficacité du transfert de connaissances, nous allons préciser comment l'interaction entre ces deux caractéristiques peut avoir de nouvelles implications sur un transfert efficace de connaissances dans une alliance.

Comme souligné dans l'hypothèse 1, les entreprises qui entrent dans une alliance avec une intention exploratoire cherchent avant tout l'obtention de nouvelles connaissances. Cette volonté motive les entreprises à mettre objectivement l'accent sur leur capacité relative d'absorption potentielle. D'un autre côté, la diversité de l'entreprise et de son partenaire influence également l'efficacité du transfert de connaissances notamment en fonction des niveaux de variétés de la nouveauté fournis par le partenaire. Ainsi, l'interaction supposée entre l'intention d'une entreprise pour explorer et la diversité des partenaires semble incessante à être étudiée.

Cohen et Levinthal (1990) soutiennent que la capacité à tirer profit des connaissances externes est une composante essentielle de l'innovation (Cohen & Levinthal, 1990, p. 128). Récemment, sur la base de cet argument empirique, certains auteurs, promeuvent l'importance de ces stratégies de recherche externes (Katila, 2002; Katila & Ahuja, 2002; Laursen & Salter, 2006). Katila et Ahuja (2002) suggèrent que la profondeur et l'étendue de champ de recherche des connaissances contribuent à l'introduction de nouveaux produits. Ils définissent la profondeur comme la mesure par laquelle l'entreprise réutilise ses connaissances existantes fréquemment, et l'étendue comme l'ampleur du champ de recherche de nouvelles connaissances par entreprise. Ils montrent que la profondeur de recherche est une fonction courbe et que l'étendue de recherche a un effet positif sur l'introduction de nouveaux produits. Laursen et Salter (2006), dans un contexte d'innovation ouverte, montrent également l'existence d'une diminution du rendement de l'étendue et de la profondeur de l'utilisation de sources externes de connaissances sur les performances d'innovation.

Alors que nous examinons ici les effets mutuels de l'intention d'explorer des partenaires et de leur diversité, nous allons adapter les concepts de la profondeur et de l'étendue de la recherche pour estimer le concept d'interaction en contexte d'alliance. L'existence de

stratégiques qui mobilisent le même type de connaissances pour être maîtrisées.

l'intention d'exploration et de son intensité modifie le concept de diversité des partenaires et l'amène au contexte d'exploration. Le niveau de diversité affecte également l'impact de l'intention exploratoire sur le transfert de connaissances en changeant la nature et les caractéristiques des éléments de connaissances. Ces derniers deviennent des *inputs* au processus d'exploration. Dans le but de prévoir cette interaction, nous définissons deux concepts : la profondeur et l'étendue commune de recherche au niveau de l'alliance comme suit: la profondeur commune de recherche se réfère à la mesure par laquelle les partenaires de l'alliance cherchent de la connaissance dans des parties communes de leurs bases de connaissances. En d'autres termes, ils montrent que, jusqu'à un niveau donné de l'intention d'explorer, les partenaires cherchent à tirer profit de leur similarité par apprentissage et exploration à travers de leur profondeur conjointe. Ce concept est proche de la «recherche locale» (Baum et al., 2000) qui considère la recherche de solutions en utilisant les connaissances qui sont étroitement liées aux bases de connaissances existantes d'entreprises. Toutefois, il y a un point qui doit être clarifié. Comme Katila et Ahuja (Katila et Ahuja, 2002) l'ont souligné, le concept de recherche locale ne comprend pas la profondeur; il n'estime que le champ de la recherche. L'interaction entre l'intention d'explorer et le niveau étroit de champ de recherche peuvent être interprétés comme étant une exploration locale qui montrent les différents niveaux d'intention d'explorer en utilisant les connaissances et les ressources actuelles (Rosenkopf & Nerkar, 2001; Fleming, 2001). Lorsqu'une entreprise, ayant une intention exploratoire, fait une alliance avec des partenaires similaires, ils profitent de leur profondeur commune de recherche pour favoriser l'apprentissage et la création de nouvelles connaissances. Dans ce cas précis, l'alliance offre de nouveaux fragments de connaissances à explorer pour l'entreprise, tout en restant dans son champ actuel de connaissances. Ainsi, le niveau d'intention exploratoire représente une gradation dans la profondeur de la recherche. Partant du constat qu'utiliser les mêmes éléments de connaissance réduit le risque d'essais/erreurs et rend l'exploration plus fiable (Levinthal & March, 1981), nous formulons donc l'hypothèse 3-1 ci-dessous:

Hypothèse 3.1: la similarité des partenaires a un effet modérateur positif sur la relation existant entre intention exploratoire et transfert de connaissances interentreprises.

Nous définissons également l'étendue conjointe de l'exploration comme la mesure par laquelle les partenaires de l'alliance explorent de nouvelles connaissances dans des éléments non-similaires de leur base de connaissances. Dans la littérature sur l'apprentissage organisationnel, il est mis en avant que l'amplitude de l'étendue d'exploration augmente le nombre de solutions disponibles (March, 1991). Cependant, certaines études soulignent également l'effet négatif d'un champ trop large d'exploration sur l'apprentissage en faisant valoir que ce dernier induit des coûts d'exploration, de désintégration, de compréhension et d'internalisation des éléments de connaissance trop élevé. Il a aussi été argumenté que des éléments de connaissances extrêmement divers ont des impacts négatifs parce que l'intégration de ces derniers devient coûteuse et inefficace en raison de la complexité de leur gestion (Grant, 1996). Un argument similaire a été fourni en contexte d'innovation ouverte qui va au-delà de l'étendue du champ de connaissances et considère la diversité des sources externes en soi. Par exemple, Laursen et Salter (Laursen et Salter, 2006) ont montré l'existence d'un effet décroissant d'un trop grand nombre de types de sources externes de connaissances mobilisés sur les performances d'innovation. Il apparaît en effet que l'entreprise voit sa capacité d'intégration de connaissance limitée si la diversité est trop importante. Il en résulte donc une efficacité moindre de cette dernière.

Au regard d'une stratégie d'alliance, l'exploration des connaissances des partenaires et l'apprentissage de celles-ci seraient inefficaces si le niveau de la diversité des partenariats est trop élevé. Une explication réside non seulement dans le fait que la distance entre les éléments de connaissances des partenaires à explorer est difficile, mais aussi que l'intensité d'exploration des différentes connaissances exige un coût de coordination trop élevé. Selon cet argument, nous pouvons conclure que:

Hypothèse 3.2: Un niveau de diversité trop élevé entre les partenaires a un effet modérateur négatif sur la relation existant entre l'intention d'explorer et le transfert interentreprises de connaissance (TIC)

4) Méthodologie de la recherche

4.1) Échantillon

Pour construire l'échantillon de recherche, nous avons utilisé la Securities Data Company (SDC) qui propose des bases de données sur les joint ventures et les alliances. Ces dernières

comprennent des données de tous les types d'alliances, issues de sources publiques, de publications industrielles ou commerciales. La base de données que nous avons utilisée porte sur les alliances à partir de 1988. Les informations contenues dans cette base ne sont pas exhaustives puisque les entreprises ne sont pas invitées à annoncer leurs alliances systématiquement. Néanmoins, la base de données est une des sources les plus complètes d'information sur les alliances et reste l'une des seules sources disponibles pour les études empiriques d'alliance à grand échelle (voir Anand & Khanna, 2000; Sampson, 2007).

Pour nos travaux, nous avons sélectionnée une liste d'alliances dans laquelle au moins un des partenaires est français (N = 4513) et pour laquelle une date effective est annoncée (n1 = 1401). Afin d'assurer l'homogénéité de notre échantillon final, les alliances ont été regroupées sur la base de leur premier code SIC¹ et nous avons été amené à ne pas considérer les SIC dans lesquelles il y avait moins de 30 alliances (n2 = 1861). Au final, 1251 cas d'alliances font partie de notre population cible.

4.2) Collecte des données

Nous avons mené une enquête par questionnaire adressée aux partenaires français des alliances retenues. Ce dernier a été développé à partir de la littérature et sa validité a été examinée par 3 chercheurs de gestion stratégique et d'alliance. Une étude pilote auprès d'un échantillon de 20 directeurs d'alliance dans des entreprises du Parc technologique de Sophia Antipolis, nous a permis de tester le questionnaire en terme de compréhension des questions et de sa conformité aux différents cas d'alliances tels que le type d'industrie ou le domaine d'activité (R&D, DNP, marketing, fabrication ...). Les résultats de l'étude pilote ont été utilisés afin d'affiner la formulation de certaines questions. Nous avons également réduit le nombre de questions posées et nous avons opté pour la technique d'analyse des items (Nunnally & Bernstein, 1994). Le questionnaire final a été ensuite développé et mis en ligne.

La collecte des données a eu lieu au cours de l'été et de l'automne 2007. Le lien électronique du questionnaire a été envoyé par courriel aux dirigeants et/ou responsables des alliances préalablement identifiés. Deux séries de rappel téléphonique ont été effectuées (une fois par semaine après l'envoi du questionnaire, puis deux semaines après le premier appel). In fine, 152 questionnaires ont été retournés, 114 sont complets donc applicables pour notre analyse statistique.

¹ Standard Industrial Classification

4.3) Mesures

Les répondants de cette étude ont été interrogés sur la base d'une échelle de type Likert. Chaque variable a été étudiée sur la base d'éléments présentés dans divers articles liés à l'alliance interentreprises et au transfert de connaissances ainsi que grâce à des entretiens réalisés par des praticiens et des professeurs dans ce domaine (au cours de l'étude pilote). Les questions se rapportant aux différentes variables étudiées ont été adaptées ou utilisées conformément aux recommandations de la littérature¹.

4.3.1) Transfert Inter-organisationnel de connaissance (TIC)

Comme nous l'avons déjà indiqué précédemment, la connaissance transférée peut être incorporée par des modifications de la base de connaissances du destinataire. Certains chercheurs, comme Mowery, Oxley et Silverman (1996) considèrent la convergence des bases de connaissances des partenaires après l'alliance comme étant une des variables représentatives du transfert de connaissances interentreprises. Ces changements peuvent se manifester dans les connaissances technologiques dans les produits, dans les techniques de développement des compétences, dans la connaissance des ressources humaines, dans l'efficacité de la production (Chen, 2004) ou dans l'évolution des performances compétitives de l'unité bénéficiaire (Argote et al, 2000). Un autre aspect a été considéré dans la littérature comme un résultat du transfert de connaissances : le niveau de satisfaction perçu par les bénéficiaires sur la maîtrise de l'internalisation, de l'exploitation et de la gestion des connaissances tirées d'autres unités ou partenaires (Cummings & Teng, 2003). Nos travaux tentent aussi de mesurer ces aspects par le développement de 10 questions ($\alpha = 0,8768$).

4.3.2) Intention d'explorer

Le concept d'exploration dans cette étude est développé selon les arguments de Grant et Baden-Fuller (2004). Selon ces derniers, l'essence de l'alliance exploratoire est dans l'intention d'au moins un des partenaires d'apprendre de l'autre. Quelques témoignages de la littérature confirment cette proposition, par exemple Inkpen (Inkpen, 1998) a observé que dans certaines alliances, les partenaires ont adopté une approche proactive et agressive concernant l'internalisation de la connaissance de l'autre, alors que dans d'autre cas, l'entreprise a choisi de suivre une approche passive pour l'acquisition des connaissances (même si l'accessibilité

¹ Une copie du questionnaire est disponible auprès de l'auteur sur demande.

de connaissances du partenaire était aisée). Dans cette étude, nous avons utilisé trois questions de type Likert relatives à l'intention:

- d'explorer des connaissances des partenaires,
- de générer de nouvelles connaissances avec des partenaires, et
- d'avoir accès à la connaissance du partenaire, sans l'internaliser.

Deux autres questions se référant à la nécessité de former une nouvelle alliance, dans le même domaine de connaissances, avec le même partenaire et dans la suite du partenariat actuel sont également incluses. Si l'entreprise a fermement l'intention d'intégrer la connaissance du partenaire au cours de l'alliance actuelle, de nouveaux partenariats dans le même domaine de connaissance ne se justifie pas ($\alpha=0,9012$).

4.3.3 Diversité des partenaires

Dans les travaux de recherche sur l'alliance, ce concept a été traité de deux manières principales. La première définit un classement par catégorie du concept de diversité des partenaires: similaire ou différent. Ces recherches qualifient de deux façons la valeur issue du partage de ressources différentes: la complémentarité des ressources et les effets de taille et d'échelle créés par l'accumulation de ressources et de connaissances par les deux alliés. Cette dichotomie porte plusieurs noms selon le courant de recherche étudié. Par exemple Hennart (1991) parle de liens et d'ampleur des alliances; Dussauge et Garrette (1999) utilisent les notions de additive et complémentaires ; Sakakibara (1997) utilise les termes de partage de compétences et de partage des coûts des alliances et enfin Jolly (Jolly, 2005) en appliquant des concepts sociologiques appelle ces deux types d'alliances exogamie et endogamie.

D'autres recherches étudient le concept de diversité au travers d'un niveau de similarité ou de diversité des ressources des partenaires. En fait, selon nous, cette approche pour mesurer la diversité est plus réaliste que des mesures catégorielles. Nous retrouvons par ailleurs dans ce courant de recherche, des études qui utilisent soit :

- les citations des brevets comme mesure de chevauchement de la base de connaissances des partenaires (Mowery et al., 1996, 1998)
- la mesure de la diversité technologique entre les partenaires comme Sampson, (2007),
- d'autres mesures telles que la RTA (*Revealed Technology Advantage*), qui est la mesure de la distance cognitive entre les partenaires (Nooteboom et al, 2007), et
- des mesures fondées sur le questionnaire (Lane & Lubatkin, 1998).

Dans cette recherche, nous utilisons une échelle de mesure que nous avons développée et testée par un questionnaire. Notre propos est de mesurer la diversité des partenaires du point de vue organisationnel et de la connaissance. Il est souhaité que cette mesure soit de type continu plutôt que de type binaire afin de bien différencier toute la gradation existant entre la similarité et la diversité. Pour se faire, nous avons conçu trois variables permettant de mesurer le niveau de diversité et de similarité entre les ressources de partenaires et entre leurs organisations, à savoir:

- le niveau de complémentarité des connaissances mises en commun,
- le niveau de similarité des bases de connaissances,
- le niveau de diversité organisationnelle.

Le mode de mesure utilisé est soit direct, pour la variable de diversité soit l'inverse pour le concept de similarité. L'homogénéité ainsi retrouvée dans l'échelle de mesure permet un calcul d'agrégation sur ces trois variables. L'alpha de Cronbach relatifs à tous les items de ces trois variables dans le questionnaire est de 0,85 ($\alpha = 0,85$) ce qui est satisfaisant.

La valeur agrégée de nos variables permet une mesure de la diversité du profil interne des partenaires, y compris la diversité de leurs connaissances et la diversité de la connaissance partagée par eux. Un autre aspect du profil interne des partenaires est relatif à l'organisation. Dans cet aspect, la diversité organisationnelle et des mécanismes opérationnels sont observées. Un des aspects importants de cette mesure est de prêter attention à la similarité ou à la diversité de la connaissance partagée. Car, même dans des alliances où les deux partenaires ont des bases de connaissances similaires, un partage de connaissances ou de ressources différentes peut intervenir. Ce point montre un signe de complémentarité et peut motiver la formation de l'alliance. Comme nous l'avons déjà montré, le partage de ressources similaires est prévu lorsque les partenaires cherchent un effet de taille ou d'échelle à travers l'alliance. Donc, si les deux partenaires ont des bases de connaissances similaires et si ils partagent en plus des ressources différentes, leur motif d'alliance peut être interprété comme complémentaire plutôt que comme la recherche d'une économie d'échelle ou de taille. Dans cette recherche, la mesure de la diversité des partenaires a été développée de telle sorte que l'on peut considérer ce type d'alliance. En effet, elle modère la variable en utilisant le niveau de diversité de la connaissance partagée.

Cette mesure a toutefois une limite. Elle ne tient pas compte de la diversité de l'environnement extérieur des partenaires. Les deux partenaires peuvent être identiques en termes de localisation géographique et de type d'industrie. En ce sens, la variable de similitude peut être interprétée de façon différente. Par exemple, agissant sur le même secteur et dans le même pays, ce point peut être un indicateur de concurrence directe. Afin de contrôler cet effet, deux variables binaires se référant, l'une à la différence de nationalité des partenaires, l'autre à l'appartenance à un même secteur d'activité, sont incluses dans le questionnaire. Les données relatives à ces deux variables sont également incluses dans le modèle statistique de la recherche.

4.3.4) Interaction de la diversité des partenaires avec l'intention d'explorer

Pour tester les hypothèses 3-1 et 3-2, deux autres variables ont été développées à partir de la mesure de la diversité des partenaires. Dans l'hypothèse 3-1, nous visons un faible niveau de diversité. Ainsi une variable appelée LODIV est créée qui équivaut à 1 lorsque le niveau de diversité des partenaires observé est plus petit que le premier quartile, sinon 0. Une variable HIDIV a été développée de la même manière pour montrer un niveau élevé de diversité des partenaires qui équivaut à 1 lorsque le niveau de diversité des partenaires observés est plus grand que le troisième quartile, sinon 0.

4.4) Variables de contrôle

Dans le cadre d'une recherche empirique, les relations de dépendance entre les variables sont à étudier. Dans notre recherche plus particulièrement, nous avons sur la base de la littérature, sélectionné 9 variables de contrôles qui nous permettent d'affiner notre résultat :

- ***Ambiguïté de la connaissance du partenaire.*** L'incapacité des concurrents à comprendre les sources d'avantages concurrentiels est un obstacle à l'imitation (Reed & Defillippi, 1990). En suivant le point de vue de Barney (1991) et Szulanski (1993) à propos de la notion d'ambiguïté causale, Simonin (1999) définit l'ambiguïté de connaissance comme un manque de compréhension de la logique des liens entre les actions et les résultats liés à un savoir-faire technologique. Elle est donc liée négativement au transfert de connaissances dans les alliances stratégiques. Pour mesurer la connaissance d'ambiguïté dans cette recherche, nous utilisons 8 questions ($\alpha = 0,764$).
- ***Confiance.*** La confiance entre les partenaires de l'alliance est cruciale pour l'efficacité du transfert de connaissances (Doz & Hamel, 1998). Elle réfère à la conviction que la parole

d'un partenaire ou sa promesse est fiable et que le partenaire remplira ses obligations (Inkpen, 1998). Le degré de confiance qu'une société accorde à ses alliés et le degré de contrôle qu'elle exerce sur son allié définissent un niveau de confiance mutuelle, c'est-à-dire une intensité attendue de comportement coopératif (Das & Teng, 2000). La confiance réduit la peur de l'opportunisme et la nécessité de mécanismes de contrôle (Norman, 2004). Elle encourage la communication ouverte et la volonté de partager l'information. Elle augmente le transfert de connaissances (Nielsen, 2005; Dodgson, 1993; Uzzi, 1996). Dans cette recherche, 6 items sont inclus dans le questionnaire relatifs à la confiance mutuelle et au fait d'avoir des relations antérieures avec le même partenaire ($\alpha=0,744$).

- **Niveau de protection des connaissances.** La connaissance peut être protégée par le partage de connaissances moins sensibles, d'une connaissance coûteuse à imiter, par le transfert de connaissances ancienne (Jolly, 2005), par la limitation de l'entendu fonctionnelle de l'alliance (Oxley & Sampson, 2003) et enfin par le secret. La protection des connaissances a une relation négative sur le transfert de connaissances dans les alliances entre concurrents (Simonin, 2004). Dans cette étude, 3 éléments sont utilisés pour mesurer la protection des connaissances ($\alpha=0,557$). L'alpha de Cronbach étant relativement faible, nous avons choisi d'ajouter une variable afin de considérer le nombre de domaines de l'alliance comme un indicateur de l'étendue de l'alliance (Oxley et Sampson, 2004).
- **Similarité de nationalité des partenaires.** Certains problèmes dans la gestion des alliances au niveau de joint ventures internationales trouvent leurs sources dans les différences culturelles des partenaires (Meschi, 1997). Lyles et Salk (Lyles & Salk, 1996) rapportent que cette différence de culture nationale peut minimiser les flux d'information et d'apprentissage. Dans cette recherche, nous avons contrôlé cet effet par une variable binaire (1 si les nationalités des partenaires sont identiques, et 0 sinon).
- **Concurrence (Similarité de secteur d'activité des partenaires).** L'effet de concurrence entre les partenaires est contrôlé par une variable binaire (1 si les partenaires sont du même secteur et 0 sinon). Certaines études antérieures montrent que les alliances entre les concurrents seraient particulièrement intéressantes pour le transfert des connaissances (Dussauge et al., 2000).
- **Gouvernance.** Mowery, Oxley, et Silverman ont observé que les joint ventures basées sur le capital (Equity-based Joint Ventures) sont plus efficaces en termes de transfert de connaissances que des contrats de coopération (Mowery et al., 1996). Ces mêmes

chercheurs ont montré dans une autre étude utilisant la même base de données mais un autre protocole de recherche, qu'il n'existe aucune preuve de l'impact de ce type de gouvernance basé sur le capital dans l'efficacité du transfert de connaissances interentreprises (Mowery, Oxley, & Silverman, 2002). Pour contrôler cet effet possible nous considérons une variable binaire (1 si l'alliance est une EJV et 0 sinon).

- ***Durée de l'Alliance.*** La durée de l'alliance a longtemps été considérée comme un indicateur de performance de l'alliance (Gomes-Casseres, 1987). Récemment, ce point est devenu une question de recherche en soi (Valdés-Llaneza & García-Canal, 2006). Simonin (1999) a montré l'effet modérateur de la durée de l'alliance sur les relations existants entre le transfert de connaissances interentreprises et respectivement la complexité, la distance culturelle/organisationnelle et l'ambiguïté de connaissance. Dans cette recherche, nous utilisons le nombre d'années d'existence de l'alliance allant de sa constitution à sa disparition (si l'alliance est terminée).
- ***Taille de l'alliance.*** Le nombre de personnes travaillant dans l'alliance a été utilisé comme un indicateur de la taille de l'alliance. L'écart-type de données pour cette question étant trop élevé, nous utilisons une échelle logarithmique (logarithme naturel) dans nos modèles statistiques.
- ***Domaines fonctionnels de l'alliance.*** La fonction d'alliance est contrôlée par 5 variables qui sont la R&D, le développement de nouveaux produits, la fabrication, la commercialisation et la vente/distribution. Comme nous l'avons signalé auparavant, la somme de la valeur de ces variables pour chaque alliance est considérée comme l'étendue fonctionnelle de l'alliance.

5) Résultats

Les tableaux 1 et 2 présentent une synthèse des données descriptives des variables et les corrélations entre elles. Étant donné que le coefficient de la similarité de l'industrie avec celui de la diversité des partenaires est élevé, le Facteur de l'Inflation de Variance (VIF¹) a été calculé en appliquant une régression d'OLS avant l'introduction de variables d'interaction (c'est-à-dire DIVERS2, EXPLOR*DIVERS). Aucun effet de multicollinéarité n'a été détecté

¹ Le VIF (Variance Inflation Factor) pour une variable montre l'augmentation de la variance d'une variable dans un régression des moindres carrés ordinaires (OLS) qui peut être attribuable au fait que cette variable est en relation linéaire avec les autres variables indépendantes dans le modèle (Greene, 2002). En règle générale, une variable dont les valeurs VIF de plus de 10 (Marquardt, 1970) mérite une considération plus approfondie.

(moyenne de VIF = 1,9 et Max de VIF = 3,75). Les autres coefficients ne sont pas considérés comme élevé (supérieur à 0,7).

-Tableaux F.1 et F.2-

Comme la variable dépendante (TIC) est limitée entre 1,2 et 4,8, et qu'il n'y a pas observation de valeur supérieure ou inférieure à cette frontière, le modèle de régression de Tobit a été sélectionné pour tester les hypothèses. Ceci se justifie par le fait que la variable dépendante est bornée dans un certain intervalle. Enfin, un modèle de régression d'OLS¹ est également utilisé pour vérifier la robustesse des résultats. A noter qu'aucune différence significative n'a été observée.

5.1) Hypothèses

Le tableau 3 présente les résultats des modèles de régression hiérarchique qui ont été utilisés pour tester les hypothèses 1 et 2. Dans une première étape (modèle 1), toutes les variables de contrôle sont introduites dans le modèle. Conformément à la littérature, les variables de contrôle présentées dans les études comme étant importantes lors d'un transfert de connaissances interentreprises ont été reconfirmées par l'intermédiaire de ce modèle. L'ambiguïté de la connaissance du partenaire est observée comme étant un obstacle à l'efficacité du transfert, ce qui est cohérent avec l'étude de Simonin (Simonin, 1999). La protection des connaissances dénote un effet négatif significatif sur le transfert des connaissances interentreprises, observation conforme aux recherches antérieures (Norman, 2002; Simonin, 2004). Toutefois, contrairement aux travaux d'Oxley et Sampson (2004) aucun lien n'a été observé entre l'étendue fonctionnelle de l'alliance et le transfert de connaissances. Globalement dans notre étude aucun changement significatif de cette variable n'a été observé. Enfin, comme il l'a été noté dans plusieurs études antérieures, le rôle de la confiance (Dhanaraj, Lyles, Steensma, & Tihanyi, 2004; Szulanski, Cappetta, & Jensen, 2004) a été corroboré par nos résultats.

-Tableau F.3-

Le modèle 2 du tableau 3 confirme l'hypothèse H1. qui prévoit une relation positive entre le niveau de l'exploration et le transfert de connaissances interentreprises ($p < 0.01$, $\Delta LL = 17,65$). Comme la variable de l'intention d'explorer a été élaborée en fonction de la définition de Grant et Baden-Fuller (Grant & Baden-Fuller, 2004), nous ne pouvons pas, par ailleurs,

¹ Ordinary Least Squares

rejeter leur proposition concernant l'absence ou le faible niveau de transfert de connaissances interentreprises dans les alliances d'exploitation. Afin de vérifier cette proposition, nous avons converti la variable d'intention d'explorer en une variable binaire prenant la valeur de 1 lorsque l'intention d'explorer observée est égale ou supérieure à la moyenne ($n_{\text{explorer}}=58$), sinon 0. Dans ce cas précis, nous sommes face à une alliance d'exploitation ($n_{\text{exploit}}=56$). Nous avons constaté que le transfert de connaissances interentreprises est significativement plus élevé dans des alliances de type exploratoire (niveau de confiance de 99,99).

Le modèle 3 du tableau 3 montre l'effet de la diversité des partenaires sur le transfert de connaissances. Il est à noter que l'effet de cette variable n'est pas d'améliorer considérablement le modèle précédent ($p < 0.05$, $\Delta LL = 2,7$). En introduisant le carré de la diversité des partenaires dans le modèle 4, la relation courbe entre la diversité des partenaires et le transfert interentreprises de connaissances a été confirmée ($p < 0.01$, $\Delta LL = 3,71$).

Le modèle 5 du tableau 3 présente un coefficient négatif significatif au regard de l'interaction entre la diversité des partenaires et l'intention d'explorer. Toutefois, on ne peut pas conclure que cet effet négatif est le résultat de la diversité sur l'exploration, ou vice versa. Ainsi, par ce modèle, nous ne pouvons pas confirmer les hypothèses 3-1 et 3-2. Nous avons besoin d'étudier la diversité dans ses deux extrêmes pour comprendre la nature de son interaction avec l'intention d'explorer. Pour cela, nous suggérons d'utiliser les modèles 4 et 6 du tableau 4, dans lesquels l'interaction de l'intention d'explorer et de deux variables concernant la faible diversité (LODIV*EXPLOR) et la grande diversité (HIDIV*EXPLOR) sont incluses. Comme présenté dans le modèle 6 du tableau 4, prendre en compte un niveau de diversité élevé dans l'exploration interentreprises a un effet négatif sur le transfert de connaissances (H.3-2). En revanche, un niveau élevé de similitude entre les partenaires amène à un effet positif de l'intention d'explorer sur le transfert de connaissances (H.3-1). À noter que les deux variables binaires diversité élevée et forte similarité n'ont pas d'effets significatifs individuellement sur le transfert de connaissances interentreprises.

-Tableau F.4-

6) Conclusion et discussion

Tant Hennart et Zeng (2002) que Grant et Baden-Fuller (Grant & Baden-Fuller, 2004) ont examiné les deux approches présentes dans la théorie sur les alliances, à savoir: par apprentissage et par accès à la connaissance. Ces derniers insistent particulièrement sur ce

deuxième aspect de l'alliance introduit plus récemment. Le concept d'alliance selon une approche basée sur la connaissance (ou KBV¹) met l'apprentissage inter-partenaires au cœur de la stratégie de formation d'alliance (Inkpen, 2002). Cette idée du transfert de connaissances d'un partenaire à l'autre est aussi examinée par Hamel (1991) notamment sous un aspect d'internalisation de la connaissance du partenaire par l'entreprise. Dans cette approche, les partenaires sont en compétition pour être le premier à internaliser la connaissance de l'autre. Selon Hamel (1991), il est possible qu'une alliance se conclue brusquement par décision de l'entreprise qui internalise rapidement les connaissances et les ressources du partenaire. C'est la raison pour laquelle cette approche est parfois qualifiée de *course à l'apprentissage* (Hamel, 1991; Khanna, Gulati, & Nohria, 1998). L'approche par internalisation des connaissances a été dominante dans le champ de recherche du transfert de connaissances et de l'apprentissage dans les années 90. Récemment, des chercheurs (Zeng & Hennart, 2002; Mowery et al., 1996; Grant & Baden-Fuller, 2004) ont défini une deuxième catégorie d'alliance fondée sur l'apprentissage. Ils distinguent deux aspects : l'internalisation des connaissances et la spécialisation basée sur la coopération² (Zeng & Hennart, 2002) ou sur l'accès à la connaissance¹ du partenaire (Grant & Baden-Fuller, 2004). Cette proposition découle des résultats de Mowery, Oxley, et Silverman (Mowery et al., 1996)1996). Sur la base d'une analyse empirique de l'évolution des joint-ventures, ils concluent que les arguments en faveur de l'internalisation des connaissances du partenaire «sont fondés sur des généralisations très larges avec un minimum de preuve» (p.81). Ceci est cohérent avec l'argument selon lequel l'alliance peut favoriser une spécialisation croissante. En effet, ils constatent que les capacités technologiques des entreprises partenaires sont devenues plus divergentes dans une proportion significative de leurs données. Le même phénomène est observé par (Nakamura, Shaver, & Yeung, 1996) dans des joint ventures Japonais-American. Ils ont constaté une convergence technologique dans ces JV où les partenaires sont engagés dans un apprentissage mutuel et la tendance inverse dans les JV où les partenaires sont des entreprises compétitives dotées de capacités différentes mais complémentaires. Cela a conduit Zeng et Hennart (Zeng & Hennart, 2002) à contester le recours systématique à l'internalisation (ou course à l'apprentissage interentreprises) et donc à appeler à une réorientation de la littérature d'alliance vers une approche basée sur la connaissance (KBV). Ils ont fait valoir que le transfert de connaissances en littérature d'alliance a souvent été

¹ Knowledge Based View

² Cooperative Specialization

considéré comme une course à l'internalisation de la connaissance d'un partenaire par un autre. Ils assument que l'idée communément admise que les partenaires doivent entrer dans une alliance avec un esprit de compétition n'est pas toujours justifiée et ils suggèrent que la spécialisation basée sur la coopération est un phénomène plus courant par rapport à la course à l'apprentissage (p.190). Les défenseurs du principe d'internalisation (la course à l'apprentissage) comme l'approche dominante dans le domaine de l'alliance ont conseillé aux gestionnaires d'utiliser les JV et les alliances comme un raccourci pour atteindre cet objectif. Ils suggèrent que l'internalisation des savoir-faire des partenaires doit se faire aussi rapidement que possible ainsi que la dissolution de la joint venture lorsque les entreprises ont atteint cet objectif. Les gestionnaires sont encouragés à bien limiter leur contribution à l'alliance, tout en faisant le maximum pour internaliser le savoir-faire de leurs partenaires, pour précipiter la course à l'apprentissage (Zeng & Hennart, 2002, p. 191). Cependant, internaliser un savoir-faire de partenaire n'est pas la seule façon de résoudre le problème du manque de capacités. Une entreprise qui doit obtenir de certaines capacités ne doit pas nécessairement toujours les internaliser. La seule nécessité est d'avoir accès à ces dernières (Zeng & Hennart, 2002, p. 191). Ces derniers sur la base d'un exemple font valoir qu'une entreprise de biotechnologie qui a trouvé une nouvelle substance chimique pour un médicament nécessite de connaître totalement les effets secondaires du produit. En ce sens, elle peut former une alliance avec une entreprise pharmaceutique pour avoir accès rapidement à ses capacités d'essais cliniques. Grâce à la joint venture, la société de biotechnologie peut obtenir l'accès aux savoir-faire d'essais cliniques sans avoir les internaliser. C'est ce que les auteurs appellent une «spécialisation coopérative» (Zeng & Hennart, 2002, p. 191).

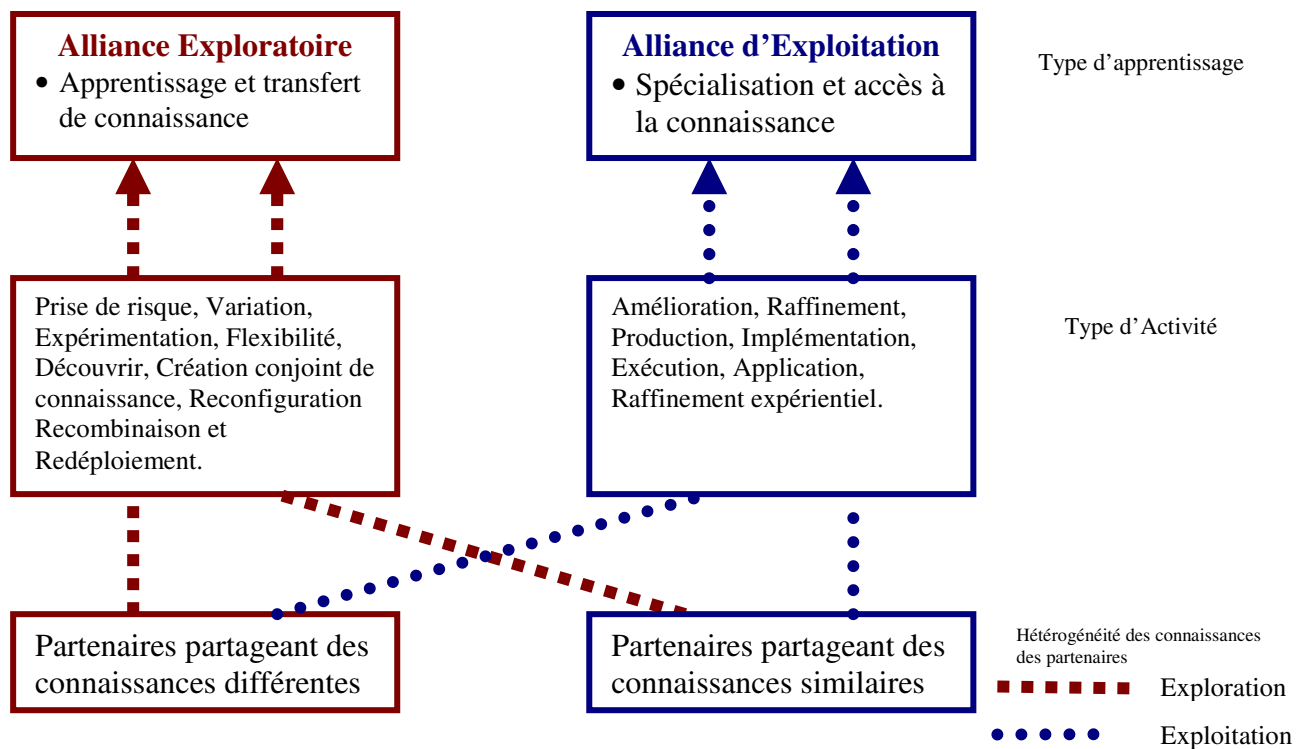
Grant et Baden-Fuller (Grant & Baden-Fuller, 2004), se référant à la fois aux recherches de Mowery et ses collègues (1996) et aux concepts d'exploration et d'exploitation selon March (1991) présentent une approche *accès aux connaissances* versus *acquisition de connaissances* dans les alliances interentreprises. Ces derniers inspirés par la dichotomie de March, précisent leur approche en montrant que l'accès à la connaissance relève d'une activité de type exploitation, et que l'acquisition et l'internalisation des connaissances relèvent d'une activité de type exploration. Ils font aussi valoir que l'internalisation ou l'acquisition des connaissances est proche de la notion d'exploration (March, 1991) ou de création de connaissances selon Spender (1992). Selon eux, avoir accès à la connaissance ou la

¹ Knowledge Accessing Theory of Strategic Alliance

spécialisation coopérative est radicalement similaire à la notion d'exploitation selon March (1991) ou à l'application des connaissances selon Spender (1992).

Considérant l'exploration et l'exploitation comme les deux extrémités d'un continuum, nous avons testé dans notre étude les idées soutenues par Grant et Baden-Fuller (2004), et Zeng et Hennart (2002). Nous montrons que considérer l'exploration conduit au transfert des connaissances. La figure 3 montre les trois aspects de l'exploration et de l'exploitation présentés au début du document de recherche, mais cette fois dans le contexte de l'alliance. Dans cette recherche, nous montrons que la nouveauté de la connaissance comme un *input* à l'exploration n'est pas vitale pour le résultat, mais qu'il peut modérer le résultat exploratoire.

Figure F.3. Trois aspects de l'alliance exploratoire et d'exploitation



Dans cette étude, non seulement le rôle de l'exploration a été confirmé, mais aussi le rôle des facteurs qui influent sur l'exploration des connaissances externes.

En ce sens la diversité des partenaires a été confirmée comme étant un facteur déterminant de l'efficacité du transfert interentreprises des connaissances (TIC). Cependant, nous avons constaté une relation courbe dans la mesure de ce facteur. Ceci confirme l'existence d'un effet positif jusqu'à un certain seuil puis un effet négatif décroissant sur l'apprentissage interentreprises. Ce seuil constitue une capacité relative d'absorption qui explique la diminution du rôle d'une diversité élevée sur l'obtention de nouvelle connaissance. Notre

troisième hypothèse, nous a permis d'étudier l'importance de l'interaction entre l'intention d'explorer et la diversité. Nous montrons que l'interaction entre similitude et intention d'explorer donne un nouvel effet qui peut être expliqué par la profondeur de l'exploration. Il apparaît que la similarité des partenaires peut avoir des effets positifs sur l'apprentissage interentreprises lorsque l'on considère son interaction avec l'intention d'explorer. Nous montrons aussi qu'une diversité élevée n'a pas d'impact négatif significatif sur l'apprentissage interentreprises, mais étonnamment, nous avons constaté que l'interaction entre diversité élevée et intention d'explorer est négative de façon significative. Cette constatation montre des capacités limitées des entreprises dans l'exploration de nouvelles connaissances externes dans une étendue vaste. Une autre conclusion sur ce point peut être que c'est une mauvaise stratégie d'essayer d'apprendre de partenaires très (trop) différents.

Les résultats de cette recherche sont cohérents avec les théories existantes de l'apprentissage interentreprises et ainsi que plusieurs études empiriques antérieures. Une première contribution de cette recherche réside dans la confirmation empirique de l'idée supportée par Grant et de Baden-Fuller (2004), à savoir que le transfert interentreprises de connaissances se produit dans les alliances exploratoires. L'exploration, par définition, concernant la modification et la reconfiguration des connaissances en vue d'une création de nouveauté, nous pouvons donc conclure qu'elle facilite le transfert interentreprises de connaissances au travers de deux sources:

- a) *Le processus d'exploration lui-même.* Grâce aux alliances exploratoires, les connaissances des partenaires sont décomposées et recombinaisonnées ce qui rend globalement la connaissance de l'un ou l'autre plus accessible et plus compréhensible.
- b) *Le résultat de l'exploration.* Le résultat d'une alliance exploratoire conduit à la création de nouvelles connaissances pour les partenaires. Ceci constitue une source de nouveauté sur laquelle tous les partenaires ont un contrôle conjoint. Cette nouvelle connaissance a une forte probabilité d'être absorbée par les partenaires, car ses origines et ses éléments constitutifs proviennent d'entreprises alliées. Selon le concept de capacité d'absorption, son intégration dans les bases de connaissances des sociétés mères n'est pas seulement possible, mais dans une certaine mesure attendue.

Une deuxième contribution de notre recherche porte sur le rôle de la diversité des partenaires. La mesure de cette dernière a été étudiée à plusieurs reprises et dans plusieurs contextes de la littérature d'alliance (Mowery et al., 1996; Cummings & Teng, 2003; Nooteboom et al., 2007; Sampson, 2007). Bien qu'une relation courbe (U inversé) entre la diversité des bases de connaissances technologiques des partenaires et la performance innovative a été confirmée par deux études (Nooteboom et al., 2007; Sampson, 2007), le même type de relation entre diversité des partenaires et transfert de connaissances interentreprises n'a pas été démontré (Mowery et al., 1996; Cummings & Teng, 2003). Dans cette recherche nous reconsidérons cette variable de diversité en y ajoutant une nouvelle dimension i.e. le niveau de complémentarité des connaissances mises en commun. Contrairement à l'étude de Cummings et Teng (2003), dans nos travaux, la relation courbe est confirmée. De plus, nous avons observé que l'augmentation de la diversité des partenaires prend des allures différentes selon la relation recherchée en termes de transfert de connaissances interentreprises. L'effet positif de la diversité peut aussi être interprété comme de la complémentarité dans la nature des connaissances ou des ressources. Lorsque la nature de deux éléments de connaissances ou des ressources sont complémentaires, ils peuvent être combinés et regroupés afin de rendre un nouveau service ou de produire de nouvelles connaissances ou de nouveaux produits. Lorsque les partenaires partagent des ressources qui sont complémentaires par leur nature, et que les mécanismes de protection de la connaissance sont différents (comme la protection ou l'ambiguïté) le transfert de ressources et de connaissances entre les partenaires peut prendre différentes formes. Ce point a été examiné récemment au courant de recherche basé sur les ressources (*Resource-Based View*) sous le terme de *rente relationnelle appropriée* (Lavie, 2006). L'auteur argumente que dans le cas des alliances, le partage des ressources par les partenaires ne peut être basé sur les suppositions d'existence d'une immobilité imparfaite des ressources et d'un contrôle parfait de l'entreprise sur ses propres ressources stratégiques.

Nous avons soutenu l'idée que la baisse de rendement de la diversité des partenaires est en raison de la diminution du niveau de la capacité relative d'absorption. Cependant deux autres raisons peuvent également interpréter ce fait. Tout d'abord, lorsque les partenaires sont complémentaires dans leurs produits, ils peuvent tirer un profit issu de la synergie qui peut apparaître lors du partage de résultats hétérogènes. Dans ce cas, le seul motif de la formation d'une alliance est de combiner les résultats de chaque entreprise en raison de leur complémentarité dans l'utilisation soit de l'approvisionnement soit sur un marché (Cantwell & Colombo, 2000). De plus, la spécialisation de chaque partenaire dans l'alliance peut aussi être

une deuxième explication de la diminution du niveau de transfert de connaissances interentreprises lors d'une diversité croissante. En effet, dans ce cas, les bases de connaissances sont complémentaires mais trop complexes et trop éloignées par leur nature. Bien que chacun des partenaires aient besoin de ressources complémentaires, ils ne peuvent pas les maîtriser par leurs propres moyens. Ils vont donc chercher à externaliser mutuellement les ressources nécessaires par alliance (Zeng & Hennart, 2002; Nakamura et al., 1996).

Une troisième contribution de cette recherche porte sur l'influence mutuelle de la diversité des partenaires et de l'intention d'explorer sur un transfert efficace de connaissances. Dans le contexte de l'apprentissage organisationnel, la profondeur de recherche a été citée comme un des facteurs influents sur l'exploration (Katila & Ahuja, 2002). La profondeur de recherche se base sur l'expérience préalable acquise. Cette dernière permet un approfondissement de la compréhension des éléments de connaissance et réduit la probabilité d'erreurs dans la création de nouvelles connaissances et solutions. La capacité d'absorption est étroitement liée à cette expérience (Macher & Boerner, 2006). Cohen et Levinthal (1990) soutiennent que la capacité d'absorption de l'entreprise est largement fonction du niveau de stock actuel des connaissances de l'entreprise. Ils ont en outre souligné que l'engagement d'une entreprise en R&D contribue à améliorer sa capacité d'absorption par la mise en place de compétences et par un élargissement de ses stocks de connaissances. Si nous considérons la similarité entre les partenaires comme un indicateur de la connaissance ou de l'expérience antérieure, nous pouvons justifier le recours à des mesures de similitude dans la littérature d'alliance comme étant une capacité relative d'absorption (Lane & Lubatkin, 1998; Nooteboom et al., 2007). Cependant, un aspect fait défaut ici, à savoir l'étude de l'interaction entre la similarité et l'intention d'explorer. C'est pourquoi nous ne pouvons pas conclure que cette similitude a joué un rôle actif pour l'apprentissage interentreprises. Nous pensons que l'interaction entre similarité élevée des partenaires et intention d'explorer montre la contribution réalisée de la capacité relative d'absorption sur l'apprentissage interentreprises à travers la profondeur de leur recherche pour apprendre. Ainsi, malgré le manque de nouveauté en similarité élevée, son interaction avec l'intention d'explorer a un effet positif sur l'apprentissage interentreprises. Nous montrons aussi qu'une diversité élevée n'a pas d'effet significatif en soi sur l'apprentissage interentreprises, mais que son interaction avec l'intention d'explorer a un effet négatif significatif. Cet effet peut aussi être expliqué par la capacité limitée de l'entreprise pour intégrer des connaissances (Grant, 1996). On peut conclure que, dans le cas d'une diversité élevée, une tentative par l'entreprise d'explorer les connaissances du partenaire est

coûteuse et inefficace, voir-même réduit la productivité de l'apprentissage. En d'autres termes, en présence d'une diversité élevée de partenaires, non seulement la nouveauté n'a pas d'effet positif sur l'apprentissage mais aussi l'intention d'explorer les connaissances des partenaires par l'entreprise amène des résultats d'apprentissage en baisse.

Implications managériales et perspective de la recherche

La nécessité d'avoir un objectif d'apprentissage dans les alliances interentreprises est la suggestion évidente de cette recherche. Une simple observation de la connaissance du partenaire ne conduit pas à un apprentissage. Ainsi, l'intention d'explorer apparaît comme primordiale dans le développement d'une relation avec un partenaire afin d'obtenir des informations et de nouvelles connaissances nécessaires à l'amélioration des bases de connaissances de chacun. Un engagement clair des différents responsables au niveau de l'alliance favorisera l'objectif d'apprentissage et permettra d'éviter des décisions rapides basées sur de simples mesures financières. L'intention exploratoire de l'entreprise vers ses partenaires s'en trouvera renforcée.

Le nécessaire équilibre entre la similitude des bases de connaissances des partenaires et le niveau de nouveauté fourni par le partenaire doit être sérieusement pris en considération dans la phase de sélection de partenaire. En effet, ces deux points ont une influence certaine sur les résultats de l'apprentissage visés par l'alliance. Beaucoup de similitudes est une situation positive pour faciliter la compréhension mutuelle, cependant, l'absence de nouveauté réduira le nombre de nouvelles connaissances développées par l'alliance. Si la diversité entre les partenaires apparaît être favorable à la production de nouveauté, il convient de noter que cette diversité doit être bien comprise et analysée. Par exemple, la diversité de partenaires provenant d'un même secteur d'activité peut avoir contribué au transfert interentreprises de connaissances, mais que cette même diversité dans des contextes industriels éloignés serait moins efficace pour le transfert. En effet, dans ce dernier cas, si le développement des connaissances et l'apprentissage sont visés, la sélection des partenaires est cruciale afin d'empêcher des facteurs tels qu'un protectionnisme avéré ou une disparité trop forte de compréhension du métier du partenaire qui auraient pour effet de limiter la capacité d'absorption.

Nous retrouvons ici les résultats de notre troisième hypothèse, à savoir que la définition d'objectifs exploratoires dans le cas d'alliances entre partenaires trop divers sont à éviter. Dans le cas l'inverse, i.e. deux partenaires fortement similaires et avec une forte intention

d'exploration, l'apprentissage par alliance se réalise grâce à une mutualisation des expériences vécues par les deux parties. Ceci va permettre à la fois une réduction des essais et des erreurs et la production de nouvelles applications et de nouvelles combinaisons basées sur le contenu actuel de leurs bases de connaissances.

Une perspective de recherche intéressante pourrait être de revisiter cette recherche sous l'angle de l'analyse des brevets et du nombre de citations mutuelles dans ces derniers. Toutefois, la mesure de certaines variables de contrôle (par exemple la confiance) sera rendu difficile par le fait qu'on s'appuie uniquement sur des données d'archives. Cependant, nous pensons que la précision des données sur les brevets et les résultats de la recherche en contexte technologique permettra d'améliorer significativement les résultats obtenus dans notre étude.

Un autre sujet de recherche pourrait résider dans une combinaison de nos variables deux à deux (similarité/diversité -ou selon Jolly(2001): Endogamie/Exogamie -, et exploration /exploitation) et conduire ainsi à un champ d'étude selon 4 contextes génériques (Figure F.4). Dans ce scénario, on pourra identifier les facteurs affectant le transfert de connaissances et l'apprentissage, que l'on soit en situation d'exploitation ou d'exploration. Ces résultats devraient contribuer à une meilleure définition et identification des différentes formes d'apprentissage par alliance (Inkpen, 2002).

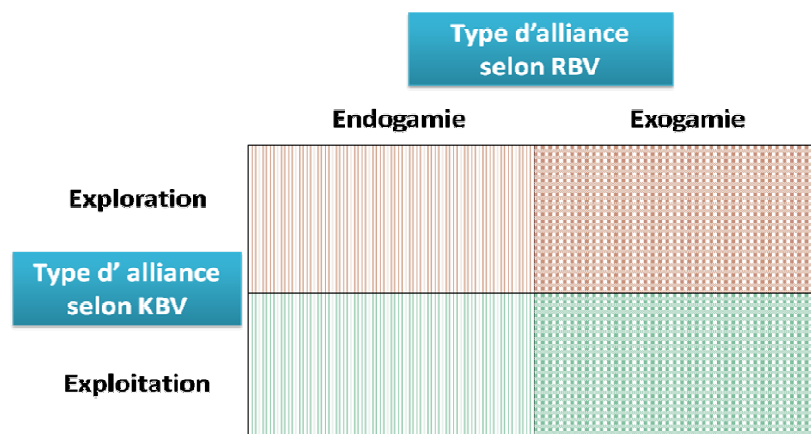


Figure F.4) 4 types d'apprentissage par alliance

Tableau F.1) Statistiques descriptives des principales variables à l'étude

Variable	Abréviation	n	moyenne	Ecart type	Min	Max
Transfert Inter-organisationnel de connaissance (TIC)	IKT	114	2,820175	0,832119	1,2	4,8
Intention d'Explorer	EXPLOR	114	2,940351	1,193768	1,2	4,8
diversité des partenaires	DIVERS	114	1,434211	0,828413	0,583333	3,75
Carré de diversité des partenaires	DIVERS2	114	2,737208	2,1882	0	7,5625
Intention d'Explorer* diversité des partenaires	EXPLOR* DIVERS	114	3,817398	2,277074	0,166667	10,816 67
Faible Diversité	LODIV	114	0,236842	0,427022	0	1
Haute Diversité	HIDIV	114	0,210526	0,409482	0	1
Intention d'Explorer * Faible Diversité	LODIV* EXPLOR	114	0,770175	1,481026	0	4,6
Intention d'Explorer * Haute Diversité	HIDIV* EXPLOR	114	0,398246	0,849569	0	4
Ambiguïté de la connaissance du partenaire	AMBIG	114	3,54057	0,657558	1,25	4,75
Confiance	TRUST	114	3,149123	0,868256	1,333333	4,6666 67
protection des connaissances	PROTECT	114	3,356725	0,852689	1,333333	5
l'entendu fonctionnelle de l'alliance	NUMDOM	114	2,035088	1,003797	1	5
Similarité de nationalité des partenaires	SAMENAT	114	0,447368	0,499418	0	1
Similarité de secteur d'activité des partenaires	SAMESEC	114	0,385965	0,488972	0	1
Gouvernance	EQUITY	114	0,140351	0,348884	0	1
Durée de l'Alliance	DURATION	114	4,482456	2,62133	1	13
Taille de l'alliance (Ln.)	SIZE	114	4,363353	1,207694	1,098612	8,4118 33
Alliance en R&D	R&D	114	0,377193	0,486824	0	1
Alliance en développement de nouveaux produits	NPD	114	0,894737	0,308247	0	1
Alliance en Marketing	MARKTG	114	0,105263	0,308247	0	1
Alliance en vente/distribution	SALE	114	0,219298	0,415598	0	1
Alliance en fabrication	MANUF	114	0,307018	0,463293	0	1

Tableau F.2. Les Coefficients de Corrélacion (n=114)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 EXPLOR	1																
2 DIVERS	-,408(**)	1															
3 AMBIG	-,427(**)	,572(**)	1														
4 TRUST	0,153	0,115	-0,124	1													
5 PROTECT	-,361(**)	-0,052	,321(**)	-,459(**)	1												
6 NUMDOM	0,108	-0,107	-,463(**)	,361(**)	-,263(**)	1											
7 SAMENAT	0,069	0,100	0,028	0,113	-0,143	-0,067	1										
8 SAMESEC	,337(**)	-,769(**)	-,455(**)	0,009	0,106	0,170	-0,134	1									
9 EQUITY	,186(*)	-,391(**)	-,353(**)	0,179	-0,051	,390(**)	-0,059	,406(**)	1								
10 DURATION	,203(*)	-,260(**)	-,316(**)	,422(**)	-,208(*)	,464(**)	-0,105	,316(**)	,399(**)	1							
11 SIZE	-,287(**)	0,008	-,271(**)	0,178	-0,065	,529(**)	-,204(*)	0,045	,311(**)	,394(**)	1						
12 RD	,338(**)	-0,075	-,204(*)	,372(**)	-,341(**)	,480(**)	0,028	,201(*)	,207(*)	,439(**)	0,177	1					
13 NPD	-0,075	,287(**)	0,092	0,175	-0,181	0,184	,194(*)	-,315(**)	-0,026	0,020	0,030	-0,028	1				
14 MANUF	-0,072	-0,055	-,255(**)	0,157	-0,071	,624(**)	-0,063	0,175	,224(*)	,241(**)	,421(**)	0,110	-0,144	1			
15 MARKTG	-0,117	-0,013	-0,005	0,023	0,148	0,102	-0,021	0,022	0,108	-0,020	0,103	-0,149	-0,162	-0,166	1		
16 SALE	-0,034	-0,153	-,272(**)	0,019	-0,031	,448(**)	-0,093	-0,028	0,030	0,040	,197(*)	-0,063	-0,025	0,107	0,025	1	
17 IKT	,613(**)	-,189(*)	-,438(**)	,695(**)	-,575(**)	,329(**)	0,082	,270(**)	,283(**)	,447(**)	0,025	,407(**)	-0,002	0,131	-0,001	-0,013	1

** . P<0.01 (two-tail).

* . P< 0.05 (two-tail).

Tableau F.3. Résultats de Régression Tobit (1). Variable Dépendant: TIC

Variabiles	1	2	3	4	5
EXPLOR		0.2711*** (0.0421)	0.2852*** (0.0416)	0.2406*** (0.0433)	0.4290*** (0.1011)
DIVERS			0.1943** (0.0831)	0.6882*** (0.1955)	1.0706*** (0.2675)
DIVERS2				-0.1957*** (0.0706)	-0.2122*** (0.0698)
EXPLOR*DIVERS					-0.1226** (0.0597)
AMBIG	-0.3320*** (0.0920)	-0.1661** (0.0825)	-0.2452*** (0.0881)	-0.2581*** (0.0852)	-0.3280*** (0.0905)
TRUST	0.5119*** (0.0605)	0.5152*** (0.0517)	0.4897*** (0.0517)	0.4779*** (0.0502)	0.4504*** (0.0511)
PROTECT	-0.2598*** (0.0629)	-0.1782*** (0.0552)	-0.1746*** (0.0541)	-0.1215** (0.0557)	-0.1166** (0.0547)
NUMDOM	0.0532 (0.1705)	-0.0322 (0.1462)	-0.0971 (0.1459)	-0.1457 (0.1421)	-0.1292 (0.1399)
SAMENAT	-0.0133 (0.0899)	-0.0107 (0.0768)	-0.0104 (0.0752)	0.0091 (0.0731)	0.0114 (0.0718)
SAMESEC	0.1656 (0.1151)	0.0906 (0.0991)	0.2792** (0.1262)	0.3146** (0.1227)	0.2938** (0.1209)
EQUITY	0.1071 (0.1481)	0.0452 (0.1268)	0.1010 (0.1267)	0.0903 (0.1226)	0.0491 (0.1222)
DURATION	0.0351* (0.0211)	0.0253 (0.0181)	0.0325* (0.0179)	0.0363** (0.0174)	0.0247 (0.0180)
SIZE	-0.1490*** (0.0437)	-0.0247 (0.0421)	-0.0320 (0.0413)	-0.0205 (0.0401)	-0.0008 (0.0406)
RD	-0.0037 (0.1855)	-0.0572 (0.1588)	-0.0346 (0.1558)	0.0225 (0.1521)	-0.0162 (0.1506)
NPD	-0.2635 (0.2500)	-0.1255 (0.2147)	-0.0860 (0.2108)	-0.0705 (0.2040)	-0.1282 (0.2023)
MARKTG	0.0358 (0.2231)	0.1609 (0.1916)	0.2036 (0.1884)	0.2776 (0.1842)	0.3373* (0.1832)
SALE	-0.1885 (0.1880)	-0.0837 (0.1613)	0.0170 (0.1639)	0.0624 (0.1593)	0.0831 (0.1569)
MANUF	-0.0656 (0.2366)	0.0918 (0.2036)	0.1334 (0.2001)	0.1841 (0.1944)	0.2011 (0.1911)
Constant	3.8655*** (0.4556)	1.7202*** (0.5114)	1.7173*** (0.5011)	1.5216*** (0.4896)	1.2457** (0.4994)
Observations	114	114	114	114	114
LL	-66.66	-49.01	-46.31	-42.60	-40.52
chi2	149.65***	184.96***	190.35***	197.78***	201.93***

Standard errors in parentheses.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Tableau F.4. Résultats de Régression Tobit (2). Variable Dépendant: TIC

Variables	1	2	3	4	5	6
EXPLOR		0.2711*** (0.0421)	0.2694*** (0.0418)	0.1901*** (0.0475)	0.2703*** (0.0429)	0.3324*** (0.0493)
LODIV			-0.1906 (0.1376)	-1.5208*** (0.4459)		
HIDIV					-0.0108 (0.1077)	0.5776** (0.2681)
LODIV*EXPLOR				0.3839*** (0.1229)		
HIDIV*EXPLOR						-0.3069** (0.1286)
AMBIG	-0.3320*** (0.0920)	-0.1661** (0.0825)	-0.1825** (0.0828)	-0.3555*** (0.0974)	-0.1641* (0.0850)	-0.1066 (0.0860)
TRUST	0.5119*** (0.0605)	0.5152*** (0.0517)	0.5027*** (0.0521)	0.4718*** (0.0510)	0.5158*** (0.0520)	0.4904*** (0.0518)
PROTECT	-0.2598*** (0.0629)	-0.1782*** (0.0552)	-0.1578*** (0.0567)	-0.1376** (0.0549)	-0.1774*** (0.0558)	-0.1528*** (0.0553)
NUMDOM	0.0532 (0.1705)	-0.0322 (0.1462)	-0.0763 (0.1485)	-0.0480 (0.1432)	-0.0320 (0.1462)	-0.0120 (0.1426)
SAMENAT	-0.0133 (0.0899)	-0.0107 (0.0768)	-0.0068 (0.0763)	-0.0058 (0.0733)	-0.0106 (0.0768)	0.0076 (0.0752)
SAMESEC	0.1656 (0.1151)	0.0906 (0.0991)	0.1814 (0.1181)	0.2245* (0.1144)	0.0888 (0.1007)	0.0472 (0.0997)
EQUITY	0.1071 (0.1481)	0.0452 (0.1268)	0.0830 (0.1288)	0.0258 (0.1256)	0.0449 (0.1268)	0.0453 (0.1234)
DURATION	0.0351* (0.0211)	0.0253 (0.0181)	0.0323* (0.0186)	0.0108 (0.0192)	0.0252 (0.0181)	0.0237 (0.0176)
SIZE	-0.1490*** (0.0437)	-0.0247 (0.0421)	-0.0226 (0.0418)	-0.0032 (0.0406)	-0.0246 (0.0421)	-0.0050 (0.0418)
RD	-0.0037 (0.1855)	-0.0572 (0.1588)	-0.0285 (0.1589)	-0.0780 (0.1536)	-0.0568 (0.1588)	-0.0840 (0.1551)
NPD	-0.2635 (0.2500)	-0.1255 (0.2147)	-0.1132 (0.2131)	-0.1807 (0.2061)	-0.1264 (0.2148)	-0.2444 (0.2151)
MRKTNG	0.0358 (0.2231)	0.1609 (0.1916)	0.1942 (0.1916)	0.2802 (0.1862)	0.1618 (0.1918)	0.1924 (0.1873)
SALE	-0.1885 (0.1880)	-0.0837 (0.1613)	-0.0330 (0.1642)	0.0217 (0.1591)	-0.0844 (0.1614)	-0.0729 (0.1572)
MANUF	-0.0656 (0.2366)	0.0918 (0.2036)	0.1194 (0.2029)	0.1357 (0.1952)	0.0923 (0.2036)	0.1030 (0.1985)
Constant	3.8655*** (0.4556)	1.7202*** (0.5114)	1.7614*** (0.5083)	2.6549*** (0.5672)	1.7141*** (0.5149)	1.3190** (0.5280)
Observations	114	114	114	114	114	114
LL	-66.66	-49.01	-48.05	-43.35	-49.00	-46.23
chi2	149.65***	184.96***	186.87***	196.27***	184.97***	190.52***

Abstract of Thesis

Learning Intention and Partner Diversity: Simple and Interactive Effects on Interfirm Knowledge Transfer

Relying on knowledge based view; this study tests the effects of three concepts as the prerequisites for interfirm learning: Intent to explore, Existence of novelty, and Approach of exploration. The paper defines the existence of new knowledge to be learnt by the level of partner diversity and addresses approaches of exploration by the interactive effect of the explorative intent and partner diversity. The hypotheses are tested based on a survey over a sample of 114 French companies. Determinants of knowledge transfer between partners such as ambiguity of partner's knowledge, knowledge protection and trust are controlled for. Using Tobit regression models, the findings show that the intent to explore is positively related with interfirm knowledge transfer. Moreover, an inverted U-shape relationship is observed between partner diversity and the effectiveness of interfirm knowledge transfer. Finally, the negative moderating effect of partner diversity on the relation of exploration and knowledge transfer highlights the effect of two approaches of exploration: depth and scope of exploration. In the accordance with the concept of depth of search we find that the interactive effect of similarity of partners with explorative intent is positive on interfirm learning. We also find that a broad search scope represented by the interactive effect of partner diversity and intent to explore has negative impact on interfirm learning.

Keywords: Exploration, Partner diversity, Absorptive capacity, Interfirm knowledge transfer, Novelty, Depth, Scope.

Chapter 1: Introduction

1-1) Today's business environment and alliances

The business environment in the previous two decades has manifested three main characteristics which challenge companies for fulfilling their mission. These three characteristics are the complexity (number and [inter-]relatedness of environmental changes), dynamism (frequency and intensity of environmental changes), and unpredictability (extent to which cause-effect relationships about the changes are incomplete) of the business environment (Volberda, 1996). The need to deal with these characteristics makes companies go beyond their boundaries for growth in order to cope with contingencies of this ever-changing environment. The changes in business environment originate from different contexts such as: rapid technological changes, increased globalisation, new business models from competitors, and accelerated speed in market changes. One of the strategic alternatives for coping with these changes is the interfirm alliance. Alliances have become an essential part of firms' competitive and corporate strategies (Kale and Singh, 2009). According to a survey by Partner Alliances more than 80% of Fortune 1000 top managers think that alliances would account for almost 26% of their firm's revenues in 2007–08 (Kale, Singh, & Bell, 2009).

Peter Drucker, the father of management theory, points out that: "the greatest change in corporate culture, and the way business is being conducted, may be the accelerating growth of relationships based not on ownership, but on partnership" (Drucker, 1996). Indeed, searches on the Internet for strategic alliances produce numerous press releases about companies forming alliances, and also produce several addresses for strategic alliance consulting companies. The number of strategic alliances has almost doubled in the 1990s (Booz, Allen and Hamilton, 1997). According to the Boston Consulting Group (BCG) report on the role of alliances in corporate strategy, the rate of alliance formations in comparison with mergers and

acquisitions declined after 2000, but during the same time period this rate increased in those industries which are growing rapidly or facing considerable uncertainty (and therefore increased risk) (BCG, 2005).

In today's ever-changing business environment of global presence, global competition and internationalization, firms should be managing themselves according to the relevant changes. But the shortage of resources and knowledge and frequent inability of firms to break out of their own self-imposed boundaries is another reality that challenges the power of the global competitiveness of today's companies. Therefore, the focus on the dynamic nature of knowledge and resources is essential for successful firms. In order to remain competitive in this hypercompetitive environment, organizations have to cooperate with each other in different ways and to share knowledge and resources in order to gain competitive advantage (Harrigan, 1987). This need for cooperation explains why the last decade of the twentieth century witnessed an increasing formation of international alliances in the global business world (Parkhe, 2001, Draulans et al. 2003) and why this rate continues to increase in high technology sectors (BCG, 2005). Establishing strategic alliances has become a critical strategy for most contemporary firms in this era (e.g., Gulati, 1998; Harrigan, 1988; Kale, Dyer & Singh, 2002; Parkhe, 1993).

In the economic and managerial literature, interest in strategic alliances between firms dates back to the late 1970s and early 1980s (see, for instance, Pfeffer and Nowak, 1976; Berg, Duncan, and Friedman, 1982; Mariti and Smiley, 1983; Harrigan, 1985; Hladik, 1985).

Alliances improve firms' competitive positions by several ways such as enhancing technological innovation (Sampson, 2007), market power (Kogut, 1991), providing complementary resources and capabilities (Arora and Gambardella, 1990; Teece, 1992; Rothaermel, 2001) and interfirm knowledge transfer (Mowery, Oxley and Silverman, 1996).

The main focus of the present study is the latter advantage of strategic alliances which is learning and knowledge transfer from alliance partners.

1-2) Purpose of the study and research questions

Despite the ability of strategic alliances to enhance the competitive position of firms, several surveys report that the rate of failure of alliances is also between 30 and 70 percent (Dyer, Kale, & Singh, 2001; Kale & Singh, 2009). According to Kale and Singh (2009) this paradox of following numerous alliance formations for enhancing growth and competitiveness while at the same time facing significant obstacles to success shows that we need a better understanding of alliance success factors and their management. Alliance success factors are illustrated in the three following phases of alliance life cycle (Kale & Singh, 2009):

- Factors related to alliance formation and partner selection phase
- Factors related to alliance governance and design
- Factors related to post-formation alliance management (Figure 1.1)

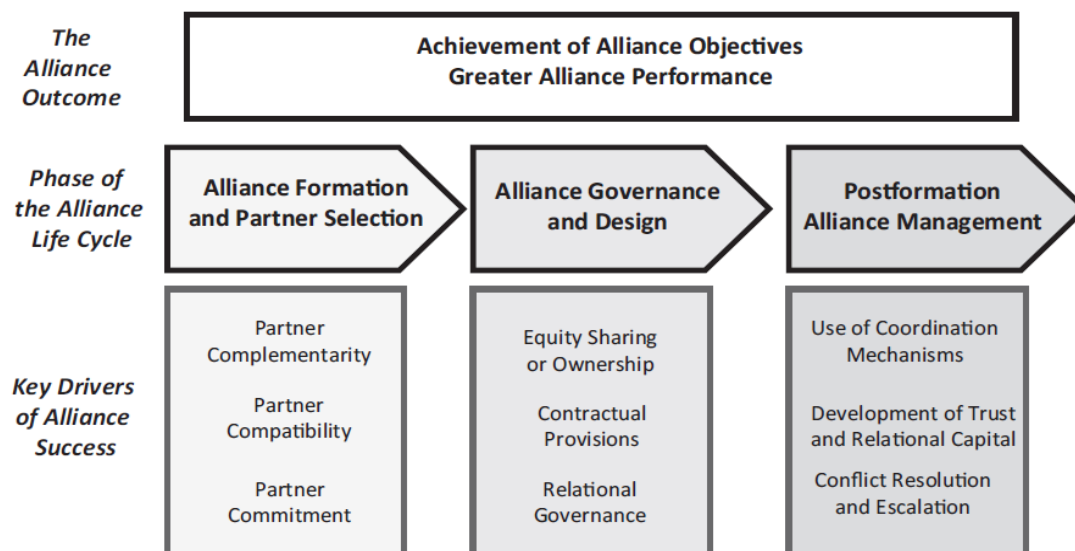


Figure 1.1) Alliance Success Keys (Kale & Singh, 2009)

When an alliance is mainly oriented toward knowledge transfer and interfirm learning, the key success factors have to be considered according to this objective in each phase of the alliance life cycle. In other words, when the objective of an alliance is knowledge transfer, the partner selection criteria regarding this objective is critical. This study aims to contribute to and improve existing knowledge of the partner selection phase of interfirm knowledge transfer based on strategic alliances.

As it is shown in figure 1.1, the objective of an alliance should be taken into account in every phase of the alliance life cycle. While the objective of the alliance in this study is related to interfirm knowledge transfer, the first question of research to be discussed is the intention of firms to learn from their partners. So we propose the first question of research as follows:

Research Question 1: What is the role of firm's intent to explore and discover toward the partner in interfirm knowledge transfer?

As this study seeks to contribute to the partner selection phase, the second question of this research deals with one of the concepts in alliance literature which concentrates on the differences of partners i.e. *Partner Diversity*. Partner diversity can represent some dimensions of the key success factors of alliances in the partner selection phase such as complementarity, compatibility and relative understanding of partners (See figure 1.1). Therefore, the second research question is proposed as follows:

Research Question 2: How does partner diversity influence interfirm learning?

As mentioned above, the *Intention to Explore* and *Partner Diversity* are the two focal concepts of this research and these concepts are going to be studied regarding alliance as a basis of interfirm knowledge transfer and learning. During recent years, understanding how interfirm learning occurs and identifying the antecedents of it has become the central interest of a stream of studies. (see Easterby-Smith, Lyles and Tsang, 2008; Van Wijk, Jansen and Lyles, 2008, Mazloomi-Khamseh & Jolly, 2008). However as Inkpen proposed, thanks to previous studies in this domain, there is a solid base of determinants of interfirm learning and now it is time for new empirical works that attempt to integrate the diverse findings and establish some causal links across variables (Inkpen, 2002). This research tries also to understand the interactive effect of earlier mentioned concepts i.e. *Intention to Explore* and *Partner Diversity* on interfirm knowledge transfer. Hence the third question of the research is formulated as below:

Research Question 3: What is (are) the interactive effect(s) of *Intention to Explore* and *Partner Diversity* on Interfirm knowledge transfer?

The following section explains the theoretical approaches of this research which are adopted in order to answer the research questions.

1-3) Theoretical and empirical positioning of research

Table 1.1 illustrates the *provenance* table of this research. A provenance table is originally a way of showing a potential idea as a research topic (Jankowicz, 2005). This method is applied here for showing the theoretical positioning of the research. In other words, the provenance table shows the theoretical bases which are adopted to answer the research questions.

Knowledge transfer is considered on an alliance level whereas the variable of knowledge transfer effectiveness is measured on a firm level. In other words, following a stream of studies concentrated on the role of alliance as a knowledge transfer strategy, this research observes knowledge transfer effectiveness via alliance and its effect on firms. For analyzing this phenomenon, two main theoretical perspectives are adopted: First, the *Knowledge Based View* (KBV) of the firm and alliance (Grant, 1996; 1996a) and secondly, *Organizational Learning* theories will be emphasized (e.g. March, 1991).

Table 1.1) Provenance Table of Research

Area	Field	Aspect
Strategic Management	Strategic Alliance	Interfirm Knowledge Transfer
Knowledge Based View of the Firm	Organizational Learning (Exploration & Exploitation) Knowledge Integration	Explorative Alliance vs. Exploitative Alliance
		Depth and Breadth of Exploration
Resources Based View of the Firm	Resources and Knowledge Diversity	Similarity and Diversity of Partners
		Knowledge and Resources Novelty

From the KBV, external knowledge integration which explains how firms can transfer and integrate external knowledge in their knowledge base (Cohen and Levinthal, 1990; Lane and Lubatkin, 1998) is selected to enrich the theoretical foundation of the research.

Another aspect of KBV which is applied in this research is organizational learning. The concept of *Intention to Explore* in this study is adopted from the dichotomy of *Exploration and Exploitation* as postulated in organizational learning strategies (March, 1991). Based on the logic of this dichotomy, the concept of explorative and exploitative alliances (Grant and Baden-Fuller, 2004) is also taken as one of locus of attention. Finally the two complementary approaches of exploration i.e. *Depth and Breadth of Exploration* (Katila & Ahuja, 2002) are relied upon for proposing the answer of the third research question..

From the resource-based view, the concepts of resources and knowledge base diversity which examine the external knowledge elements' novelty (Sampson, 2007) and complementarity in alliances (Dussauge, Garrette and Mitchell 2000) are applied. It should be noted that these concepts can also be positioned in KBV. However in chapter five, which is related to hypotheses and research model, both RBV and KBV are applied in the hypotheses development process.

1-4) Methodological approach of the study

In this research, a survey-based approach is adopted for gathering data from already formed alliances. As the variables of this research are related to the partners' relative characteristics and the focal firms' learning intentions, the results of this study show the characteristics of successful learning alliances through the lenses of independent variables. Implications of the findings of study contribute to the managerial knowledge of selection of the right partner in order to realize interfirm learning. In other words, based on the findings, appropriate partners for knowledge transfer can be identified from the partner selection phase of the strategic alliance.

Based on this approach, the following general steps are respected in this study:

1. *Subject Elaboration*: during this step an initial literature review has been done and several interviews with alliance managers were organized.
2. *Literature Review*: after finalizing the subject, a comprehensive literature review has been realized for identifying current issues and arguments within the interfirm learning area, the antecedents of interfirm knowledge transfer, relevant considered concepts and variables. As this step has been done during earlier stages of research, a continuous parallel literature monitoring has been performed during all steps of the research. Through this process of continual review, the received knowledge from the literature review has been kept current and any corresponding updates were incorporated during all stages of research.
3. *Research Population Selection*: French firm alliances are selected as the target population of the research. A list of firm alliances was extracted from the SDC-Platinum Strategic Alliances and Joint Venture Database. All alliances in which at least one partner is French are included in the population of study.
4. *Data Collection Tool Elaboration*: Based on the objective of research and the literature review, a questionnaire was been developed. Through a pilot study, the questionnaire was tested for recognizing potential weakness and shortages related to validity of questions. It was finalized after several qualitative improvements based on the comments of pilot study respondents and feedback during this stage by the researcher. Some quantitative tests were also performed for reduction of questions and for estimating the reliability of collected data.

5. *Data Collection, Analysis and Writing down the Research Document*: Data collection took place during summer and autumn of 2007. The data was collected by an online questionnaire. 152 questionnaires were returned of which, 114 were applicable to our statistical analysis. The main statistical model that was applied for testing the hypotheses was Tobit Regression. After achieving the positive results from the statistical analysis, the writing stage of the dissertation was started.

1-5) Structure of thesis

This document is composed of two main sections. The first section is a French detailed summary of research. The second section, and main body of study, is presented in English. Chapter One (current chapter) introduces the study and its research questions. Theoretical position of the research is also presented in this chapter.

Chapter Two reviews the definition of alliance and alliance formation motives and related theories. A short evaluation of sufficiency of reviewed theory for explaining interfirm knowledge transfer is presented in this chapter.

Chapter Three considers the importance of interfirm knowledge transfer. This chapter also reviews some of the main antecedents and influential factors of interfirm knowledge transfer proposed in previous studies in alliance research.

Chapter Four is the first initiative for conceptual consideration of diversity of partners (Similarity vs. Diversity) and types of interfirm learning objective (i.e. Exploration vs. Exploitation). This chapter tries to show the importance of understanding the context of

learning alliances based on the two dichotomies of Exploration/Exploitation and Similarity / Diversity.

Chapter Five's starting point is the theoretical analyses for the development of hypotheses of the study. In this chapter, after providing a theoretical clarification about the dichotomy of exploration and exploitation based on a systemic view, the role of diversity is rectified in exploration and exploitation learning. The chapter ends with hypotheses of research.

Chapter Six explains the research methodology used in the research approach and research design including the variables, measures of survey, and questionnaire development process. The data analysis method is also described in this chapter.

Chapter Seven which is the final chapter concludes the research, discusses the results and presents the research and managerial implications of the work.

Chapter 2: Alliance, Definition and Theories

2-1) Introduction

This chapter tries to demonstrate a complete and concise picture of the alliance theories. As interfirm knowledge transfer is the heart of this research, this chapter reviews the different alliance formation theories and briefly evaluates their explicative sufficiency regarding interfirm knowledge transfer. The chapter starts with the definition of alliance and a short review on the motives of alliance formation. It continues with one recent conceptual clarification of different types of alliances which considers partner diversity as the heart of classification: *Endogamy* and *Exogamy*. This conceptual classification is the departure point for studying the concept of partner diversity in this research. Review of the main alliance formation theories and their sufficiency toward explaining interfirm knowledge transfer ends this chapter. By considering different theories, the relevance of KBV is clarified in the conclusion of this chapter.

2-2) Alliance Defined

Interfirm alliance has been defined several times in several approaches by different authors. This section of the research does not intend to repeat them; however according to the objective of this research I adopt a clear definition of interfirm alliance and try to show the main characteristics of an alliance. Harrigan (1988) defines interfirm alliances as the partnerships between firms which work together for attaining a strategic objective. This definition does not cover any aspect of knowledge transfer and interfirm learning. Many definitions of alliances are similar and consider the governance of alliance and its strategic objective achievement by partnering firms. But what is intended in this research relates to what is happening through alliances. Therefore, I focus on those definitions which consider the type of activities realized by alliances and define an alliance as:

A voluntary arrangement among independent firms involving exchange, sharing, joint development or provision of technologies, products, and services (Gulati, 1998), and a noteworthy vehicle for exploration and exploitation (Lavie & Rosenkopf, 2006) which adds new knowledge to the firm's knowledge base (Hamel, 1991)

Four conditions related to governance must be met for an inter-firm alliance (Jolly, 2002 p.47): *First*, each of the partners must accept they are losing some of their autonomy in order to pursue a common goal in a well-specified area – whether this is an entire business, a specific function such as joint supply or a well-defined project such as joint development of a new technology. *Second*, each partner has to pool a fraction of its own resources for cooperation. *Third*, the joint action should produce results that would not occur in the context of independent action. And *finally*, outside the alliance, each partner should conserve a significant part of its own business – a precondition that is significant because without it the freedom of either party to act alone may be compromised and balance between the partners undermined. Inter-firm alliances require at least two partners, although it seems that an increasing number of co-operations feature more than this minimum.

2-2-1) Motives of alliance formation

Alliances are developed relying on some prior motives. Researchers have provided varying reasons for formation of alliance in strategic management literature. Although those reasons and objectives are sometimes overlapping, they are not necessarily the same for any given partnership. Motives describe the reason companies want to form an alliance in preference to other alternative ways for achieving the desired goals and objectives are the strategic outcomes desired by the firm (Nasiriyar and Jolly, 2008). They can be divided into short-run and long-run. For instance, a firm which is motivated to form a partnership in order to reduce

the risk and cost advantages may have the objective of knowledge development or achieving new markets. If the firm wishes to avoid risk or minimize the time required to enter a new market strategic alliance will be a preferred option(Nasiriyar and Jolly, 2008).

Alliance motives have been examined from many different viewpoints. More recent studies that present motives and benefits of alliances are presented in Table 1 (Nasiriyar and Jolly, 2008). Some research stream tends to present motives (e.g. R&D cost sharing or economies of scale) and objectives (e.g. new technology development or expansion of market) without distinction (e.g. Nielsen, 2003). Another stream has chosen to present specific types of alliance motives such as market expansion, economy of scale or technology access. Most researchers offer a long list but fail to distinguish those items into different categories (Nasiriyar and Jolly, 2008).

While these studies list up specific motives, others present the motives of alliance formation in separate categories. For example, Eisenhardt and Schoonhoven (1996) proposed two main types of motives for forming an alliance. The first category demonstrates the strategic intent for alliance formation, and the second one refers to social motives, including the factors that are almost related to selection of a partner. Varadarajan and Cunningham (1995) classified the formation purpose from the competitive perspective: market growth and/or profit growth. Jolly (2001) classified the benefits of forming a strategic alliance considering the effects resulted from resource pooling. Table 2.1 summarizes the review of different motives and their classification after Nasiriyar and Jolly (2008).

Table 2.1) Motives and related benefits of alliance (Nasiriyar and Jolly, 2008)

Study	The alliance motives and benefits
Nielsen (2003)	<p>1) Innovation</p> <ul style="list-style-type: none"> • Sharing R&D costs • Develop new technology • Product diversification • Payback on investment <p>2) Market expansion</p> <ul style="list-style-type: none"> • Economies of scale • Market penetration/expansion • International expansion <p>3) Market defense</p> <ul style="list-style-type: none"> • Maintain position in existing market • Spreading risk of an investment <p>4) Technology transfer</p> <ul style="list-style-type: none"> • Alliance with supplier/ distribution channel • Exchange existing technology <p>5) Market power</p> <ul style="list-style-type: none"> • Alliance with competitor to reduce competition regulations • Alliance to conform to government policy
Tsang (1998)	<ul style="list-style-type: none"> • Create rents through access to the scarce resources and combination of them • Expansion of resource usage • Diversification of resource usage and reduce risk of a portfolio of financial assets • Imitation of partners resources • Disposal of resources
Cagliano <i>et al.</i> (2000)	<ul style="list-style-type: none"> • Reduce or limit technological and commercial risk • Achieving critical mass in research • Defining a technological standard • Achieving economies of scale • Reduce the time and costs • Capturing market opportunities • Accessing and integrating different technological disciplines and knowledge • Extending or deepening the company's knowledge • Improving creativity and innovativeness, by connecting people • Accessing specialized assets needed for the development of a new product • The integration of complementary competencies
Colombo (2003)	<ul style="list-style-type: none"> • Cost sharing • Risk sharing • Mutual specialization of tasks • Consolidation of production capacity • Developing new capability • To gain access to the complementary knowledge • The combine the complementary competencies
Jolly (2001)	<p>1. Quantitative complementarities (Endogamy)</p> <ul style="list-style-type: none"> • Reaching a critical mass • Reaching the optimum scale • Gaining scope economies • Increasing joint economies of scale • Spreading risks amongst members <p>2. Qualitative complementarities (Exogamy)</p> <ul style="list-style-type: none"> • Combining different types of knowledge or competencies • Uniting buyer / seller • Uniting separate lines of products or services • Merging distinct geographical territories
Eisenhardt and	<p>1. Strategic motives: Companies engage in alliances because they anticipate a</p>

Schoonhoven (1996)	<p>certain, appropriate payoff structure by doing so.</p> <p>2. Social motives: The need for alliances arises from social contacts, and alliances are more likely to happen between people who know each other.</p>
Glaister and Buckley (1996)	<ul style="list-style-type: none"> • Risk sharing • Product rationalization and economies of scale • Transfer of technology/exchange of patent • Shaping competition • Government policy • Facilitate international expansion • Vertical links • Consolidate market position
Varadarajan <i>et al.</i> (1995)	<ul style="list-style-type: none"> • Market entry in the international arena • Evade barriers to entering new international markets • Broaden product line/fill product line gaps • Protection of the home market competitive position • Enter new-product market domains • Reduce potential of future competition • Raise entry barriers • Enhance resource use efficiency • Resource extension • Acquire new skill
Hagedoorn (1993)	<p>1. Motives related to basic and applied research and some general characteristics of technological development</p> <ul style="list-style-type: none"> • Sharing of risk and costs of R&D • Ensuring access to complementary technologies • Ensuring ability to monitor the evolution of technology • Increasing R&D creativity <p>2. Motives related to speeding up the innovation process by getting access to other companies' resources</p> <ul style="list-style-type: none"> • More rapid payback time • Getting a more attractive position in competition <p>3. Motives related to market access and search for opportunities</p>
Sakakibara (1997)	<p>1. Scale-sharing motives</p> <ul style="list-style-type: none"> • Fixed cost sharing among R&D participants • The realization of economies of scale in R&D • The avoidance of 'wasteful' duplication <p>2. Skill-sharing motives</p> <ul style="list-style-type: none"> • To gain access to the complementary knowledge of other participants • To enter a new business area/technology
Zeng and Hennart (2002)	<p>1. Cooperative Specialization</p> <p>2. Learning Race</p>
Grant and Baden-Fuller (2004)	<p>3. Knowledge Acquisition</p> <p>4. Knowledge Access</p>

By considering Table 2.1., different points of view for explaining alliance motives and its benefit can be recognized. While in this study the diversity of partners is questioned for inter-firm knowledge transfer, focusing on a conceptual framework from the previous table, which considers deeply partner diversity in terms of alliance dimensions (motives, objectives, partner profile, etc.), does matter. The conceptual elaboration of alliance definition by Jolly

(2001) covers the theoretical development of partner diversity in this research. Thus the next section of this chapter explains this elaboration.

2-2-2) Exogamy and Endogamy¹

Inter-firm alliances can be explained by the reduction of transaction costs (Hennart, 1988; Parkhe, 1993), as well as cost and risk sharing (Kogut 1988), symbiotic effects, increase of market power, resource transfer (Hamel, 1991; Mowery et al., 1996; Kumar and Nti, 1998; Khanna et al., 1998; Si and Bruton, 1999), knowledge creation (Inkpen, 1996), knowledge acquisition (Inkpen, 2000), and knowledge access (Grant and Baden-Fuller, 2004).

The endogamy / exogamy dichotomy builds on the resource-based approach (Jolly 2001)². Das and Teng (2000) have stressed the usefulness of the resource-based view for understanding alliances. They argue that alliances are essentially the result of resource integration amongst firms which use cooperation to gain access to other firms' valuable resources. The rationale for alliance formation comes from the value creation potential of firms pooling together resources. Alliances are set up because partners want to benefit from complementarities between their resource bases. Three concepts need to be clarified (Jolly, 2001): the partners' resource profile, the type of joint activity, and the nature of the complementarities gained from pooling resources. These three concepts are discussed below. As a conclusion, it will be suggested that endogamies and exogamies are two extremes of a continuum.

¹ This section relies heavily on a work-in-progress paper by the author and Dominique Jolly

² Seminal references include: Wernerfelt, 1984; Prahalad & Hamel 1990; Barney, 1991; Stalk et al., 1992; Leonard-Barton, 1992.

2-2-2-1) **The partners' resource profile and the resources pooled into the alliance**

In the interpersonal sphere, endogamy is the union of two partners coming from the same social milieu; exogamy is the marriage of two people originating from different backgrounds (e.g., different countries, religions, socio-economic groups, ethnicities, communities, etc.). In the application to business world, the concept of social milieu is replaced by the companies' resource base. Endogamic alliance happens when partners mobilize similar resource bases. Exogamic alliance emerges by the pooling significantly distinct resource bases (Jolly, 2005).

The distinction between endogamic and exogamic partnerships stems from Hennart's (1988) work on transaction cost perspective of alliance. He proposed dichotomy between 'scale' and 'link' joint ventures. Roberts and Mizouchi's (1989) 'resource accumulation ventures' versus 'resource complementing ventures' also refer to similar distinction. Sakakibara (1997) also has distinguished 'cost sharing' from 'skill sharing' alliances. As a conclusion, researchers applied different labels: Hennart refers to 'knowledge', Roberts and Mizouchi use the word 'resource' and Sakakibara discusses about 'abilities'. Yet, the underlying thread common to all these conceptualizations is the relative characteristics of resources pooled via the alliance (Jolly, 2005).

As illustrated in Figure 1, the argument can be taken one step back looking not only at the resources brought into the cooperation, but also at the resource profiles of the partners. According to Nickerson, Hamilton and Wada (Nickerson et al., 2001) resource profile is: "The set and type (i.e., the degree of idiosyncrasy) of resources and capabilities employed in the constellation of activities in a value chain [to produce a good]" (p. 252). In other words, a resource profile should be considered as the specific set of abilities, assets, expertise and knowledge operated within a value chain and under the control of one given firm (Jolly, 2005).

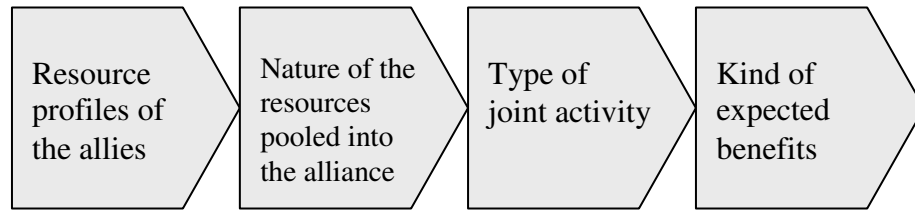


Figure 2.1) Four elements of determining Endogamy and Exogamy relationship (Source: Jolly, 2001)

The contributions of one partner to an alliance are related to the resources it possesses then if two partners demonstrate different resource profiles, their contributions will differ as well(Jolly, 2005). Their cooperation will be built on their differences. When each partner contributes resources that cannot be brought in by the counterpart, the result is that resources pooled in the cooperation cannot be substituted. On the other hand, if two partners have similar profiles, they can either (1) pool similar contributions (e.g., R&D staff with homogenous experience) or (2) pool diverse contributions (e.g., research staff from partner and development resources from the firm) (Jolly, 2005). Because of coordination costs, the second type of alliance produces limited benefits and, it occurs less frequently than the first type where the coordination is not difficult (Jolly, 2005). Consequently, it is presumable that when two companies from the same industry have related profiles, then they have related assets, resources and knowledge based capacities and types of expertise. In this case there is a high probability that they will pool similar type of resources in their partnership(Jolly, 2005). In that case, allies build their cooperation on their similarities.

2-2-2-2) **The type of joint activity**

The type of joint activity that will be pursued is linked to the nature of the resources pooled into the alliance by partners. As already mentioned, allies can pool resources of the same

nature or they can pool diverse contributions. When resources pooled are identical and can be brought by either one partner or another, this means that the value of the partnership does not lie in gaining access to partner's resources but rather in accumulating this joint set of resources at the same stage of the value chain. This can be done at the supply stage by merging two supply departments, at the manufacturing stage for producing one given component, etc. When resources brought by each partner are distinct and cannot be substitutable, this opens the door to other types of activities, i.e. where the issue is more to combine differentiated sets of resources. This can be done at the R&D stage when two distinct streams of research tend to merge and none of the partners is able to deal with these two distinct areas solely. This can be done when partners' manufacturing abilities cover different components or sub-systems. This can occur at the commercialization stage if partners cover different geographical areas.

2-2-2-3) The nature of the complementarities gained through cooperation

Going back to Richardson (Richardson, 1972), "activities are complementary when they represent different phases of a process of production and require in some way or another to be coordinated" (p. 889). This perspective is today too narrow as it restricts inter-firm alliances to vertical cooperation between a firm and its suppliers.

According to Teece (1986), complementarity in assets refers to their different nature by they determine the commercialization of an innovation. Geringer (1988) also distinguishes between compatibility (match between resources of two sides) – from complementarity (when a firm has a knowledge or resources that the partner does not possess but needs it). According to same view, Hill and Hellriegel (Hill & Hellriegel, 1994) defined complementarity among partners as "only when the partners bring distinctive competencies that are different and non-overlapping" (p. 595). From this perspective, 'complementing' is discerned from

'supplementing'. Das and Teng also made similar distinction (Das & Teng, 2000) when they refer to partners' resource alignment. They define resource alignment as the pattern whereby firms' resources are coordinated and applied in the alliance: similar resources create a supplementary pattern and dissimilar resources induce a complementary pattern.

Another meaning given to the word 'complementarity' is Chi's definition (Chi, 1994) which pointed out that "complementarity exists between two sets of resources when a joint use of them can potentially yield a higher total return than the sum of the returns that can be earned if each set of resources are used independently of the other" (p. 275). In the same vein the capability heterogeneity (versus homogeneity) amongst firms defined by Sakakibara match to Chi's (1994) definition. For Sakakibara capability heterogeneity is "the breadth or diversity of technological capabilities that firms possess" (Sakakibara, 1997, p. 147). This third interpretation of the word "complementarity" opens the door to distinguish two kinds of 'complementarities': quantitative and qualitative. If both sets of resources are similar, one can refer to 'quantitative complementarities'; on the contrary, if the two sets of resources are unrelated, the term 'qualitative complementarities' is appropriate (Jolly, 2005).

As a consequence, in contrast to much of the literature on alliances, our contention is that all alliances are complementary: it is the nature of these complementarities that differs (Jolly, 2005). When two allies operate similar value chains in the same environment, they are likely to bring similar resources into the alliance; this opens the door to the accumulation of undifferentiated resources. Adding similar, fully substitutable resources creates scale or size effects. For example, if these companies decide to jointly research a new technology they will most likely bring together engineers with similar backgrounds. If they intend to merge their supply functions, the purchasing skills on each side will certainly be alike. And if they decide to build a joint factory, the manufacturing experiences will be close in nature. Examples of

quantitative complementarities include: reaching a critical mass; reaching the optimum scale; gaining scope economies (e.g., one distribution network for several product types); increasing joint economies of scale; spreading risks amongst members. On the other hand, when partners operate different value chains or they come from unrelated and different environments, they are likely to bring differentiated resources that they will not accumulate, but combine.

2-2-3) Alliance in Knowledge Based View

Grant and Baden-Fuller (Grant and Baden-Fuller, 1995, 2004) attempt to clarify the concept of alliance from the Knowledge Based View (KBV). While this study focuses on knowledge transfer as an intended result of interfirm alliances and while knowledge is considered as the important resource of the allying firms, it is preferable to rely on knowledge based view of the firm for defining the concept of interfirm alliance. The basic assumptions of KBV are presented below (adapted from Grant and Baden-Fuller, 1995, 2004):

- 1) Knowledge is the key productive resource of the firm in terms of contribution to value added and strategic significance.
- 2) Knowledge comprises information, technology, knowhow, and skills. A critical distinction is between explicit knowledge that can be articulated and therefore communicated, and tacit knowledge that is "personal" (Polanyi, 1962) and more difficult to communicate. "Different types of knowledge vary in their transferability" (Grant, 1996).
- 3) Knowledge is acquired by individuals, and in the case of tacit knowledge is stored by individuals.
- 4) Because of the cognitive and time limitations of human beings, individuals must specialize in their acquisition of knowledge: increased depth of knowledge can normally only be attained through sacrificing breadth of knowledge.
- 5) Production (the creation of value through the transformation of inputs into output) requires the application of several different types of specialized knowledge.

Following these assumptions KBV considers the firm as a knowledge integrator. Grant and Baden-Fuller (2004) believe that “Although firms are generally superior to both alliances and markets in integrating knowledge to produce goods and services, alliances can overcome the limits of firms in encompassing highly differentiated knowledge integration processes, while offering efficiencies in knowledge utilization. The advantages of alliances are especially apparent under conditions of uncertainty and early mover advantages” (p77). Based on this argument Grant and Baden-Fuller provide a knowledge-based approach for interfirm alliances. According to them, alliances are mechanisms for learning and having access to external knowledge. “The alliances-as-learning thesis predicts that the knowledge bases of alliance partners will tend to converge as each partner learns from the other. The alliances-as-knowledge-accessing thesis predicts that alliance partners will maintain, and possibly increase their knowledge specialization (p.77)”. This approach for defining alliance is the adopted view of this dissertation.

2-3) Theories of Interfirm Alliances and Their Perspectives about Knowledge Transfer

This section reviews some of the outstanding theories explaining interfirm alliances. Every review is accompanied by an assessment of its usefulness for understanding interfirm knowledge transfer via alliance. Through this section the theories facilitating the comprehension of different aspects of alliances are explained. Some of these theories are directly related to the objectives (and consequently to the hypotheses) of the research: such as knowledge based view, the dichotomy of exploration versus exploitation and the relational view.

2-3-1) **Transaction Cost Approach**

Transaction Cost Approach (TCA) views the firm as a governance structure (Rindfleish and Heide 1997) and describes it “as an efficiency-inducing administrative instrument that facilitates exchange between economic actors” (Leiblein, 2003, p. 939). According to one of initial propositions of TCA, firms (hierarchies) and markets are alternative structures of governance and they differ in their transaction costs (Coase, 1937). Specifically, Coase proposes that the costs of conducting economic transaction in market may, under certain conditions, exceed the costs of organizing the exchange in a firm (Coase, 1988). In this context according to Rindfleish and Heide (1997, p31) “the cost of using market or transaction costs are the costs of running the system and include such ex ante costs as drafting and negotiating contracts and such ex post costs as monitoring and enforcing agreements”. Williamson (1975, 1985, 1996) has added substantial precision to Coase’s general argument by identifying those transactions that are more appropriately conducted in firm than the market. He also has augmented Coase’s initial framework by suggesting that transaction costs include both the direct costs of managing relationships and the possible opportunity costs of making inferior governance decisions (Rindfleish and Heide 1997). Williamson’s framework is built on the two main assumptions of behaviour (Bounded Rationality and Opportunism) and two key dimensions of economic exchange (Asset specificity and Uncertainty).

According to the assumption of bounded rationality the decision maker has limits on his cognitive capabilities and constraints on his/her rationality. While decision maker often tries to act in a rational manner, this intention may be constrained by his/her limited information processing and ability of communication (Simon, 1957). Those constraints in an uncertain environment become challenging because under uncertainty condition the factors surrounding a transaction cannot be determined in advance (i.e. environmental uncertainty) and the

outcome of the exchange cannot be verified clearly after the transaction (i.e. behavioral uncertainty (Rindfleish and Heide 1997)).

The main outcome of environmental uncertainty is an adaptation struggle, that is, difficulties on updating the terms of agreement when the circumstances change. For example, a firm that, due to competitive pressure, must change and improve the design of its product also may need to change the components that constitute the final product. The transaction cost in this case will be associated to renegotiation. This cost will be considerable if the contract with the supplier is not sufficiently comprehensive to specify in advance required component design and related requirements (Rindfleish and Heide 1997).

The behavioural uncertainty refers to difficulties in checking whether the terms of an established contract has been fully respected. For instance, verifying whether a reseller has provided necessary pre-order service to customers is a difficult verification. In this case, even the relevant aspects of operations of the reseller can be measured, finding the right sources of data, gathering and processing the information is a costly control for the firm (Rindfleish and Heide 1997).

The assumption of opportunism is about the decision makers who are exposed to a given opportunity may inherently inclined to serve their own interests, and about the difficulties of determining who is a trustworthy person *ex ante* (Barney, 1990). According to Williamson opportunism is “self-interest seeking with guile” (1985, p47) which involves cheating and lying and such types of behaviours which can violate an agreement. Opportunism is a potential problem if the exchange is supported by some resources which do not have value out of the relationship. For example, according to Rindfleish and Heide (1997) the firm that invests in training a distributor may subsequently have difficulty to replace the distributor with a new one in future. The incumbent distributor then has a leverage to exploit the situation

opportunistically by asking for various kinds of demands from the firm (Rindfleish and Heide 1997). Table 2.2. summarizes the above-mentioned types and sources of transaction costs.

	Asset Specificity	Environmental Uncertainty	Behavioural Uncertainty
A. Source of Transaction Costs			
<i>Nature of Governance Problem</i>	Safeguarding	Adaptation	Performance Evaluation
B. Type of Transaction Costs			
<i>Direct Costs</i>	Costs of crafting safeguards	Communication, negotiation and coordination costs	Screening and selection costs (ex ante) and measurement costs (ex post)
<i>Opportunity Costs</i>	Failure to invest in productive assets	Maladaptation, failure to adapt	Failure to identify appropriate partners (ex ante) and Productivity losses through effort adjustments (ex post)

Table 2.2) Sources and types of transaction costs (Source: Rindfleish and Heide 1997, p.46)

TCA provides two main insights: first, agreements of economic exchanges between actors require specific costly governance mechanisms. Second, the governance measures vary in their potential for facilitating the exchange, and this heterogeneity stem from the differences of attributes in the environment of the exchange (Leiblein, 2003).

According to TCA, the choice of governance form of an organization is the central measure by which management influence the costs of organization (i.e. cost of administration, control, and more specifically, the costs of negotiating the terms of contracts and “enforcing contractual performance” (Leiblein, 2003).

If these costs are too high, the parties will tend to avoid the market and carry out the corresponding exchanges inside a single organization, provided that the organizational costs incurred are no greater than the transaction costs avoided (Dussauge and Garrette, 1999).

Although TCA raises concerns about minimizing of costs of production and transaction at the same time, the application of TCA has been narrowed mainly to the costs associated with governance and controlling economic transactions. As Leiblein (2003, p.939) highlighted: “Due to the economies of scale and specialization available in the marketplace as well as the administrative and incentive limits associated with managing economic transactions within a firm (i.e., hierarchical governance), the theory generally assumes that simple market contracts provide a more efficient, or lower-cost, mechanism for managing economic exchanges than hierarchical organization. Given that most complex contracts are incomplete, the theory holds that in certain situations the costs of market exchange may increase substantially and surpass the technical efficiencies provided by the market”.

TCA is particularly suited to analyzing alliances, as these can be interpreted as hybrid forms in an intermediate position between arm’s length transactions carried out in the market and complete internalization within the firm. In the make or buy dilemma, alliances appear as an intermediate solution (Dussauge and Garrette, 1999). Rindfleish and Heide (Rindfleish and Heide 1997) also report that TCA approach is widely used to analyse vertical integration, vertical alliances and recently horizontal alliances.

2-3-1-1) The Transaction Cost Approach of Interfirm Alliances

One of initial studies that applied TCA to interfirm alliances - or a hybrid governance mechanism according to TCA - is the study of Monteverde and Teece (1982) which examines the antecedents of quasi vertical integration in the US automobile industry. In their paper

quasi vertical integration in which a supplier makes the parts but the manufacturer owns the tools is discussed from TCA approach as a new solution.

The TCA suggests that alliances may be the optimal form of governance structure in some situations (Kogut, 1988; Hennart, 1988). When neither the market (i.e., an arm's length transaction between the parties) nor internalization (i.e., the organization of exchanges within a single firm) can minimize the sum of production and transaction costs, alliances offer a valuable alternative. Indeed, when the limited number of potential suppliers for a customer-specific product creates conditions favorable to opportunism, thus increasing transaction costs, and when internalizing production increases production costs too drastically, collaboration, which can be viewed as only partial internalization, may allow a decrease in both transaction and production costs (Dussauge and Garrette, 1999). In other words, interfirm alliances cope with the high level of uncertainty over the behaviour of the contracting parties (in transactions with market) when the assets of one or both parties are specialized to the transaction and also when it is desirable comparing the high production or acquisition costs of full ownership (Kogut, 1988).

2-3-1-2) Assessment of TCA

Transaction cost economics thus provides a powerful framework to identify those situations in which alliances are more efficient than either turning to the market or internalizing transactions. Under this logic, alliances are solely viewed as an optimizing mechanism and it is assumed that, when firms choose to collaborate, it is only with the objective of minimizing costs. However, many alliances are more strategic in nature; they may also be aimed at enhancing the firm's competitive advantage. Thus, alliances are not only economic devices, but they are also strategic moves aimed at outcompeting rival firms (Dussauge and Garrette, 1999, p.38). Another limit of TCA is about its emphasis on simply cost minimization that

ignores the mutual commitments and interdependence between transaction partners in their pursuit of a common goal or effort. It also neglects the inter-organizational exchange development process over time and as Zajac and Olsen pointed out it also “views dyadic exchange relationships solely in terms of having certain structural properties before contract execution and other structural properties after contract execution” (Zajac and Olsen, 1993, p136).

2-3-2) Resource-Based View

Resource-based view (RBV) of the firm is an ever-growing theory in strategic management research. Strategy literature conventionally suggested that a firm needs to make a strategic fit between its internal strengths and weaknesses (i.e. internal characteristics) and its external opportunities and threats (i.e. external environment). Traditionally despite the importance of strategic fit, the emphasis has been oriented toward firm’s competitive environment and its competitive position (Das and Teng, 2000). To compensate the effect of internal characteristics, the resource-based view adopts a different approach, which put substantial emphasis on the internal aspects of a firm. Barney (Barney, 1991), points out that discuss that a firm’s competitive strategy is critically shaped and affected by its accumulated resources. He believes that the theory of industrial organization which considers external environment as the determinant factor of strategic positioning has an unrealistic assumption which takes firms of an industry as homogenous. According to RBV a firm should focus on its resources more than its competitive environment because the resources it possess determines what it can accomplish. Rooted in the early contribution of Penrose (Penrose, 1959), the RBV conceptualizes firms as heterogeneous entities consisting of sets of different and unique resources. According to this view, a firm can be observed by a broad set of resources that it owns (Das & Teng, 2000). Rumelt (Rumelt, 1984) and Wernerfelt (Wernerfelt, 1984)

advanced the resource based view by arguing that the internally developed resources, their nature and characteristics, and different ways of applying those resources influence the profitability of a firm. Hence, according to Lavie firms can develop isolating mechanisms or resource-position barriers that secure economic rents of their resources (Lavie, 2006).

Some authors argue the accumulated stock of resources matters more than flow of resources and if those resources are non-tradable, non-imitable, and difficult to substitute they could be central for competitive advantage (Dierickx and Cool, 1989). Barney (Barney, 1991) has proposed four characteristics for essential resources in order to gain sustainable competitive advantage— value, rareness, imperfect imitability, and imperfect substitutability. In the same vein, Peteraf (Peteraf, 1993) depicts the features of the rent created by these resources as— heterogeneity in resources, ex post and ex ante limits to competition and imperfect resource mobility. In other words, firm resource heterogeneity is not a punctual phenomenon; rather, firm tends to sustain this heterogeneity over time (Peteraf, 1993).therefore, if firm can sustain its resource based heterogeneity can have above normal returns and gain competitive advantage over other competitors.

Since the resources based view of the firm put its central emphasis on maximization of the value of a firm by bundling then utilizing valuable resources, the firm should be constantly trying to find which resources should be inside the boundaries of the firm, how to develop or acquire them, and how to combine them to maximize the realized value by firm.

2-3-2-1) **RBV of Alliance**

Because the resources are scarce, difficult to imitate and substitute according to the resource-based view, exchanging and accumulation of resources is central strategic action of the firm (Barney, 1991).

Firms are more likely to rely on market and continue alone if transaction of resources is possible efficiently (Eisenhardt & Schoonhoven, 1996). However, the efficient exchanges are not possible on the spot market (Das and Teng, 2000). Some types of resources are not tradable in perfect manner because they are embedded in organization. This is why mergers, acquisitions and alliances could be suitably employed by firms to have access to needed resources which are not available in market and costly or difficult to develop internally.

Eisenhardt and Schoonhoven's (1996) seminal work on resource based view of alliance formation demonstrates that firms form strategic alliances either because their strategic position is weak and they need to resources, or when they possess strong and valuable resources that can be shared (i.e. strong strategic position). As Das and Teng conclude: "the overall rationale for entering into a strategic alliance appears fairly simple. It is to aggregate, share, or exchange valuable resources with other firms when these resources cannot be efficiently obtained through market exchanges or mergers/acquisitions (M&As). In sum, it is about creating the most value out of one's existing resources by combining these with others' resources, provided, of course, that this combination results in optimal returns" (Das & Teng, 2000, p.37).

Das and Teng (Das & Teng, 2000), considering the characteristics of resources, propose that the "more a firm's resources are characterized by imperfect mobility, imperfect imitability, and imperfect substitutability, the more likely the firm will get involved in strategic alliances"(p.41). But they go further and discuss the role of relative characteristics of partners' resources on alliance performance and argue that the changes in resource alignments at alliance level not only influence alliance performance and success but they increase the chances of dissolution in existing alliances. According to Das and Teng (Das & Teng, 2000, p48), partner resource alignment refers to "the pattern, whereby the resources of partner firms

are matched and integrated in an alliance. This pattern defines the resource-based relationship between the partners” and it influences alliance performance significantly (Hagedoorn, 1993). One measure of recognition of partners’ resource alignment is similarity or dissimilarity of contributed resources by two allies. Another criterion proposed by Das and Teng “is the degree to which the resources contributed by the partners are utilized for achieving the goals of the alliance” (p.49). Based on these two dimensions, four types of resource alignment have been proposed by Das and Teng (2000): Supplementary, Complementary, Surplus, and Wasteful. Supplementary is where partners share similar and performing resources, but when the same resources are not performing, it is called surplus. In the same vein, when partners share dissimilar performing resources, it is considered as complementarity; but if they are not performing, this dissimilarity is wasteful.

2-3-2-2) Assessment of RBV

RBV has some limitations regarding interfirm knowledge transfer. Lavie (Lavie, 2006) explained that the proprietary assumption – which claims that valuable resources have to be owned by a firm and be under firm control to have strategic contribution – pose no limitation when we consider that the competitive environment is populated by independent firms. Lavie, referring to Gulati (Gulati, 1999), continues that in recent years lots of evidences has demonstrated that resources of alliance partners transferred through direct interfirm interactions influence the focal firm performance considerably (Lavie, 2006). He concludes that the proponents of RBV failed to recognize the direct sharing and exchange of resources and indirect mobility of benefits associated with the resources (Lavie, 2006, p. 641): “The fundamental assumption of the RBV, according to which firms must own or at least fully control the resources that confer competitive advantage, turns out to be incorrect. Ownership or control of resources is not a necessary condition for competitive advantage. A weaker

condition of resource accessibility, which establishes the right to utilize and employ resources or enjoy their associated benefits, may suffice. This idea is akin to the Penrose's (1959) suggestion that it is the services that resources provide, not resources themselves that generate value for the firm." Thus for understanding the role of interfirm knowledge and resource transfer on firm performance, the new extensions for RBV or even some complementary approaches are needed. For dealing with this shortage, Lavie (2006) presents two types of rents which are different from the rent created by resources under control and ownership of the firm. These two types of rents are *relational* and *spillover* rents. "Relational rents are extracted from relation-specific assets, knowledge-sharing routines, complementary resources, and effective governance mechanisms. They can be extracted only from resources that are intentionally committed and jointly possessed by the alliance partners, and, thus, they involve the shared resources of the focal firm and its partner." (Lavie, 2006, p645). Spillover rent (Inbound, Outbound) pertains to unintended gains due to both shared and protected resources of the alliance partner. Figure 2.2. depicts the three types of rents defined by Lavie (2006) which extends the approach of RBV to the alliance context. According to Lavie (Lavie, 2006), this figure represents the configuration of rents from the focal firm's perspective. "Internal rent can be extracted from the focal firm's own shared and non-shared resources. Appropriated relational rent can be extracted only from the shared resources of both partners. Inbound spillover rent applies to the partner's shared and non-shared resources, whereas outbound spillover rent applies to the focal firm's own resources. Unlike other rent types, outbound spillover rent results from the transfer of benefits from the focal firm to the partner and is, thus, in the opposite direction"(p.644).

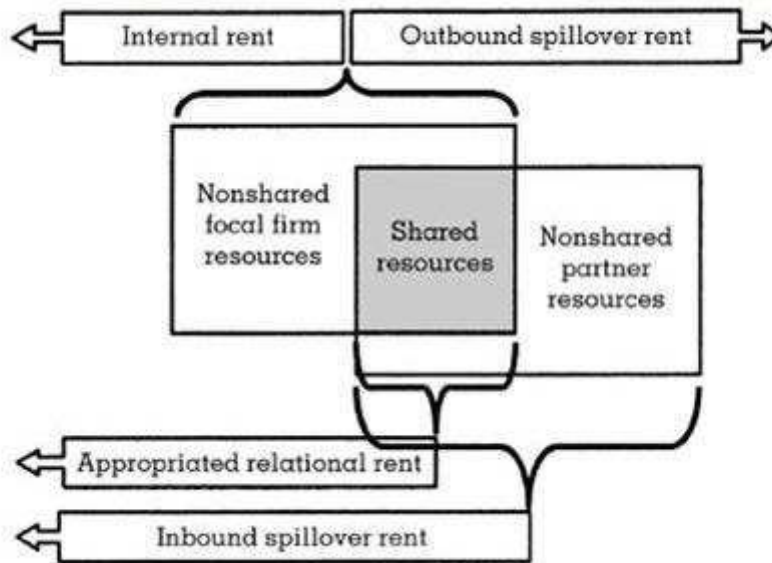


Figure 2.2) Composition of Rents Extracted by the Focal Firm in an Alliance (Source: Lavie, 2006, p644).

2-3-3) Knowledge-Based View

Research into the resource-based view, dynamic capabilities perspective and organizational learning is increasingly considering knowledge as an essential resource, in a way that a new conceptualisation of the firm has appeared as the knowledge-based view (KBV). According to KBV knowledge is the *raison d'être* for a firm; and “what firms do better than markets is the sharing and transfer of the knowledge of individuals and groups within an organization” (Kogut & Zander, 1992, p383). Knowledge is seen as potentially the most strategically important resource (Grant, 1996). What makes this view particularly interesting is that the knowledge can be explicit -which means it can be articulated and taught to others- and tacit, which refers to the type of knowledge embedded in people and cannot be articulate, written and taught. Polanyi (1966) characterised tacit knowledge by highlighting that: we know more than we can say that we know (Channon, 1997).

It is generally argued that tacit knowledge has strategic value because it's embedded in human resources and cannot be replicated. In other words it is inimitable according to RBV perspective. The valuable tacit knowledge of an individual is also essentially rare and difficult to transfer, therefore fulfilling all the requirements of a valuable resource. But KBV goes beyond the leading definition of knowledge as an important resource that can be tacit or explicit to claim that knowledge is about the process phenomenon of knowing which clearly gets influenced by cultural and social contexts in which it happens (Eisenhardt and Santos, 2006).

2-3-3-1) **Knowledge-Based View of the Firm**

Considering the origins of KBV (See Appendix. 1), there are a set of assumptions concerning the characteristics of knowledge and the circumstances of its creation and application which create the foundations of KBV(Grant 1997, p451):

“These include:

- Knowledge is the overwhelmingly important productive resource in terms of its contribution to value added and its strategic significance.
- Different types of knowledge vary in their transferability. The critical distinction is between ‘explicit knowledge’ which is capable of articulation (and hence transferable at low cost), and ‘tacit knowledge’ which is manifest only in its application and is not amenable to transfer. The ease with which knowledge can be transferred also depends upon the capacity of the recipient to aggregate units of knowledge.
- Individuals are the primary agents of knowledge creation and, in the case of tacit knowledge, are the principal repositories of knowledge¹. If individuals’ learning capacity is bounded, knowledge creation requires specialization: increased depth of knowledge normally requires sacrificing breadth of knowledge. At the same time, production typically requires the application of many types of knowledge.

¹ Knowledge repositories are also considered by other literatures like economic geography, high-tech firm clusters and Regional Innovation Systems (RIS) in different levels (e.g. Regions and Clusters as knowledge repositories). See Maskell (2001), Cooke (2001).

- Most knowledge is subject to economies of scale and scope. This is especially the case with explicit knowledge which, once created, can be deployed in additional applications at low marginal cost.”

According to this view knowledge is dispensed through the different individuals who are specialized in different types of knowledge. For yielding products and services several types of knowledge should be organized and applied together. The organization and utilization of knowledge should preserve individuals specialization in knowledge domains. According to Grant (1996, 1997) the firm is the institution which resolve this challenge: “it permits individuals to specialize in developing specialized expertise, while establishing mechanisms through which individuals coordinate to integrate their different knowledge bases in the transformation of inputs into outputs”(Grant, 1997, p.451). Grant proposes four mains mechanisms to integrate Individuals’ which are:

- transfer;
- direction;
- sequencing;
- organizational routine.

Although knowledge transfer has been considered as the primary mechanism of managing knowledge in organization, its efficiency as a knowledge integration mechanism is questionable because as Grant pointed out it undermines the efficiencies of specialization. The knowledge integration should be more than inter-individual learning. Knowledge can be embedded in reduced forms of ‘direction’ such as rules, operational procedures and instructions that one specialist in a given knowledge domain issues. This type of ‘direction’ guides the behaviour of other members of organization even if they are not specialist in that domain of knowledge. Grant discusses that this integration can be achieved by simply

'sequencing' behaviours or at a more complex level by 'organizational routines' that are regular pattern of coordinated activities of multiple individuals (Grant 1996, 1997)

2-3-3-2) **The contribution of the knowledge-based view¹**

Acknowledging the characteristics of knowledge and the challenge of organizing the integration the knowledge of multiple individuals and sources provide considerable insight into the conventional understating of organization function of a firm. Certainly TCE can show the sources of market failure in knowledge based transactions (Choi, Raman and Ussoltseva, 1998). However, showing the inefficiencies of contracts in coordinating the efforts of an interwoven team of individuals does not provide much insight into the design of an organization which is capable to maximize performance of that team. Kogut and Zander (1992) present the firm not so much as an institution that economizes on the transaction costs of markets, but as a social institution capable of coordinating human behaviour in ways that is impossible for pure market contracts. They argue that 'organizations are social communities in which individual and social expertise is transferred into economically useful products and services by the application of a set of higher-order organizing principles. Firms exist because they provide a social community of voluntaristic action structured by organizing principles that are not reducible to individuals' (Kogut and Zander, 1992: 384). However, Kogut and Zander, do not clarify entirely what is the nature of those 'social communities', their 'social expertise' and the 'organizing principles' under which they operate (Grant, 2001).

According to Grant (2001) "part of the problem is that Kogut and Zander, together with Nonaka and other writers on knowledge and the firm, rest much of their analysis on the concept of 'organizational knowledge'. Once we view organizations as knowing entities, it is

¹ The section is heavily based on Grant, R. M. 2001. Knowledge and Organization. In *Nonaka I. and Teece D.J.(Eds) Managing Industrial Knowledge, Creation, Transfer and Utilization*. Sage Publications Ltd.

difficult to discern the mechanisms by which individuals link their separate skills and knowledge bases to create this collective knowledge (Grant, 2001: 148).

Grant (2001) suggests that one alternative solution for this problem is to consider organizational knowledge as the collection (or aggregation) of individuals' knowledge which corresponds to the Simon(1991) idea that claims all knowledge resides in human heads and organizations per se does not have knowledge.

Grant (1996) suggested some of the mechanisms that firms might use to integrate individuals' knowledge in order to produce products and services. The key to efficiency in knowledge integration is to create mechanisms that avoid the costly and time consuming learning. After all, the benefits of specialization will be lost if each person has to learn whatever other person possess as knowledge (Grant, 2001). The knowledge based view should help us view coordination mechanisms as strategic and tactical choices made by the firm in order to achieve the integration of the special knowledge of multiple individuals (Grant, 2001). Thus the firm's existence according to KBV is based on knowledge integration

2-3-3-3) Knowledge-based view and interfirm knowledge transfer

Most knowledge-based approaches have concentrated on alliances as vehicles for organizational learning. Such characterization tends to conflict with the observation that alliance activity among companies is associated more with narrowing than broadening firms' knowledge domains. An alternative knowledge-based analysis of alliances views them as concerned more with accessing than with acquiring partners' knowledge. Such knowledge accessing permits increased utilization of knowledge resources, an advantage that is enhanced when there are uncertainties concerning technological change and early mover advantages in product markets. Even if collaborative alliances are less efficient than full internalization in

supporting the knowledge integration mechanisms that form the basis of productive activity, these inefficiencies may be offset by the advantages of knowledge utilization and speed of knowledge access (Grant and Baden-Fuller, 1995).

2-3-4) Exploration and Exploitation

March (1991) presents two general approaches for organizational learning. He defines exploration as a concept which can be captured by the terms such as search, variation, risk taking, experimentation, play, flexibility, discovery and innovation. At the other hand exploitation includes the terms such as refinement, choice, production, efficiency, selection, implementation and execution. March pointed out that learning organizations (or what he called adaptive systems) have two processes of exploration of new possibilities and exploitation of old and known certainties. He proposes that organizations need to keep balance between these two processes for survival and prosperity because over-engagement to one of them excludes the other. He argues that engaging in exploration creates the high costs of experimentation without tangible benefits because of exclusion of exploitation. And over-commitment to exploitation leads to many undeveloped new ideas and too little distinctive competences (p.71).

In alliance literature this dichotomy has been applied several times in research contributions. Koza and Lewin (1998) for first time present the application of this dichotomy in alliance classifications. Rothaermel (2001) and Grant and Baden-Fuller (2004) use this dichotomy for types of alliances. They believe that alliances for interfirm learning are explorative alliances and those aiming to have access to complementary assets and knowledge are exploitative ones. Rothaermel (2001) found that those incumbents which concentrate on exploiting complementarity assets via alliances outperform other incumbents that focus on exploring the new technology. Lavie and Rosenkopf (2006) also refer to knowledge-generating alliances as

exploration and knowledge-leveraging alliances as exploitation. In a nutshell we can accept that those alliances in which new knowledge emerges can be classified as explorative alliances. Then we can accept that the novelty is the result of exploration. While in interfirm knowledge transfer the result of transfer for the recipient is the novelty, I believe focusing on exploration can be useful for understanding interfirm knowledge transfer. Recently in the organizational learning domain two general approaches have been presented as the approaches of exploration. The researchers developing these approaches believe that exploration leads to novelty by two mechanisms: Depth of exploration, and Scope of exploration. I consider these two approaches below.

2-3-4-1) Depth and Scope of Exploration

Exploration can be realised by different approaches and firms can find the approach which fits best with their capabilities and strategic objectives. Katila and Ahuja (2002) present two main approaches called *Depth* and *Scope* of search for new product innovation. They argue that depth of exploration, or “how frequently the firm reuses its existing knowledge” (Katila and Ahuja, 2002, p1183), influences explorative results of innovation via three kinds of experience effects: “First, using the same knowledge elements reduces the likelihood of errors and false starts” (p1184). Second, increased experience is also likely to make the search results predictable so the exploration can be decomposed into several solvable sub problems (p1184). “Third, repeated usage of a given set of concepts can lead to significantly deeper understanding of those concepts and boost a firm's ability to identify valuable knowledge elements within them, to develop connections among them, and to combine them in many different and significant ways that are not apparent to less experienced users of those concepts” (p1184). However they found an inverted U shape relationship between depth of

exploration and innovation. They argue that the negative effects of excessive depth are due to limits to improvement along a technological trajectory and rigidity (pp 1184-5).

The next approach of exploration is related to scope of search which refers how widely the firm explores new knowledge. Katila and Ahuja (2002) suggest two mechanisms which improve innovation by scope of exploration: high scope search and exploration adds new variations to the existing knowledge pool and these new variations provide new choices to solve problems. Second, search scope increases a firm's number of new products through enhancing recombinatory search. Although Katila and Ahuja suggest an inverted U-shape relation among scope of exploration and innovation, their empirical setting did not support the proposed relation.

In the interfirm context the concept of depth and scope has been also studied for the variety of external sources of knowledge. Laursen and Salter (Laursen and Salter, 2006) applied these concepts to the openness of the firm for profiting from external sources of knowledge. They found that depth of using external sources can have an inverted U-shape relationship with the innovative performance of the firm. They argue that “search for new ideas is not just about scanning a wide number of sources; it also involves drawing knowledge heavily from these sources (p.136).” For each external source of knowledge, the firm has to develop a pattern of interaction over time and construct a common way of working together and shared understanding. The intensity of these efforts of the firm defines its depth of exploration regarding each of the external sources.

Extending Katila and Ahuja, Laursen and Salter (2006) hypothesize that external search breadth also influences innovative performance. They define external search breadth as the number of different search channels that a firm draws upon in its innovative activities (p135). Although they suggest a positive effect of scope of search on innovative performance, they

hypothesize also decreasing returns from a broad scope on innovation performance and called it over-search. They proposed three reasons for the decreasing return of scope of exploration: *bounded absorptive capacity*, the *timing problem* (i.e. ideas and solutions come at wrong moment and wrong place) and *attention allocation problem* (i.e. “since there are so many ideas, few of these ideas are taken seriously or given the required level of attention or effort to bring them into implementation”) (p.135).

2-3-5) **Relational View**

The relational view which Dyer and Singh forwarded in 1998 can be considered as an extension from the resource-based view. On one hand, the relational view considers interfirm relationships and routines as rare, valuable, non-substitutable and difficult to imitate resources. On the other hand, Dyer and Singh (1998) believe that the search for origins of competitive advantage should go beyond firm boundaries to interfirm relationships because no single firm is operating in a vacuum. Instead, firms participate in various business relationships throughout its business lifecycle with its suppliers, customers, partners and competitors. Inevitably, the performance of the firm will be positively or negatively affected by the current business situations of the whole network of relationships the firm has formed. The relational view of Dyer and Singh provides valuable insights for studying of sources of competitive advantage in inter-firm routines and processes such as strategic alliances because it contributes to clarify some business challenges which cannot be adequately explained by extant views (i.e. industry structure view or the resource-based view) of sources of competitive advantage. For example, why do the firms starting with identical resources achieve different returns in different social and institutional contexts (Dyer and Singh, 1999). According to this view *Relational Rent* is: “a supernormal profit jointly generated in an exchange relationship that cannot be generated by either firm in isolation and can only be

created through the joint idiosyncratic contributions of the specific alliance partners” (Dyer and Singh, 1998, p.662). In other words, the unique configurations of resources or ‘constellations’ of alliance partners that result from proactively managed alliances may be difficult to imitate, leading to sustainable performance differences (Gomes-Casseres, 1996). Thus compared to RBV in which the unit of analysis is the resources of firm, relational view (Dyer and Singh, 1998) argues that the ‘network’ is an important unit of analysis for explaining competitive advantage.

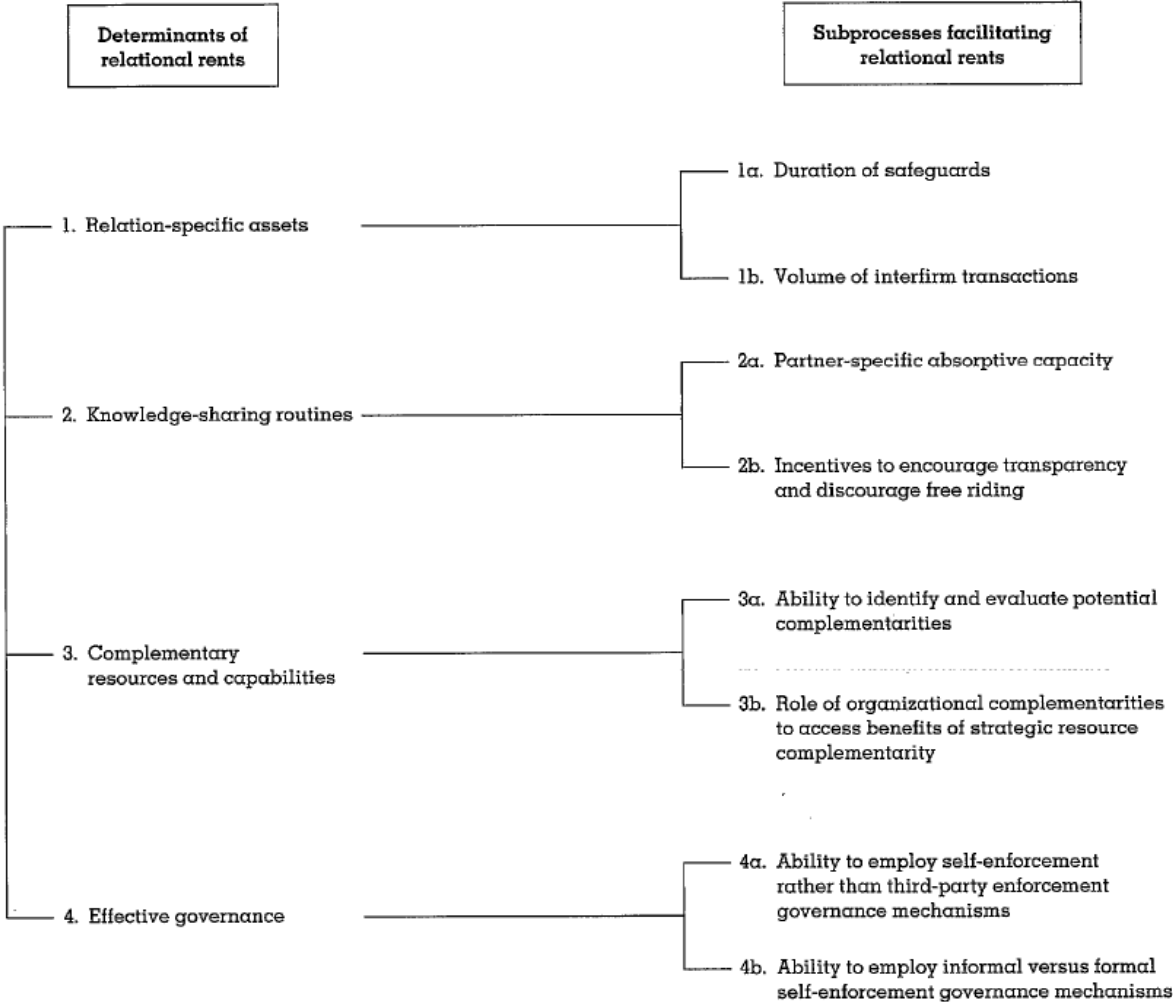


Figure 2.3) Determinants of Interorganizational Competitive Advantage (Dyer & Singh, 1998)

Figure 2.3. shows the determinant of competitive advantage in the relational view. As it is shown in this figure, all sub-processes supporting the relational rent are in interfirm level and

they do consider resources, routines and capabilities beyond individual firm level. Although the organizational learning literature focus on the individual firm, but there is increasing evidences which suggests that a ‘network’ of firms may be a critical, but less explored unit of analysis for distangling firm-level learning (Powell, Koput, and Smith-Doerr, 1996; Dyer and Singh, 1998).

2-3-5-1) Assessment of relational view for explaining interfirm knowledge transfer

Dyer and Singh not only recognize the strategic importance of interfirm knowledge transfer, but they define interfirm knowledge sharing routines as a regular pattern of interfirm interaction that permits the transfer, recombination, or creation of specialized knowledge (Dyer & Singh, 1998). So according to this view, partners via interfirm alliances not only exchange knowledge but also create and recombine specialized knowledge. And these knowledge sharing routines create relational rent. This dimension of rent¹ would be realised only when firms try to develop their partner-specific absorptive capacity and improve their alignment to promote mutual transparency and, at the same time, to avoid free riding on the knowledge acquired from the partner.

One of the main implications of relational view is about considering some of the determinant factors of interfirm learning in relational level. For example the concept of absorptive capacity (cf. next chapter) (Cohen and Levinthal, 1990) is improved according to relational view and it is redefined and observed at alliance level as *relative absorptive capacity* (Lane and Lubatkin, 1998).

¹ The relational rent defined by Dyer and Singh is composed by 4 dimensions: Relation-specific assets, knowledge sharing routines, complementary resources and capability, effective governance.

What you should know by now

- Alliances are a voluntary arrangements among independent firms involving the exchange, sharing, joint development or provision of technologies, products, and services (Gulati, 1998), and are a noteworthy vehicle for exploration and exploitation (Lavie & Rosenkopf, 2006) which adds new knowledge to firm's knowledge base (Hamel, 1991)
- The motives of alliance formation can be classified into two general categories: Complementary-based motives and Scale-based motives. Recent classifications are emphasizing the knowledge-based view for defining alliance motives (Zeng and Hennart, 2002) (Grant and Baden-Fuller, 2004).
- For showing the importance of partner diversity, the dichotomy of Endogamy and Exogamy (Jolly, 2001) has been selected and explained in this chapter. In endogamy, partners build on their similarities, and in exogamy, partners build on their differences (Czipura and Jolly, 2007). This dichotomy can help to better understand the construct of partner diversity in this study.
- KBV considers the firm as a knowledge integrator. Grant and Baden-Fuller (2004) believe that "Although firms are generally superior to both alliances and markets in integrating knowledge to produce goods and services, alliances can overcome the limits of firms in encompassing highly differentiated knowledge integration processes, while offering efficiencies in knowledge utilization" (p.77).
- Transaction Cost Approach (TCA) views alliances from a cost minimization perspective. Therefore it has no significant implication about the strategic importance of alliance, interdependence of partners, and the development of intensity of interfirm exchange over time. By definition, TCA cannot have direct implications regarding interfirm knowledge transfer.
- The proponents of RBV failed to appreciate correctly the direct exchange and sharing of resources and indirect benefits associated with the transferability of resources. So alliance can blur the assumption of ownership of resources in RBV. A weaker condition of resource accessibility, which set up the right to utilize and apply resources or enjoy their resulting benefits, may be adequate in alliances (Lavie, 2006, p. 641). By this modified argument of RBV interfirm knowledge transfer can be explained as one of the sources of heterogeneity in firms' performance.
- From KBV, alliances are the vehicles for organizational learning. Two different approaches have been developed in KBV for explaining alliances. The first one, which is based on the concept of exploration, considers alliances as knowledge transfer vehicle from the partner.

The second approach views alliance based on the concept of exploitation. In this approach alliance is a knowledge accessing option without any intention of internalization.

- Knowledge generation alliances can be classified as explorative alliances and knowledge leveraging alliances as exploitative alliances (Lavie and Rosenkopf, 2006). In other words, those alliances in which new knowledge emerges can be classified as explorative alliances. Then the novelty is the result of explorative alliances. Inward transfer of new knowledge from partner can also be considered as novelty generation.
- There are two approaches for exploration: Depth and Scope of Exploration. *Depth* of exploration refers to “how frequently the firm reuses its existing knowledge” (Katila and Ahuja, 2002, p1183) for novelty generation. *Scope* of exploration refers to how widely the firm explores new knowledge for novelty creation. The same concept is applied in the context of open innovation (Laursen and Salter, 2006). Depth of using external sources can have an inverted U-shape relationship with the innovative performance of the firm. For the scope of external knowledge exploration the same type of relationship - i.e. decreasing returns - has been observed.

Chapter 3: Interfirm Knowledge Transfer

3-1) Interfirm Knowledge Transfer and Its importance

Knowledge transfer in organizations is the process through which one unit (e.g., group, department, or division) is affected by the experience of another (Argote & Ingram, 2000, p151). The ability to transfer knowledge from one unit to another has been found to contribute to the organizational performance of firms in both the manufacturing and service sectors. Although the benefits of knowledge transfer have been documented in many settings, the effectiveness of knowledge transfer varies considerably among organizations (Argote & Ingram, 2000). Knowledge transfer in organizations manifests itself by modifications and changes in the knowledge or performance of the units that receive and learn the knowledge (Argote & Ingram, 2000).

Argote and her colleagues (Argote et al, 2000) list a number of mechanisms of knowledge transfer which are recognized by knowledge management and organizational learning studies. They point out that “these mechanisms include personnel movement, training, communication, observation, technology transfer, reverse engineering products, replicating routines, patents, scientific publications, and presentations, interactions with suppliers and customers and alliances and other forms of interorganizational relationships”(p.3).

Some authors suggest that knowledge transfer (Interfirm and Intra-firm) is a basis of competitive advantage (Argote & Ingram, 2000). The comprehensive review by Van Wijk et al. (2008) shows that ‘*intra-firm*’ knowledge transfer contributes differently to performance compared to the ‘*inter-firm*’ knowledge transfer. According to them the main possible explanation of this finding is that internal units of a firm are more eager to transfer knowledge that is relevant to exploitative innovations which aim short term results. On the other side, exploration that have uncertain outcomes requires knowledge from external sources

(including other firms). The positive effect of interfirm knowledge transfer on innovative performance has been also observed earlier by Powell et al (Powell, Koput, & Smith-Doerr, 1996), and the effect of interfirm knowledge transfer on general performance is supported (Lyles and Salk, 1996; Steensma and Lyles, 2000). Knowledge transfer helps the firm to develop organizational capabilities which are difficult to imitate and this, in turn can improve firm performance (Szulanski, 1996). Lane and his colleagues also find a higher performance of partner firms because of higher interfirm knowledge acquisition (Lane et al, 2001). Considering the importance of interfirm knowledge transfer, studying its antecedents is a priority in alliance research.

3-2) Antecedents of Interfirm Learning¹

Through a review of literature of knowledge transfer in strategic alliances, some variables and factors that were introduced by previous studies are identified. Since these factors are somehow heterogeneous, they are classified in this section in a bibliographical manner. These factors are classified into the 4 following categories: 1) The nature and characteristics of required or transferred knowledge; 2) The absorptive capacity of partners; 3) The reciprocal behaviour of the partners, and finally, 4) The nature of alliance activity and alliance objective. These four categories are the results of bibliographical classification, grouping factors according to their similarity. The similarity criterion in this section is the main area of research related to each factor.

¹ This section relies heavily on the paper of the author and Dominique Jolly in *Journal of Knowledge Management*. (Mazloomi-Khamseh and Jolly, 2008)

3-2-1) The nature and characteristics of required or transferred knowledge

The nature and role of knowledge required by one partner from another could affect knowledge transfer particularly through the type of mechanism required for its transfer in the alliances. From this aspect, tacitness versus explicitness, simplicity versus complexity, and core versus non-core knowledge have been principal focuses of authors.

3-2-1-1) Tacit versus explicit knowledge

Explicit knowledge is knowledge that is codified and transferable in a formal, systemic language (Polyani, 1966). It is knowledge that can be found in contracts, manuals, databases, licenses, or embedded in products. Tacit knowledge is made up of knowledge that has a personal quality, making it difficult to formalize and communicate. Tacit knowledge is embodied in individuals, such as employees with expertise and know-how resulting from years of on-the-job experience, as well as in organizations, such as that with an established brand name, shared routines and company culture. The transfer and formalization of tacit knowledge has been discussed by many authors (e.g., Choi and Lee, 1997; Kogut and Zander, 1993; Senker and Faulkner, 1996; Zander and Kogut, 1995, Inkpen, 2000, 2006). Some authors believe that tacit knowledge can be transformed into explicit knowledge (Nonaka and Takeuchi, 1995), but this argument has convincingly been refuted by others who believe that the two kinds of knowledge are actually two sides of the same coin (Tsoukas and Vladimirou, 2001; Cook and Brown, 1999; Von Krogh and Grand, 2002).

From the alliance management point of view, authors claim that because explicit knowledge is easier to codify and articulate, it will travel more easily across organizational boundaries (inside but also outside the company) than tacit and less articulate knowledge (Badaracco, 1991; Nonaka and Takeuchi, 1995). The nature of

knowledge, tacit vs. explicit, has a deep impact on its transfer process, so that many authors (Kogut, Zander, 1992; Nonaka and Takeuchi, 1995; Spender, 1996) maintain that because explicit knowledge can be codified in formal rules, tools and processes, it is easily transferable, while because tacit knowledge is often embedded in the individuals' cognitive processes, it is more difficult to communicate and transfer; this would imply that the transfer of tacit knowledge requires richer context and more than mere codification (Daft and Lengel, 1986).

Depending on the distinction made by the literature, a knowledge transfer may refer to the transfer of tacit knowledge, explicit knowledge or to both. Because individualism and collectivism affect the way individuals think, interpret and use of knowledge, it appears reasonable to suppose the context effect of those cultural dimensions on the type of knowledge that may be transferred in an international strategic alliance (Canestrino, 2004). According to Bhagat *et al.* (2002), firms located in individualistic-oriented cultures can transfer and absorb explicit knowledge better than the tacit. In contrast, firms and organizations in collectivist cultures transfer and absorb knowledge more effectively if that is tacit. "The transfer of tacit knowledge is typical of those collectivistic cultures, like the Japanese, where people usually learn from each other, according to a sort of collectively tuning" (Canestrino, 2004). It has also been argued that different operational modes will be conducive to the transfer of different types of knowledge. Choi and Lee (Choi and Lee, 1997), for instance, argue that joint ventures and alliances will be effective for the transfer of highly tacit knowledge, franchising and licensing for knowledge of medium tacitness, and outsourcing for knowledge of low tacitness. The rationale could be that joint ventures involve a high degree of integration of activities and interaction of personnel, and are therefore good for the experiential learning of tacit knowledge. Inkpen

also argued that the movement of personnel, while it could be associated with explicit knowledge, will be most effective as a means of gaining access to tacit knowledge (Inkpen 1996, 1998a). Thus the more tacit the knowledge is, the more difficult it is to transfer through strategic alliances.

3-2-1-2) Simple versus complex knowledge

Knowledge can vary in complexity (Kogut and Zander, 1992). Complexity refers to the number of interdependent routines, individuals, technologies and resources linked to a particular knowledge or asset (Simonin, 1999). Reed and DeFillippi (Reed and DeFillippi, 1990) argue that more complex human or technological systems generate higher levels of uncertainty or ambiguity which leads to limit imitation. The full information field of a particular knowledge based asset may be compartmentalized across various teams or individuals so that the entirety of the knowledge cannot be easily re-integrated or comprehended. When number of components of a system increases and those components interact with each other, the system will be a non-decomposable whole with high level of complexity (Singh, 1997). Complexity influences the understanding of the totality of a system and to weaken its transferability. Kogut and Zander (Kogut and Zander, 1993), for example, increase in complexity of technologies make their transfer to partner or third parties more difficult than to the wholly owned subsidiary. Hansen (Hansen, 1999) also suggests that strong ties like formal mechanisms and interactions are better for transfer of complex knowledge in inter-firm contexts. It should be noted that complex knowledge should not be used interchangeably with tacit knowledge. In other words, complex knowledge is not always necessarily tacit, and it requires special mechanisms and procedures to be transferred. We can conclude that the more complex the knowledge, the more difficult to transfer it through strategic alliances.

3-2-1-3) Core and peripheral knowledge

Core competences and capabilities are those that are central to a firm's success because they may be the basis of competitive advantage. Different managerial considerations are necessary when bringing core and peripheral capabilities to an alliance. Firms are especially likely to bring core assets to joint development alliances. When all partners contribute their core assets to such alliances, the potential payoffs are greatly increased. At the same time, however, the potential loss of core knowledge increases the long-term risk faced by the firm (Norman 2002).

The more an alliance involves a firm's core businesses, markets, and technologies, the greater the scrutiny of partners for potential hidden agendas and opportunism. In addition, firms are more likely to try to limit the diffusion of valuable knowledge. Losing valuable, core knowledge to a partner may eradicate a firm's source of competitive advantage. Losing peripheral knowledge, on the other hand, should have much less impact on a firm's ability to compete. Therefore, firms are expected to be more protective of knowledge that is core to their operations. Thus, core knowledge cannot be easily transferred between partners in alliances. It must be noted that the concepts of tacit and core knowledge cannot be used interchangeably. In fact tacit knowledge is not necessarily core knowledge, but core knowledge is likely to be tacit.

3-2-2) Factors related to the absorptive capacity of partners

Cohen and Levinthal (1990) introduced the concept of absorptive capacity which refers to the ability of the firm to evaluate, assimilate and use outside knowledge for commercial ends. They introduced the absorptive capacity construct as "the firm's ability to identify, assimilate and exploit knowledge from the environment". Absorptive capacity affects the ability of partnered firms to learn, according to Lane and Lubatkin (1998, p462) who noted "... the

ability of a firm to learn from another firm is jointly determined by the relative characteristics of the two firms.” Absorptive capacity also affects the ability of a firm to internalize knowledge obtained from its partner or generated in concert with the partner. The existence of a differential in the respective absorption capacities of the allies induces different learning rhythms (Kumar and Nti, 1998). These variations explain, to a great extent, the interactions between partners in the alliance and the trajectory it follows (stable, unstable, unilaterally disputed relation, etc.). Two important features that could affect the absorptive capacity of partners are: resource overlap and history of prior relationships. Resources’ overlap appears in endogamies while it cannot emerge in exogamies (Jolly, 2002). As such, the relatedness between allies’ profiles has to be considered. It seems that the Cohen and Levinthal’s definition of the firm’s absorptive capacity has been supported also in Inkpen’s work (Inkpen, 1998b). Inkpen analysed the importance of related prior knowledge in the learning opportunities created by international joint ventures. He put emphasis on the role of following features: the existence of prior and familiar knowledge; and the existence of complementary knowledge from partners.

3-2-2-1) Relatedness of transferred knowledge with existing knowledge or resources overlap.

While alliance partners are an important source of external knowledge, external knowledge differs in how easily it can be internalized. Absorptive capacity has been associated to overlap of resources and knowledge bases (Lane and Lubatkin, 1998; Mowery et al., 1996) and similarity in organizational structures and processes (Lane and Lubatkin, 1998) in dyadic alliances. Crossan and Inkpen (Crossan and Inkpen, 1995) assert that managers should look for equilibrium in selecting alliance partners; a potential partner must be similar enough to be understood, but not so similar that limits learning opportunities. The potential to internalize and use partner’s knowledge is great when that

partner has similar skills, resources, and capabilities. Due to relative absorptive capacity a similar partner can more easily recognize the value of a firm's knowledge and has a greater ability to transfer and use the knowledge (Norman, 2002; 2004). Therefore, resource (especially knowledge) overlap with a partner can positively affect knowledge transfer between partners.

3-2-2-2) Knowledge Complementarity

According to Teece (1986), complementarity in assets refers to their different nature by they determine the commercialization of an innovation. Geringer (1988) also distinguishes between compatibility (match between resources of two sides) – from complementarity (when a firm has a knowledge or resources that the partner does not possess but needs it). According to same view, Hill and Hellriegel (Hill & Hellriegel, 1994) defined complementarity among partners as "only when the partners bring distinctive competencies that are different and non-overlapping" (p. 595). From this perspective, 'complementing' is discerned from 'supplementing'. Das and Teng also made similar distinction (Das & Teng, 2000) when they refer to partners' resource alignment. They define resource alignment as the pattern whereby firms' resources are coordinated and applied in the alliance: similar resources create a supplementary pattern and dissimilar resources induce a complementary pattern.

Another meaning given to the word 'complementarity' is Chi's definition (Chi, 1994) which pointed out that "complementarity exists between two sets of resources when a joint use of them can potentially yield a higher total return than the sum of the returns that can be earned if each set of resources are used independently of the other" (p. 275). In the same vein the capability heterogeneity (versus homogeneity) amongst firms defined by Sakakibara match to Chi's (1994) definition. For Sakakibara capability heterogeneity is

"the breadth or diversity of technological capabilities that firms possess" (Sakakibara, 1997, p. 147). This third interpretation of the word "complementarity" opens the door to distinguish two kinds of 'complementarities': quantitative and qualitative. If both sets of resources are similar, one can refer to 'quantitative complementarities'; on the contrary, if the two sets of resources are unrelated, the term 'qualitative complementarities' is appropriate (Jolly, 2005).

Most traditional literature is preoccupied with knowledge complementarity that is skills and resources that the other partner needs but does not have (Nielsen, 2005). As discussed by Harrigan (1985), strategic alliances are more likely to survive when partners have complementary resources and thus a firm will seek knowledge it considers missing but determinant for the achievement of its strategic goals. Brockhoff, Gupta and Roterling (Brockhoff *et al.*, 1991), by examining the transfer of complementary know-how, identified synergies resulting from the exchange of complementary know-how. So complementary know-how is one of the main trigger for alliances, particularly in R&D. One traditional view is that in seeking and applying the relevant knowledge, a firm will also need to have a knowledge base in the same or similar area, because only such similarity will let an understanding of the complexities of the new knowledge as well as of its applicability to the firm's unique circumstances (Nielsen, 2005).

The complementarity of knowledge refers to development and distribution of synergies of knowledge and to match of knowledge resources pooled within strategic alliances. But the similarity of knowledge bases of the partner firms refers to their strength in absorbing and interpreting transferred knowledge (Nielsen 2005).

3-2-3) Factors related to the reciprocal behaviour of partners

These factors are related to the interactions, policies and attitudes of partners toward each other. A firm's approaches to decision making and reactions by a firm in the face of the dilemmas related to the partner's behaviour affect knowledge transfer by changing the level of trust, openness, and motives for cooperation. Cultural differences between the partners' organizations also could affect these mentioned factors and then affect knowledge transfer effectiveness indirectly (Liu & Vince, 1999). Having prior relationship can also contribute to the effectiveness of knowledge transfer.

3-2-3-1) Level of knowledge protection by partners

Consistent exchange among employees of partners facilitates the information sharing, which increases the probability of that knowledge will be transferred. While restrictions on exchange may block a partner from learning knowledge from a focal firm, these limitations can be self-defeating because they also limit the ability of the firm to transfer knowledge and learn (Norman, 2002). Partners often respond to each other's limiting of information exchange by further reducing their own interaction, an action that reduces knowledge transfer to the focal firm. Therefore, increasing knowledge protection will decrease knowledge transfer (Norman, 2002). This factor is very important in alliances between competitors and is discussed in some other research as *Transparency* – the degree of openness to the partner (Joy Jiang, 2002). Some previously mentioned factors also could influence the level of knowledge protection in the firm. For example, the factor concerning resource overlap: while some levels of similarity in knowledge base is needed to ensure that partners understand, exchange and eventually combine effectively their knowledge, a firm will be eager to reduce the learning opportunities of a partner who has a greater ability to learn rapidly and easily from those opportunities because such a partner is more harmful than a partner with lower similarity (Norman, 2004).

3-2-3-2) Learning Intent

The perceived partner's learning intent is the extent to which the focal firm believes that the partner is focused on learning during the alliance. Because not all firms are equally concerned with knowledge transfer, learning first requires that a firm has intent to learn (Hamel 1991). Without this intent, a partner is less likely to commit resources to knowledge transfer and less likely to take actions to appropriate a firm's knowledge. Factors such as those considered by Inkpen (Inkpen, 1998a) to be the factors affecting effective knowledge acquisition, including *flexible learning objectives, leadership commitment, and avoiding performance myopia*, could represent the learning intent of a partner in alliance.

Inkpen (1998a) has noted that the collaborative objectives of the alliance partners are a key element in alliance knowledge creation. However, it is not enough to enter an alliance with a learning objective. This does not mean that learning objectives are unimportant. If learning objectives are linked with alliance formation, a firm may enter more actively into the alliance in order to search for knowledge. However, if the initial learning objective is not correctly focused and management is unwilling or unable to adjust the objective, knowledge management efforts may be ineffective. He has also mentioned that the top management's role in managing knowledge should be one of catalyst and architect (Inkpen 1998a). While multiple advocates are important, there must be at least one strong champion of knowledge creation in a leadership position. Inkpen has said that managers seeking to create knowledge must cope with confusing experience. When a firm is heavily focused on financial performance issues, learning will be often a secondary and less

tangible concern. This could lead to performance myopia that acts as a barrier to knowledge creation.

3-2-3-3) Trust

Scholars have demonstrated the importance of mutual trust for efficient knowledge transfer (Doz and Hamel, 1998). In the same vein, Das & Teng (1998) suggested that the level of trust that one company grants to its ally and, at the same time, the level of control it exerts on its ally, both define the confidence level, i.e. the expected intensity of cooperative behavior. Trust reflects the belief that a partner's word or promise is reliable and that a partner will fulfill its obligations in the relationship (Inkpen, 1998a). Trust among alliance partners, especially in technology collaborations, is critical. Trust reduces the fear of opportunism by partners, and then should reduce transaction costs. With trust, the need for monitoring and other control mechanisms is reduced (Norman, 2004). In addition, trust encourages behaviors such as open communication and the willingness to share information. Trust has been shown to increase cooperation and improve flexibility, lowering the cost of coordinating activities and increasing the level of knowledge transfer and potential for learning (Nielsen, 2005).

Trust has been discussed frequently in learning literature, Lack of trust can create confusion about whether a partner is really a partner or a competitor (e.g., Powell *et al.*, 1996) or in case of low level of trust accuracy of exchanged information is questionable (e.g., Currall and Judge, 1995). This infers that inter-firm trust is an important antecedent and a form of currency that facilitate knowledge transfer and accessibility (Inkpen, 2000). Consistent with this, in his study of two biotechnology alliances Dodgson (Dodgson, 1993) found that trust facilitated inter-firm knowledge transfer between alliance partners.

Uzzi (Uzzi, 1996) via a field study found that trust is a governance mechanism of interfirm alliances and facilitates the exchange of tacit knowledge.

3-2-3-4) Prior Relationship.

Prior relationships with a particular alliance partner allow a focal firm to learn about that partner and facilitate the building of trust between the partners. Prior relationships can enhance cooperation in a variety of ways. Over time, the parties develop behavioural expectations, become subject to norms of reciprocity, and develop a greater understanding of their partners and these partners' true motives (Norman, 2002). In addition, because of the cumulative nature of learning and knowledge transfer process, knowledge transfer will be more effective when transferred knowledge is related to knowledge that has already been transferred from a given partner via the past experiences (Inkpen, 1998a, b). So when there is a deeper prior relationship between partners, knowledge transfer through strategic alliances becomes more effective.

3-2-4) Exploration versus Exploitation: purpose of alliance activity

March (March, 1991) proposed a model of organizational learning based on two distinctive types of activities: exploitation and exploration. In exploitative activities, firms make use of their existing assets –“improving and refining existing capabilities and technologies – to generate rents and increase productivity. In explorative activities, the firms look to create new capabilities, technologies, or products. Exploitative and explorative alliances differ in several dimensions (Joy Jiang, 2002). First, the need for knowledge sharing is much higher in explorative alliances than in exploitative ones. While the exploitative alliances aim at efficiency, knowledge application, and value-adding, the explorative alliances focus on innovation and knowledge creation. Too much control of knowledge flows can stifle the creative exchanges between the partners' personnel and may defeat the original purpose of the

explorative alliance. Second, the need for knowledge protection is higher in exploitative alliances than in explorative ones. Similar to this issue, and using a similar logic, Jolly and Rolland in their question “if knowledge management is a critical issue in strategic alliances, does this issue present different aspects in exogamies and endogamies?” analyse the differences of knowledge management process in two generic types of alliances and show that the two types of alliances have different characteristics in terms of knowledge management process elements (Jolly and Rolland. 2004). Thus the nature of alliance activity can influence knowledge transfer in strategic alliances.

Figure 3.1. summarizes the content of this chapter

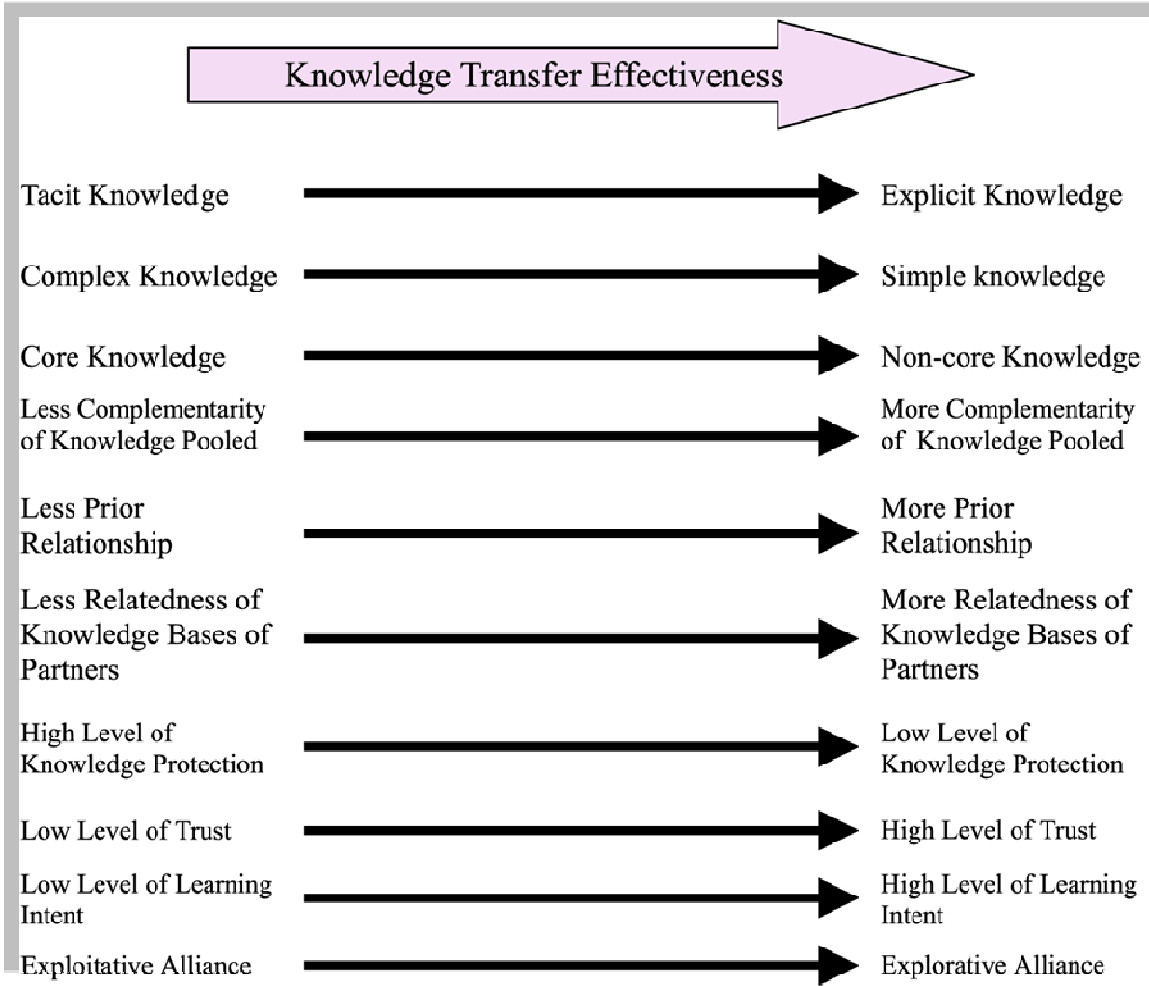


Figure 3.1) Determinant factors of knowledge transfer effectiveness in inter-firm alliances

What you should know by now

- Interfirm knowledge transfer antecedents can be classified by following four categories:
 - 1) The nature and the characteristics of required or transferred knowledge:
 - a) Tacit versus explicit knowledge;
 - b) Simple versus complex knowledge;
 - c) Core and non-core knowledge; and
 - 2) Factors related to the absorptive capacity of the partners:
 - a) Relatedness of transferred knowledge with existing knowledge; and
 - b) Knowledge complementarity.
 - 3) Factors related to the reciprocal behavior of the partners:
 - a) Level of knowledge protection by partners;
 - b) Learning intent; and
 - c) Trust.
 - d) Prior relationships.
 - 4) Exploration versus exploitation: the purpose of alliance activity.

- It's clear that some of the factors mentioned are not independent from the others. For example, trust could affect the level of knowledge protection of firm. But trust is just one of the determinants of intensity of knowledge protection. For example, being a competitor or not is another factor that influences the level of knowledge protection of partners in a strategic alliance. The final factor also can influence the effects of others because this factor represents varied learning objectives pursued by partners. For different objectives, partners may pool different resources and knowledge which have different characteristics and act in different ways.

Chapter 4: Toward a Typology of Interfirm Learning

4-1) Introduction¹

In the Interorganizational learning research two dominated approaches are adopted: Resource-based view (RBV) and Knowledge-based view (KBV). The detailed description of these theories is already discussed earlier, so this chapter tries to focus on shortcomings of each of them regarding explanation of learning and knowledge transfer by interfirm alliances:

- From RBV the level of complementarity between partners' resources and knowledge is the source of potentially valuable knowledge/resource to learn/acquire. Then, one of the main explanations of RBV for alliance formation is profiting from the complementarity of partners' resources (Arora and Gambardella, 1990; Teece, 1992; Rothaermel, 2001); and varying levels of similarity and diversity of partners' profile has been considered as the level of complementarity. (Mowery et al, 1996), (Sampson, 2007). Some of the prior research shows that similarity of firms leads to less innovation and interorganizational learning (Ahuja & Katila, 2001), (Sampson, 2007) and in order to profit from knowledge transfer opportunities, some level of diversity is needed (Mowery et al, 1996), (Sampson, 2007). But even with the strength of these empirical findings, two important and related points are still ambiguous:

-The *first* point concerns R&D alliances between competitors in which partners try to develop new knowledge and technology and exploit it in their internal products and processes. In this type of alliances a high level of knowledge creation and learning takes place and the partners profit from the value of alliance by reducing the risk of failure of the project. In other words, by putting similar R&D knowledge and resources together, they benefit from scale/size effect to reduce risk (particularly risk of failure) and at the same time they create knowledge and transfer it to their respective organizations. But according to findings of prior research when partners' knowledge profile are similar and they aim scale effect by sharing similar knowledge and resources, knowledge transfer and learning cannot take place.

-The *second* point relates to the concept of diversity. Diversity has been defined versus similarity in the context of the relative resource profile of partners. But in some cases

¹ This chapter is heavily based on the paper of author in *The Third European Conference on Management of*

where the differences between knowledge/resource bases of partners are very substantial, two partners cannot interact in order to learn from each other because this type of difference represents a distance instead of complementarity; i.e. because of high heterogeneity among knowledge bases, partners cannot grasp, even partially, the counterpart's knowledge.

- Hence, as argued above, it is evident that the concept of diversity and its measures in RBV have serious inadequacies in explaining interfirm learning. The extension of KBV in strategic alliances can overcome this shortcoming. However, it should be noted that KBV of strategic alliances has also been evolved partially. Thus before any application of this approach, the less scrutinized aspect of it must be clarified:

From KBV, the alliances form in order to meet two purposes. The first purpose is acquiring knowledge from a partner. Knowledge can be transferred more easily between partners than through market mechanisms (Shenkar and Li, 1999). In this stance, alliance is a way of learning from a partner and internalization of its socially and organizationally embedded knowledge (Kogut, 1988). According to this purpose, acquisition and absorbing the skills and knowledge is the key determinant of performance (Hamel, 1991). Even when learning is not declared intention, firms may learn some knowledge from their partners and the outcome of this learning can enhance their performance (Crossan and Inkpen, 1995). Thus, internalizing partner's knowledge is a critical point regardless of original intentions of formed alliance. A partnering firm may be simultaneously attempting to learn the knowledge from its ally, to absorb and integrate this knowledge, and then apply it to develop its own competitive products and services (Richter and Vettel, 1995). But this approach cannot justify the formation of all of alliances. In many cases for instance, the firm wants to ally with a partner to free itself from peripheral skills and focus on its own core competences. This leads us to the second purpose of alliance formation from KBV which has not been considered frequently in the literature.

The second purpose of strategic alliance formation from KBV relates to cooperative specialization. Following Nelson and Winter (1982), a firm may decide to enter into a joint venture in order to retain the capability (or what they call 'remember-by-doing') of organizing a particular activity while benefiting from the other superior activities of a

partner (Kogut, 1988). In other words, in many cases of interfirm alliances, the objective of the firm is not internalization of a partner's knowledge but simply having access to it. The firm can concentrate on what it can do best and let other activities be done by the partners ; this leads to specialization of the firm in its own competences. This reason as a motive of alliance formation has been underestimated in alliance literature, and much of research on interorganizational learning neglects it. This aspect of KBV of strategic alliance is highlighted recently by several authors (Zeng and Hennart, 2002) (Grant and Baden-Fuller, 2004). It is believed that both approaches have significant importance in reality and relying on just one of them will bias our understanding about alliance management.

In this chapter, the purpose of alliance from KBV and the concept of diversity of partners from RBV are addressed in two following sections. Based on these two dimensions – partners' diversity and type of knowledge based purpose of alliance – an integrated framework is presented for improving the perceived wisdom about knowledge transfer and learning by interfirm alliance. The framework consists of four cells, and for each cell one example is provided.

4-2) Exploration and Exploitation: Two faces of alliance from knowledge-based view

According to KBV of interfirm alliance, inter-partner learning is considered as the purpose of alliance formation (Inkpen, 2002). The idea of knowledge transfer from one partner to another is discussed by Hamel (1991) as internalization of a partner's knowledge by the firm. In this approach partners compete to be the first to internalize the counterpart's knowledge; and it is likely that an alliance would be terminated by the partner which internalize rapidly other partner's knowledge and resources. The approach of knowledge internalisation was the

dominant sense of knowledge transfer and learning in 1990s. But recently some researchers (Zeng & Hennart, 2002) have defined a second category of alliance-based knowledge transfer and interfirm learning perspective. They distinguish the knowledge-internalisation purpose of alliances from what they call cooperative specialization (Zeng & Hennart, 2002), or knowledge accessing approach of interfirm alliance (Grant & Baden-Fuller, 2004).

Zeng and Hennart (Zeng & Hennart, 2002) challenge the internalization or learning race view of interfirm joint ventures and to call for a redirection of current alliance literature from knowledge based view. They argued that knowledge transfer in alliance literature has been treated as a race for the internalisation of one partner's knowledge by the other one. They contend that the normative suggestion of this view that partners should enter a joint venture with a racing mindset is not always justified and they suggest cooperative specialization as a more real phenomenon compared to a learning race.

Grant and Baden-Fuller (Grant & Baden-Fuller, 2004) referring to the research of Mowery and his colleagues (Mowery, et al, 1996) and to the concepts of exploration and exploitation (March, 1991) present knowledge accessing versus knowledge acquisition approach of interfirm alliances. Grant and Baden-Fuller, being inspired by March's dichotomy, present their knowledge accessing approach as an exploitative approach of learning by alliance and state knowledge internalization or knowledge acquisition as explorative learning by alliance. Grant and Baden-Fuller argued that internalisation or acquisition is close to the concept of exploration and having access to knowledge to exploitation. Exploration from this viewpoint points to partnership as a channel of learning in which each firm uses the alliance to learn and internalize the partner's knowledge. In the same vein, exploration refers to a type of "knowledge sharing in which each firm gets access to its partner's stock of knowledge in order to exploit complementarities, but with the intention of maintaining its distinctive base of

specialized knowledge” (Grant & Baden-Fuller, 2004, p64). So in short, in alliances with an explorative motive the probability of a learning race between partners is relatively high, while in exploitative alliances cooperative specialisation and obtaining access to knowledge base of partner is essential for focal firm.

In this part, the author adopts Exploration as one aspect of KBV of interfirm alliance motives which represent knowledge acquisition and internalization. Exploitation is also considered as another aspect of KBV of alliance motives which refers to knowledge access and cooperative specialization. This dichotomy is the first dimension of the framework presented in this part; the second dimension will be discussed in next section.

Table 4.1. summarises the two aspects of KBV of interfirm alliance which represents two principal types of inter-organizational learning.

	<i>Exploitation</i>	<i>Exploration</i>
Development of the alliance partners' knowledge bases	Alliances increase knowledge specialisation Partners' Knowledge bases remain differentiated	Alliances cause broadening of each firms' knowledge base Partners' knowledge bases converge over time
Learning occurs by	Obtaining access to partner's knowledge	Internalising partner's knowledge
Stability of alliances	If successful, alliances become increasingly stable over time	As each partner absorbs knowledge from the other, alliances become less stable
Longevity of alliances	Can be long term	Life span limited to the time it takes to acquire partner's knowledge
Numbers of alliances	A firm can engage in multiple alliances simultaneously without sharply declining marginal benefit	Limited absorptive capacity implies a limit to the number of alliances a firm can pursue simultaneously

Table 4.1) Two principal types of inter-organizational learning from KBV

Adapted from Grant & Baden-Fuller (2004) and Zeng and Hennart (2002)

4-3) Diversity: A typology of the contributions of partners

In existing literature on alliance, differences in skills/knowledge are considered as the catalysts for learning by partners (Harrison et al., 2001) (Sampson, 2007). This difference is interpreted as complementarity of assets. Complementarity is conceptualized several times

from economic and management research points of view. For example, according to Richardson, activities are complementary when they represent different phases of a process of production and require in some way or another to be coordinated (Richardson, 1972, p. 889). Teece underlined the prominence of complementary assets in understanding the failure of many innovators who were unable to appropriate the economic rents of their innovations (Teece, 1986). Chi believes that (Chi, 1994, pp. 274–275) “complementarity exists between two sets of resources when a joint use of them can potentially yield a higher total return than the sum of returns that can be earned if each set of resources are used independently of the other”.

In alliance literature, the level of diversity between partners’ resources and knowledge is also the source of potentially valuable knowledge to learn. Diversity of knowledge is treated in two ways in research of alliance. Some authors on one hand define an individual variable for measuring the level of similarity of partners (as a continuum) in one aspect related to knowledge, without separating alliances into different classifications. They interpret a lower level of similarity as higher level of complementarity (Mowery et al, 1996)(Sampson,2007) (Rothaermel and Boeker, 2008). On the other hand, a stream of research and empirical studies goes further and presents two general types of alliances in their research populations. In these studies, alliances are categorized into two discrete categories as complementary (or symbiotic) when the one partner’s contribution to alliance is different from the counterpart’s contribution and as accumulative alliances when allies share the same type of knowledge or resources (Hennart, 1988, Dussauge, Garrette, Mitchell, 2000, Jolly, 2001). This dichotomic perspective is critical for this part because it has a more comprehensive approach to complementarity from RBV than other streams of studies. Hence some of these dichotomic approaches are discussed here.

Hennart (Hennart, 1988) identifies scale alliances on the one hand and link alliances on the other side. According to Hennart (1988: 362) “Scale JVs are created when two or more firms enter together a contiguous stage of production or distribution or new market... [but] in link JVs, the position of the partners is not symmetrical”.

The scale-link distinction reflects different objectives that firms assign to alliances (Dussauge, Garrette, Mitchell, 2000). Scale alliances, in which the firms contribute similar type of resources that belong to the same stage of the value-chain, will lead to substantial economies of scale for those actions that firms perform in the alliance. In other words, scale alliances contribute to the partners by facilitating achievement to the scale economies and to reduce the need for extra capacity. Such alliances can involve joint R&Ds, the collaborative production of a given product or component.

In contrast, link alliances aim at combining dissimilar and maybe complementary knowledge and resources that each partner brings in the alliance.

This dichotomy is recently redefined and improved by Jolly (2001) as Endogamy and Exogamy. He argued that the resource profiles of partners define the nature of pooled resources, and these pooled resources, which can be combined or accumulated, in turn create different types of expected benefit from alliance (Jolly, 2001)¹.

In this section the dichotomy of similarity and diversity (complementarity) is applied as a representative of contribution of each partner from RBV. Exogamy is selected as complementary alliance and Endogamy as non-complementary alliance. The more endogamic (or scale) an alliance, the less the complementary pooled knowledge and more similar the knowledge profile is; that in turn means less opportunity to learn. In exogamic (or link)

¹ For more detail on Endogamy and Exogamy see chapter two.

alliances, knowledge complementarity increases the opportunity of learning from external knowledge. But it should be noted that extreme difference in exogamies, between resources and knowledge profile of partners or between shared knowledge can convert the complementarity to distance which reduces the ability of partners to understand and analyse a counterpart's knowledge. This dichotomy is the second dimension of the framework presented in this section.

4-4) Toward a new framework of interfirm learning typology

In two previous sections, the learning purposes of alliance from KBV have been discussed and the concept of complementarity of contributed resources from RBV was presented.

In this section, four sets are defined by applying the characteristics of the two previously explained dichotomies. An example is presented for each type. Exploration and exploitation represent the dichotomy of two purposes of alliance formation from KBV; Exogamy and endogamy are applied also to refer to the existence or absence of complementarity between partners from RBV.

In this section, the interaction of complementarity of partners with type of learning by alliance leads us to a conceptual framework. In other words, here the author tries to fulfil the shortage of each of these two dimensions by introducing them simultaneously through an integrated framework. This framework is a cognitive outline which increases the ability of each two dimensions by considering them simultaneously.

For instance, in order to examine the role of complementarity in explorative alliances, ponder an explorative alliance formed by a food company and a cosmetics company for the development of a new dermatological product. This alliance could bring varying contributions

in comparison with what two competing partners in semiconductor industry gain from an R&D alliance to develop a new generation of a technology. In the first case two firms come from different sectors and shared different competence and resources, while in the second case the partners share similar resources to reduce the risk of failure of a new technology development project. Both cases are explorative alliances, but the level of knowledge transfer for partners is not the same. Because of similarity of the knowledge bases of the two partners in the second case, the internalization of generated knowledge by alliance is easier than the first case in which the knowledge bases are not very similar. But due to the low level of complementarity of partners in the second case, the amount of knowledge learned from a partner could be less than that of the first case. Thus, in a nutshell, knowledge transfer in explorative alliances would be easy in the presence of similarity. But the quantity and importance of knowledge transfer would be high in explorative alliances because of the complementarity of partners.

Through the account of each setting, three important antecedents of interfirm learning – which are observed in existing literature – are also discussed. These three antecedents are Relative absorptive capacity (Lane & Lubatkin 1998), Knowledge Ambiguity (Simonin 1999) and Knowledge protection (Norman 2002, 2004). The first factor is expected to have a positive effect on knowledge transfer and the latter two have a negative impact on knowledge transfer. It is expected that the effect of these three factors on knowledge transfer in each of the four presented settings be different.

4-4-1) Explorative Endogamy

When two partners aim to benefit from scale or size of their alliance, it is expected that they share similar resources and knowledge. This type of alliances can occur between high-tech companies to develop a new technology or a high-tech product. Due to the high risk of failure

in high-tech R&D projects, partnership can distribute this risk between partners. So there is no need to contribute all R&D resources and knowledge by one firm to carry out a high-risk technology development project. In fact, the complementarity in this partnership is not qualitative but quantitative (Jolly, 2001), and a joint team works to develop the technology; finally the results and knowledge created in this team will be devoted to partners. In other words, the partners will internalise jointly created knowledge in their own knowledge bases, and as mentioned by Zeng and Hennart (2002), in this case of learning race (or exploration) value appropriation does really matter.

As has been observed empirically, Relative Absorptive Capacity (Lane and Lubatkin, 1998) is one of the important factors enabling and facilitating knowledge transfer from a partner and its internalisation. The similarity of partners' knowledge bases (i.e. one of the important measures of Relative Absorptive Capacity) helps them to have a favourable platform for integrating jointly developed knowledge. This similarity lowers the level of knowledge ambiguity (Simonin, 1999) of jointly created knowledge for both parties. But a well-defined policy for knowledge transfer and appropriation (rooted in property rights protection) is needed to avoid conflict between partners. In fact, the competitive nature of partners obligates a system of protection for knowledge and resources (Norman, 2004). In brief, explorative endogamies aim to develop new knowledge and technology by sharing similar knowledge bases of competitive partners in order to reduce the risk of failure. In these types of alliances, relative absorptive capacity is an important factor for enabling the comprehension of jointly created knowledge; this in turn reduces knowledge ambiguity that hinders knowledge internalisation. Knowledge transfer and learning occurs in this category by internalizing jointly created knowledge in the parent's knowledge base and technology portfolio. Knowledge protection in this type of alliance is concentrated on property rights protection.

Although knowledge ambiguity in this setting is weak due to the similarity of knowledge bases, it is far from being ignorable since protection systems keep some level of ambiguity desirable for knowledge owners. In other words, the source of a partner's knowledge ambiguity is its knowledge protection system and not the complex and tacit nature of that knowledge.

One recent example of explorative endogamy is the Crolles II Alliance. On 12 April 2002 Motorola Semiconductor (now trading as Freescale) joined Philips and STMicroelectronics at Crolles to set up a joint R&D centre to develop (90-32 nm) CMOS technologies on 300mm silicon wafers. Their objective is to attain global leadership for this type of circuit. The aim of this partnership is to attain global leadership in nano-metric technologies on 300mm wafers. By pooling resources the alliance gives the three partners an enormous advantage in terms of costs, shorter design cycles and standardized platforms. The joint development program is based at Crolles, near Grenoble, at the new Crolles II R&D centre. The joint R&D programs are focusing on exploration and development processes on Complementary metal-oxide-semiconductor (CMOS) for technologies from 90nm down to 32nm, including SOI (silicon-on-insulator) technologies and embedded memory (eMRAM, eDRAM, eSRAM). In this alliance three industry leaders share similar knowledge and capital for developing one of the future technologies of the semiconductor industry. The competitive role of this technology requires a symmetric power and symmetric result appropriation for each of the partners.

4-4-2) Explorative Exogamy

When two partners share complementary resources and knowledge to explore and to develop a new product or even to enter into a new business, they use their qualitative complementarity for creating value in an explorative manner.

Because of its exploratory nature, this type of alliance targets product or process innovation in order to enter a new business or market. Complementarity is necessary in these alliances and lets partners do strategic moves that, even with extra costs and time, are impossible for them to do individually. The complementarity in these alliances can be derived from the different nature of partner firms (partners from different sectors) or it can be the result of sharing different types of resources by firms with same resource and market profile (competitors).

As argued earlier by Grant and Baden-fuller (2004), in explorative alliances learning can occur by knowledge internalisation. In these alliances, partners share their knowledge and use it jointly, so the possibility of learning from the knowledge of the partner is high, especially tacit knowledge –which couldn't be protected and owned by property rights - can be transferred to the counterpart.

For internalising a partner's knowledge the role of relative absorptive capacity is determinant. In this type of exogamic alliance the existence of new and complementary knowledge means that there is new knowledge to learn and this identification is realized by relative absorptive capacity. But the relative absorptive capacity would be low if there would not be any overlap and similarity between the firm's knowledge base and the knowledge shared by an alliance partner. The more the knowledge base of one partner is similar compared with knowledge shared by another partner in an alliance (or with knowledge created in an alliance), the more feasible it is to internalise knowledge.

Knowledge ambiguity also plays an effective role in this case. Less relative absorptive capacity (derived from different levels of knowledge base diversity) will lead to more ambiguity of new knowledge for partners. The level of ambiguity in this setting is more than that of explorative endogamy because the shared resources by a partner have a different nature and are not so familiar for the focal firm to be analysed and easily internalized.

However there are some exceptions regarding the determinant role of relative absorptive capacity, knowledge ambiguity and knowledge protection. Sometimes a partner wants to intentionally transfer its knowledge to its counterpart. This is the case in pre-acquisition alliances in which the acquired firm wants to transfer some knowledge to its future acquirer in order to encourage it and reduce ambiguity. Or in the case where a firm wants to delegate the after sale service and supply of its products to another firm, the alliance becomes a way of education and teaching. In these cases alliance would not be a learning race and knowledge owners would try to teach their knowledge to partners. In such cases the knowledge owner would try to reduce its knowledge ambiguity by analysing it for a partner and by reducing its protection level. This will improve the relative absorptive capacity of a partner in order to internalise knowledge in an effective manner.

The example of this category is Galderma. Galderma is a joint venture between cosmetics leader L'Oreal and Nestlé, which is a giant in the food and nutrition industry. This joint venture was born in 1981 and it is actually one of biggest companies focusing on dermatology. Its growing portfolio includes treatment for major skin conditions, such as acne, rosacea, fungal nail infections, psoriasis, seborrheic dermatitis, non-melanoma skin cancer and photodamage, and pigmentary disorders. The complementarity of shared knowledge between L'Oreal's dermatology and cosmetics knowledge and Nestlé's clinical testing and nutrition knowledge creates a solid motive for each partner to form this alliance. The explorative nature of this alliance is evident by the 14 years of research before the introduction of its first home grown product, Galderma, in 1995. The similarity of jointly created knowledge in Galderma and L'Oreal is more than that between Galderma and Nestlé (Nestlé has no dermatology personnel outside of Galderma, but just 50 percent of L'Oreal's dermatology personnel work for Galderma, and the rest of them work directly in L'Oreal.

Therefore, the ambiguity of a great part of Galderma's knowledge is low for L'Oreal, and the interaction of Galderma and L'Oreal is more than the interaction of Nestlé¹ with Galderma.

4-4-3) Exploitative Endogamy

Like the first category, the partnership is characterized by unifying similar resources in order to achieve scale or size effect. But the difference of this setting with the first one is in its exploitative purpose. In fact, in these types of alliance, the learning intent, such as in explorative alliances, does not exist and the partners are not involved in explorative activities by alliance. Generally, in low-tech industries, in which exploitation and the application of technology while constantly reducing the fixed cost is vital, this type of alliance could be effective. Product and process knowledge transfer in this case is very limited and due to the similarity of pooled knowledge there is no new and really attractive knowledge to learn. Activity done by alliance in this category is feasible to do individually by each partner with more cost and time.

Relative absorptive capacity does not play an important role in this case because there is no intention to internalise the knowledge of the partner. For the same reason the knowledge ambiguity also does not matter significantly. But the competitive nature of partners provokes the intensity of a protection system on a company's strategic information and policies.

The cooperation between PSA and Fiat in manufacturing MPV (Multi Purposes Vehicles) is a good example of an exploitative alliance with value creation by scale effect (Jolly, 1997).

¹ Another relevant example for this category that has been discussed frequently in the literature of alliance management is the case of NUMMI- joint venture between Toyota and General Motors. NUMMI has been analysed precisely by Inkpen (Inkpen, 2005).

4-4-4) Exploitative Exogamy

This category is characterized by what Zeng and Hennart (2002) called Cooperative specialization and Grant and Baden-Fuller (2004) called Knowledge accessing alliance. Exploitative exogamies concerns technologies with short life cycle (Zeng & Hennart, 2002) and/or very complex and sophisticated product development. Also, when the product of each partner should be integrated together – even by the partners’ final customer– this type of alliance can be a very effective way to increase compatibility and interoperability. Generally in this type of exogamies the dissimilarity of pooled knowledge is high, and this distance creates high ambiguity which leads to difficult analysis and comprehension of the partner’s knowledge. Then in this category there is no or little intent to internalize the partner’s knowledge, and the partners gain advantage from the complementarity in order to specialize themselves on their own knowledge and technology. In other words, value created by this type of alliance comes from further concentration of resources on the firm’s strategic and distinctive knowledge and capabilities. In this context firms are sure that whenever they need special knowledge or resources that are not mastered by themselves, they can have access via an alliance with a firm specialized in that knowledge or resource. The learning in this context occurs not by internalisation of a counterpart’s knowledge but by observing the interaction of the firm’s own knowledge base with the knowledge or product of the partner and by profiting from the feedback created from this interaction. This means that firms enrich their knowledge base by self-development not by transfer and absorption of partner-developed knowledge in its knowledge portfolio.

The relative absorptive capacity in these alliances is not a determinant factor because there is no intent for internalisation. On the other hand, the capability of knowledge and technology development and improvement for a firm in this setting is more important than learning from

the knowledge of external partners. So the author suggests that the internal capability of knowledge and technology development has a more determinant role compared to relative absorptive capacity. It is the firm itself that creates and develops new knowledge and specializes itself by profiting from this type of alliances.

In this category the level of ambiguity of a partner's knowledge is high but it has no significant consequence on learning and knowledge development of the focal firm because there is no intention to imitate the counterpart's knowledge. Knowledge protection in this category can be embodied in the complex nature of knowledge and property rights.

Exploitative alliances can be found frequently in the computer equipment and IT sectors in which the interoperability and compatibility of each product is essential. But they could be found in any industry with sophisticated and complex products. Two good examples of this category are the HP-Oracle alliance and Airbus. The cooperation between HP and Oracle on the technical side¹ helps them to improve their technology and product development capability in order to improve the quality of service delivered to their final costumers by increasing interoperability and compatibility between Oracle software and databases with HP hardware and servers. In the case of Airbus each partner became a specialized developer of one part of the aircraft (for instance wings, motor, and assembly), and they cannot make the final product individually.

¹ These two cases contain marketing sides and technological sides. For this category just the technological side is intended. On the marketing and commercial side, these alliances are applicable for exploitative endogamies (category 3 in this section) because a marketing alliance between HP and Oracle created a single-point of contact to their customers. For example Oracle in its global business centers makes a showcase for its product on HP servers. Also in after-sale services Oracle and HP transfer and exchange feedback from customers concerning their products respectively. Airbus also in its marketing and commercial side has a strong global presence by unifying and integrating all marketing resources and policies of its partners (Garrette and Dussauge, 1995).

What you should know by now

- Interfirm learning and knowledge transfer is the main purpose of several studies in the literature of alliance research. While this subject is becoming more and more interesting for researchers, the type of alliance is ignored in the majority of empirical research, or considered as a control variable without further considerations. This leads to a misunderstanding of observed results in the literature and a limited level of generalization.
- This section aims to classify types of learning in interfirm alliances according two dimensions: Diversity from RBV and Purpose of alliance from KBV (Figure 4.1.).
- In *Explorative Exogamies*, the intent is to internalise the knowledge of the counterpart, so relative absorptive capacity is a positive determinant factor. Knowledge ambiguity and respective protection policies are negative determinants of interfirm learning.
- In *Explorative Endogamies* the partners' purpose is to internalise the knowledge created jointly through alliance. Relative absorptive capacity matters because the created knowledge is resulting from the knowledge bases of the partners, and relative absorptive capacity (and consequently, a low level of relative ambiguity of the partner's knowledge) helps focal firms to understand and integrate knowledge generated together. But knowledge protection systems in terms of intellectual property and generated value appropriation is a determinant and proactive factor enabling firms to absorb and use generated knowledge.
- *Exploitative Exogamies* target the knowledge access approach of learning. In this type of alliances, partners move their knowledge and resources away from performing non-core functions and concentrate them on their core knowledge bases and enrich them. They try to specialize themselves interactively by giving feedback and increasing compatibility of product and process knowledge accordingly. Extreme distance of partners' knowledge creates a high level of knowledge ambiguity and an indirect protection mechanism. This could lead to the absence of internalisation intent by partners. Relative absorptive capacity then does not matter. But absolute absorptive capacity and internal development capabilities are important in order to understand

external signs for improvement of knowledge and to apply them to the knowledge bases of the firm.

Endogamy (Similarity)	Exogamy (Diversity)	
<ul style="list-style-type: none"> • Learning together from cooperatively generated knowledge • No complementarity • Relative absorptive capacity • Partner's knowledge ambiguity is low • IP protection system in addition to mutual protection of resources and knowledge 	<ul style="list-style-type: none"> • Learning from partner and/or knowledge creation • Intended level of complementarity but not so distant • Relative absorptive capacity • Moderate level of knowledge ambiguity • Knowledge protection is a negative factor affecting learning 	Exploration
<ul style="list-style-type: none"> • No or little intent to internalize partner's knowledge • Scale effect is only intent of alliance • Moderate level of protection for information related to management and policy because of competitive nature of partners. • Absorptive capacity does not matter 	<ul style="list-style-type: none"> • Cooperative specialization and learning by having feedback from partner • Knowledge and tech. development capability matters more than relative absorptive capacity • High level of partner's knowledge ambiguity • Knowledge protection isn't determinant factor (because of extreme distant of partners knowledge bases) 	Exploitation

Figure4.1) Four types of learning by alliance and their main

- And finally, in *Exploitative Endogamies* there is no need to internalise the knowledge of the partner and no intent for co-specialisation. There is no or a very low level of knowledge transfer and interfirm learning in this type of alliance.
- In this chapter the two concepts of partner diversity and the importance of exploration or exploitation has been discussed as two concepts which create different contexts in which types of learning and knowledge transfer are different. As discussed, these two variables can represent four contexts for different types of interfirm learning; in other words, the interaction of them does matter for interfirm learning.
- Studying the effects of these two variables and their interactive effect empirically is the heart of this research. In the next chapter these concepts and their interaction are studied deeply, and based on literature review and theoretical clarifications of each concept, the model of research and related hypotheses are presented.

Chapter 5: The Model and Hypotheses of Research

5-1) Introduction: Exploration, Partner Diversity and Interfirm Knowledge Transfer

The ever-increasing importance of organizational learning in strategic management and innovation has motivated the study of antecedents and determinants of knowledge transfer at intra- and inter-firm levels. Knowledge transfers refers to the process through which organizational actors – teams, units, or organizations – exchange, receive and are influenced by the experience and knowledge of others (Van Wijk et al, 2008). Since knowledge transfer needs the combination of different domains of knowledge, it will change or modify the knowledge bases or performance of the unit that receives the knowledge (Argote et al., 2000).

Knowledge transfer has been labelled in various ways in the literature. Mowery, Oxley and Silverman (1996) explicitly apply the label of interfirm knowledge transfer. Some others use knowledge sharing (Hansen, 1999; Tsai, 2002), and knowledge flows (Gupta and Govindarajan, 2000; Schulz, 2001), and knowledge acquisition (Darr et al., 1995; Lyles and Salk, 1996).

In this research I am focused on inter-organizational knowledge transfer that is more complicated than intra-organizational knowledge transfer (Inkpen and Tsang, 2005).

As mentioned earlier knowledge transfer can be embodied in changes of knowledge base of recipient and some researchers such as Mowery and his colleagues (Mowery et al, 1996) show that convergence in knowledge bases of partners after alliance as a proxy of interfirm knowledge transfer. These changes could be manifested in technological knowledge, product/technology development competence, knowledge of human resources, efficiency of production (Chen, 2004) and changes in competitive performance of recipient unit (Argote et

al, 2000). Another aspect which can be considered as the result of knowledge transfer and has drawn the attention in the literature is the level of satisfaction perceived by recipient about mastering the internalization, exploitation and management of transferred knowledge from other unit or partner (Cummings & Teng, 2003).

Through the chapter four, the concepts of interest of this study has been presented. As discussed earlier two elements of partner diversity and intent to explore are the essential elements of this study. In chapter four these two elements are presented and their interaction is also discussed conceptually. In this chapter, I construct the hypotheses and the model of relationships among research variables. For being more precise in testing the hypotheses I define dependent variables of this study not as categorical variables (i.e. Exogamy/Endogamy and Exploration/Exploitation) but as continuous variables: Level of partner diversity and level of intention to explore.

During this study I found an ambiguous point in theoretical aspect related to these two independent variables. In some studies the diversity has been interpreted as novelty and having new knowledge in the explorative process as prerequisite of exploration is implicitly pointed out. For cope with this challenge, this chapter begins with a theoretical clarification about the concept of exploration and exploitation and the role of new knowledge in explorative and exploitative process. Based on this clarification I present the model of research. The chapter follows by the hypotheses of research.

5-2) Theoretical Basic: Exploration, Exploitation and Novelty

The exploitation/exploration dichotomy made by March (March, 1991) has traditionally assumed that exploitation activities are based on existing resource base while explorative activities use new resources. In this section, we differentiate between input, process and

output of exploration and exploitation. We also suggest that existing resources contribute to the process of exploration and new resources might also serve the process of exploitation. The moderating effect of input on the effectiveness of process is presented in the third part of this section.

5-2-1) Exploitation of existing resources versus exploration of new resources.

March (1991) proposed a model of organizational learning based on two distinctive types of activities: exploitation and exploration. In exploitative activities, firms make use of their existing assets – “improving and refining existing capabilities and technologies” – to generate rents and increase continuous improvement and productivity. In explorative activities, the firms look to create new capabilities, technologies, or products. As March noted, “The essence of exploitation is the refinement and extension of existing competencies, technologies and paradigms....The essence of exploration is experimentation with new alternative”(March, 1991:p85). Baum, Li, and Usher (Baum, Li and Usher, 2000) suggested that “exploitation refers to learning gained via local search, experiential refinement, and selection and reuse of existing routines. Exploration refers to learning gained through processes of concerted variation, planned experimentation, and play” (Baum et al., 2000: 768). So the exploitative activities include also at least some learning. Even when an organization attempts replicate past actions, it accumulates knowledge and experience and goes down in the learning curve, even though it is in an incremental manner (Gupta, Smith and Shalley, 2006). “There is no such thing as perfect replication. There is always some learning, even if it is relatively little and serves only to reduce variation around the historical mean” (Gupta, et al. 2006, p.694). This leads us to accept that from organizational learning view whatever the type and purpose of an activity (including alliances) is, it consists of always a level of learning.

5-2-2) Exploitation and Exploration: Two Different Processes

In order to analyze the role of exploration and exploitation in alliance context, a closer look to three dimensions of this dichotomy seems to be useful. Through these dimensions we are going to analyze the concepts of exploration and exploitation in a simple mode. These three dimensions relate to output, process and input of exploration. Output concerns the type of learning and its originality. Process refers to the type of activities to be accomplished for achieving to the outputs, and finally; Input deals with the source of knowledge and resources involved in the process of exploration and exploitation:

- *Output:* Learning gained via exploration is a new generated knowledge, product and resource (McGrath, 2001) whereas in exploitation, learning is the improved efficiency and productivity of existing knowledge, resource or product. Thus the output of exploration adds new knowledge to knowledge base of the firm.
- Explorative learning is the results of challenging activities such as: search, risk taking, experimentation, flexibility, discovery, innovation (March, 1991), generation (Spender, 1992), pursuit of new knowledge (Levinthal & March, 1993), concerted variation, play (Baum et al, 2000), re-configuration, recombination and redeployment (Fleming 2001, Rosenkopf & Nerkar 2001). Exploitation in contrast is the consequence of activities such as improvement, refinement, choice, production, implementation, execution (March, 1991), application (Spender, 1992), “the use and development of things already known” (Levinthal & March, 1993).

- The third aspect of this dichotomy concerns the source of resources and knowledge involved in the process of exploration and exploitation. In early definitions, exploration is the result of experimenting and discovering activities on the new resources (i.e. resources beyond the knowledge base of firm) but exploitation concerned refinement of existing resources and knowledge (e.g. March, 1991). Recent elaborations and clarifications about this dichotomy try to show that whatever the source of the resources and knowledge, exploration and exploitation are characterized by the type of activity and the novelty of resulted learning (two formerly discussed dimensions). For example, Rosenkopf and Nerkar (Rosenkopf & Nerkar, 2001) consider the explorative activities on existing resources of a firm as the local exploration. Fleming also (Fleming, 2001) categorizes the knowledge generated from the new combination of existing components as exploration. Along the same line, mere application of new resources could be interpreted as exploitation because it doesn't involve any experimental manipulation (Spender, 1992).

5-2-3) The moderating effect of input on the process of exploration

Considering the process-based perspective of exploration/exploitation, we tend to improve our insight about exploration and exploitation as below (Figure 1):

- A. The new knowledge developed through exploration is resulted from the experimenting activities such as: discovery, flexibility, generation, concerted variation, play, re-configuration, recombination and redeployment.
- B. Availability of the resources and knowledge beyond existing ones is not a necessary antecedent of exploration. This means that: If there is the intent to explore,

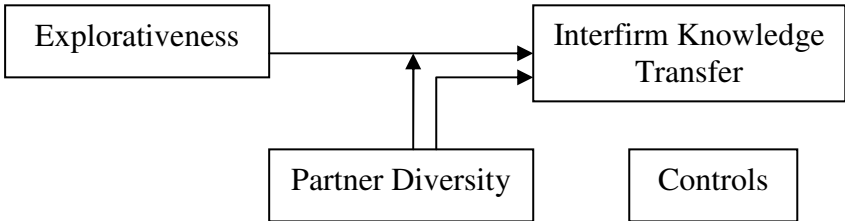
recombination, reconfiguration and any other types of experimenting activities by using existing resource / knowledge base of the firm can lead to explorative results. Thus using the resources beyond the existing base of the firm is not prerequisite element for occurring exploration. Thus, in the absence of explorative objective, availability of new knowledge and even out-of-scope of the extant knowledge base doesn't lead to a new knowledge development (See oblique links on figure1).

Researchers in recent years step further on analyzing the exploration and reconsider the role of the scope of knowledge and resources on the process of exploration. They consider exploration as a search process whereby the firms try to find and generate new solutions. Referring to the earlier definitions of exploration by March (March, 1991) in which new resource and knowledge is considered as required input for exploration, they argue that the availability of new knowledge and resources broaden the scope of knowledge involved in explorative process. This in turn, may increase the different alternatives of resource and knowledge to be experimented and recombined through explorative activity and by consequence raise the potential of novelty of solutions (Katila and Ahuja, 2002; Fleming and Sorenson, 2001) Katila and Ahuja found a linear and positive relationship between new product introduction and scope of knowledge –defined as how widely the firm explores new knowledge (Katila & Ahuja, 2002). In brief, the effect of novelty of knowledge and resource elements is also important in exploration and may moderate the efficiency of experimenting activity for generating new results. Thus it is worthy of being studied along with explorative activity.

Figure 5.1 summarizes the dichotomy of exploration and exploitation in a simple and educational manner. It should be noted that in this study along with the argument of Gupta, Smith and Shalley (Gupta, et al., 2006, p697) which point out that “the scarcer the resources

The interactive effect of these two constructs is also included in the research model to understand their joint effect on interfirm learning. In other words, the effect of partner diversity on interfirm knowledge transfer and its moderating impact on the relation of exploration and interfirm knowledge transfer are studied separately in this research (Figure 5.2.)

Figure 5.2) Research Model



5-3) Hypotheses of research

5-3-1) Level of exploration in alliance and interfirm knowledge transfer

Alliances are voluntary arrangements among independent firms involving exchange, sharing, joint development or provision of technologies, products, and services (Gulati, 1998), and noteworthy vehicles for exploration and exploitation (Lavie & Rosenkopf, 2006). Literature has long emphasized the learning from external sources (alliance as an external entity or partner) which adds new knowledge to firm’s knowledge (e.g. Hamel, 1991, Mowery et al, 1996; Simonin, 1999; Inkpen, 2002).

Knowledge can be transferred from the knowledge reservoirs (Argote et al, 2000) mastered and contributed by the partner as well as from those knowledge elements developed jointly through alliance. Because the focal firm and its partner have separate sets of knowledge bases, exploration would be, for focal firm, searching, discovering and analyzing of the partner’s resources and knowledge and recombining its knowledge with that of partner. Contrary to the

improvement oriented activities of exploitation, the exploration is an intended search, experimentation, discovery, and play. It involves the open interaction, information flow, testing new alternatives and generating new combinations. Hence the partners with explorative intent have more intent to implement exploration based activities which lead new knowledge and innovation comparing partners with exploitative intents. By contrast, in exploitative alliances, there is no intent for creating or exploring new knowledge because the purpose of exploitation concerns application and efficiency. Even when partners share different types of resources which create heterogeneity, the exploitative activities would not have knowledge transfer effects between partners (Grant and Baden-Fuller, 2004).

The more an alliance is explorative the more the partners try to profit from counterpart's knowledge bases by searching, exchanging and sharing information and knowledge, by generating knowledge jointly, and also by perceiving the variation between their mutual experience. In other words, focal firm tries to explore external knowledge and to learn by interacting with it. Less explorative alliance which means more exploitative will affect firm's knowledge base in different manner, because exploitation concerns learning by enriching existing knowledge base and improving its existing components. Since I consider the exploration and exploitation as two ends of a continuum (Gupta et al. 2006) I formulate the first hypothesis of this research as below:

Hypothesis 1. The more explorative an alliance is, the higher is the interfirm knowledge transfer.

5-3-2) Partners Diversity

The importance of partner diversity can be rooted in several contexts (Boschma, 2005). Diversity of partners in alliance research has taken two main dimensions: Novelty and

Absorptive capacity. In this section I review shortly these two dimensions and I build our hypothesis based on received wisdoms about them.

The idea of novelty has been developed in two close ways: complementarity and novelty in knowledge provided by partner. According to the resource based view (RBV), the heterogeneity of resources causes differences in performance of firms (Penrose, 1959). Some research focuses on the type of alliance and the value created from the alliance by looking at the heterogeneity of partners or that of shared resources. This stream of research presents two bases for classifying alliances: diversity of shared resources and diversity of partners' profile. The first classifies alliances into two categories in which partners are similar in terms of shared resource and knowledge or they are different and complement each other. This dichotomy has been called by several names such as: *Scale vs. Link* (Hennart, 1988), *Additive vs. Complementary* alliances (Dussauge & Garrette, 1999), *Cost-sharing vs. Skill-sharing* (Sakakibara, 1997), *Complementary vs. Supplementary* alignment (Das and Teng, 2000). And the second one not only includes shared resources diversity but also considers the diversity of profiles of partners- e.g.: *Endogamy vs. Exogamy* (Jolly, 2005). These streams of research study the concept of complementarity by applying those dichotomy-based typologies. This aspect of partner diversity which is close to RBV, concerns the level of heterogeneity created by complementary resources shared by partners. In this point of view, if the partners belong to the same industry, more heterogeneity refers to more complementarity¹. For instance, Dussauge and his colleagues (Dussauge, Garrette and Mitchell, 2000) suggest that the amount of knowledge transfer is higher in link alliances than scale alliances. They argue that link

¹ This approach (i.e. more heterogeneity as more complementarity) is applied generally in inner industry context. For example Gulati (Gulati, 1995) suggests that complementarity between organizations within the same industry can be represented by non-overlap in the niches in which they operate. Similar approach has been applied by Chung, Singh and Lee (Chung et al. 2000). Dussauge and his colleagues (Dussauge et al. 2000) focusing on horizontal alliances among competing firm show that even competing firms can form complementary alliances sharing different types of resources.

alliances in which partners contribute different capabilities are more likely to be restructured because of learning over time. Hill and Hellriegel also view complementarity as “the extent to which the joint venture partners bring non-redundant distinctive competencies to the partnership” (Hill & Hellriegel, 1994: p.595). As noted earlier from organizational learning view the novelty has been recognized as novelty in idea and new knowledge which nurtures learning-based and innovative performance of the firm. Sampson (Sampson, 2007) and Nooteboom and his colleagues (Nooteboom, Vanhaverbeke, Duysters, Gilsing and Van Den Oord, 2007) find that partner diversity has a significant effect on the number of patent issued by the focal firm because of novelty in knowledge and technological resources provided by partner. They find that the more similar the partners are, the less innovative the partner is after alliance. They observed that increasing the technology diversity of partners leads to better firm’s innovation performance; however this relationship has a decreasing return. This sheds light on the second dimension of partner diversity i.e. *absorptive capacity* which I am going to discuss below.

The external knowledge that firm obtains typically by searching its external environment is a collection of fragments of possibly useful knowledge. These fragmented knowledge elements become helpful to develop new knowledge and solution only when the firm has complementary capability to assimilate and integrate the novelty in the organizational routines (Winter, 1984). This indispensable capability is absorptive capacity. Cohen and Levinthal (1990) introduce the absorptive capacity concept as the firm’s ability to identify, assimilate and exploit knowledge from the external environment. The level of firm’s prior experience in related knowledge is identified as a key factor characterizing absorptive capacity. The definition of Cohen and Levinthal considers absorptive capacity is an “absolute” entity. In other words, regardless of the situation, the absorptive capacity of the organization is the same

(Alvarez & Busenitz, 2001). But, Lane & Lubatkin (1998) argue that the absorptive capacity is relative entity and its strength depends to current context or situation. According to them the ability of a firm to learn from another firm is jointly determined by the relative characteristics of the two firms (Lane and Lubatkin, 1998, p473). In a study of alliances between biotechnology and pharmaceutical firms, they re-conceptualize absorptive capacity as an alliance level construct and find that similarity measures – which they named relative absorptive capacity-, better explain the ability to learn in alliances. The rationale behind the relative absorptive capacity argument is that interorganizational learning is determined by the fit between alliance partners in terms of resources, knowledge bases and organizational characteristics. They suggest that the similarity of basic knowledge of partners and the similarity of their organizational settings are positively related to the inter-organizational learning through alliances. Several previous and recent works have also recognized the role of similarity of knowledge bases between two units in order to effective knowledge transfer (Mowery et al, 1996, 2002, Szulanski 1996, Nooteboom et al. 2007)¹. Organizational similarity is also a part of this concept which points out to the firm to fit with their partner in the processing of acquired knowledge and information (Lane and Lubatkin, 1998) and ease of communication (Szulanski 1996, Simonin 1999).

These two dimensions of diversity determine jointly the effectiveness of knowledge transfer of a firm from a partner by compromising between the diversity of new elements and the ability to understand and decode and process them in focal firm. As the increasing diversity of partners can represent the diminishing level of relative absorptive capacity vis-à-vis increasing level of difference in knowledge elements I estimate a curvilinear relationship between diversity of partners and effectiveness of interfirm knowledge transfer.

¹ Even the similarity of business strategy of partners seems to have positive impact on interfirm knowledge

It should be noted that the inverted U shape relationship between partners' technology profile diversity and innovative performance has been observed by patent data¹ (Sampson 2007) (Nooteboom et al. 2007) while in this research I use the survey for studying interfirm knowledge transfer effectiveness and partner diversity.

Thus, I suggest that:

Hypothesis 2: Partner diversity has an inverted U-shape relation with interfirm knowledge transfer.

Note that, although partner diversity is an alliance-level construct, hypothesized interfirm knowledge transfer effectiveness is considered here at the firm level.

5-3-3) The interactive effect of partner diversity and explorativeness

While Hypotheses 1 and 2, focus on the distinct effects of explorative intent and partner diversity on interfirm knowledge transfer effectiveness, here I specify how the interaction of these two characteristics of alliances may have new implication in knowledge transfer effectiveness.

As argued in hypothesis 1, firms entering in an alliance with an explorative intent search new knowledge. This intention motivates firms to focus purposively on their potential relative absorptive capacity in alliance setting. At the other hand the diversity of firm and its partner also affect interfirm knowledge transfer effectiveness by changing the level of novelty provided by partner. Thus the interaction of intent of focal firm to explore and level of

transfer (Darr & Kurtzberg, 2000) because it refers to the similarity of strategic problems which need same type of knowledge to cope with.

¹ Mowery et al, 1996 suggest also the inverted U shape relationship between technology overlap and knowledge transfer but their statistical results do not support this idea significantly.

diversity of its partner seems worth being studied. I develop our analysis of interaction based on the recent contributions in the domain of search strategies in exploration.

Cohen and Levinthal argue that the capacity of profiting from external knowledge is a critical component of innovation (Cohen and Levinthal, 1990, p128). Recently based on this arguments some authors promote empirically the importance of external search strategies on exploration (Katila 2002; Katila and Ahuja 2002; Laursen and Salter, 2006). Katila and Ahuja (2002) suggest that the depth and breadth of knowledge search contribute the new product introduction. They define depth as how frequently the firm reuses its existing knowledge and they refer to how widely the firm explores new knowledge as search scope. They find that search depth has an inverted U shape return and search scope has a positive effect on new product introduction. Laursen and Salter (2006) in a context of openness of firm to external knowledge sourcing show also the decreasing returns of breadth and depth of use of external sources of knowledge on innovative performance.

As I am considering here the mutual effects of explorative intent and partner diversity, I adapt concepts of depth and scope of search for estimating the interaction in alliance context. The existence of explorative intent and its intensity changes the role of partner diversity and brings it to exploration context. Level of diversity also affects the impact of explorative intention on knowledge transfer by changing the nature and characteristics of knowledge elements as input of exploration. For predicting this interaction I define two concepts of joint search depth and joint search scope at the alliance level as follows: Joint Search Depth refers to how extent the partners in the alliance search for knowledge in overlapping parts of their knowledge bases. In other words it shows that in a given level of explorative intent, to how extent partners wants to profit from their similarity for learning and exploration through their joint depth. This concept is close to local search (Baum et al. 2000) which considers searching for solutions by

using knowledge that is closely related to firms extant knowledge bases. However there is a point to be clarified. As Katila and Ahuja (Katila & Ahuja, 2002) pointed out, the concept of local search does not include the dimension of depth and it considers just the scope of search. The interaction of intent to explore and narrow level of search scope can be interpreted as local exploration, because it shows different levels of explorative intents in existing knowledge and resources (Rosenkopf & Nerkar, 2001) (Fleming, 2001). In alliance level, when firms with explorative intent make partnership with similar partners, they aim profiting from their joint search depth for learning and new knowledge generation. Because it provides a new amount of knowledge fragments to be explored for focal firm but in the scope of its existing knowledge bases. In this case varied level of explorative intent can represent the variation of depth of search. While using the same knowledge elements reduces the likelihood of trial and errors and facilitates making exploration more reliable (Levinthal & March, 1981) I formulate therefore the hypothesis 3-1 as below:

Hypothesis 3-1: Partners similarity has moderating and positive impact on the relations of intent to explore and interfirm knowledge transfer.

I define also Joint Search Scope as the extent by which partners in alliance explore new knowledge in non overlapping knowledge elements of each other. In organizational learning literature it is argued that broad exploration scope increases the number of solution available for choice (March, 1991). But some research also point out the negative effect of extremely broad search scope on the explorative learning by arguing that the highly broad search scope makes the costs of exploring, unpackaging and understanding and internalization of highly distant knowledge elements more than the benefits of them. This may be explained better by knowledge based view of the firm which considers the integration of knowledge elements as the essence of the firm. It is argued that extremely diverse knowledge elements will have

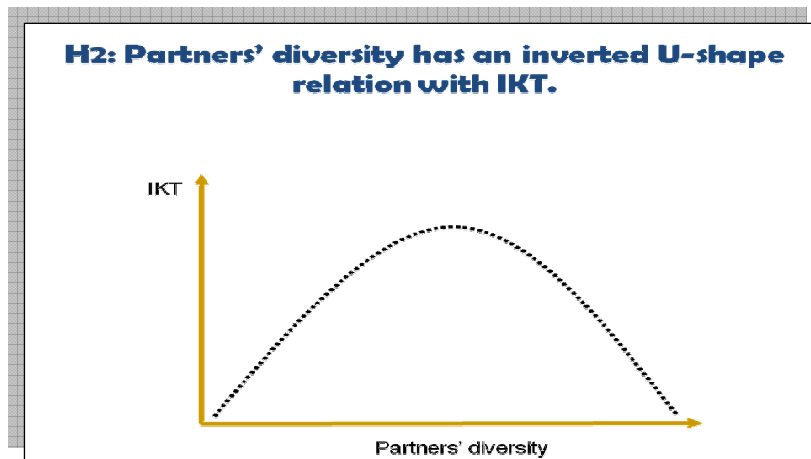
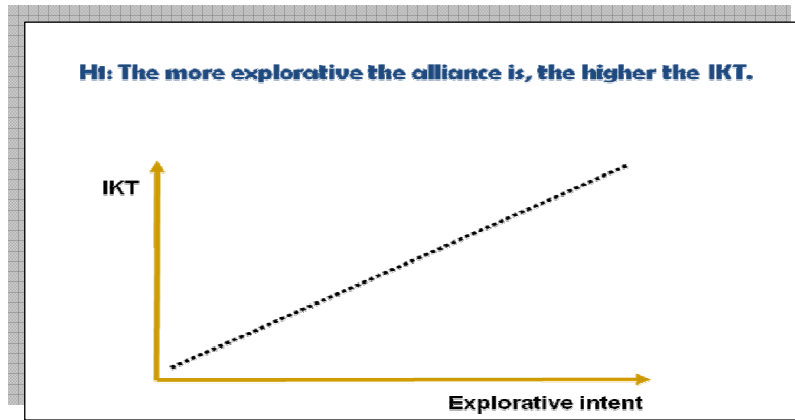
negative impact because the integration of them is costly and ineffective due to the complexity of managing and creating integration (Grant, 1996). Similar argument has been provided in the context of openness of firm for innovation which goes beyond the scope of knowledge and considers the variety of external sources per se. For example Laursen and Salter (Laursen and Salter, 2006) found the detrimental effect of high number in types of external sources of knowledge on innovative performance which also refers to bounded efficiency of firm in its knowledge integration capability.

In alliance level, exploring partner's knowledge and learning from it would be inefficient if the level of diversity between partnering firm is high. Because not only due to distance of counterpart's knowledge elements exploring them is difficult but also trying to explore those different knowledge requires intense coordination and attention with/to the partner, so the cost of organizational coordination would be high too. According to this argument I conclude that:

Hypothesis 3-2: High level of partner's diversity has moderating and negative effect on the relation of explorativeness and interfirm knowledge transfer.

What you should know by now

- Exploration and Exploitation are two different processes. Their input could be same however their outputs are different: the main characteristic of output of explorative process is the novelty.
- Explorative output is the result of a process performing explorative activities. It implies that when the explorative activities are executed on any types of knowledge-based input (whatever the level of novelty of input to process), the result would be explorative. In other words, the novelty of input is not the prerequisite of explorative output.
- Although executing explorative activities on existing and on new knowledge will have explorative results; it is expected that the novelty of output moderate to some extent the novelty of results of exploration.
- In alliance context, it is argued that the level of similarity or diversity of partners' knowledge bases doesn't secure the interfirm knowledge transfer. And for knowledge transfer the presence of explorative activity and objective does matter.
- The more explorative an alliance is, the higher is the interfirm knowledge transfer (Hypothesis 1).
- Partner Diversity has two dimensions: Diversity as a symbol of novelty, and Similarity as a representative of relative absorptive capacity. The total effect of this two dimensions leads to an inverted-U shape relationship between the level of diversity and interfirm knowledge transfer (Hypothesis 2).
- In alliances with similar partners, explorative intent has a positive effect on interfirm knowledge transfer, because it increases the depth of exploration in alliance (Hypothesis 3.1).
- In alliances with highly different partners, the explorative intent has negative impact on interfirm knowledge transfer. Because it over-expends learning capacity and knowledge integration capacity of partner on a vast scope of external knowledge (Hypothesis 3.2).
- Next Page figures illustrate the hypotheses of this thesis



H3.1: Partner similarity has moderating and positive impact on the relation of explorative intent and inter-firm knowledge transfer.

H3.2: Partner's high level diversity has moderating and negative effect on the relation of explorative intent and interfirm knowledge transfer.

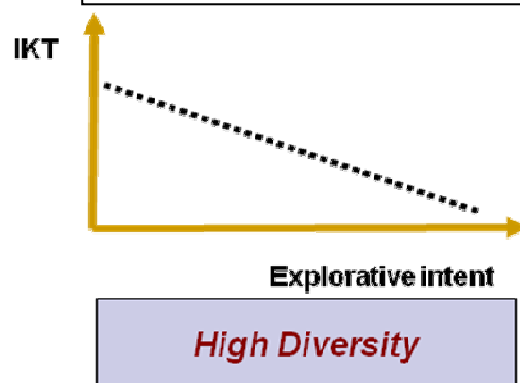
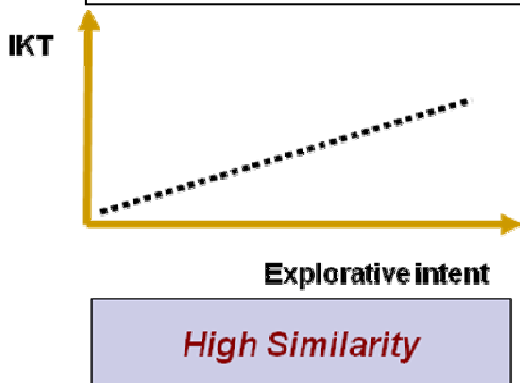


Figure 5.3) Illustrative presentation of hypotheses of the thesis

Chapter 6: Methodology of Research

6-1) Introduction

The task of a research is providing empirical data to answer theoretically interesting questions. In the previous chapter the theoretical basics of this research have been clarified.

In this chapter the methodology used to test the hypotheses of research is explained in detail. First the general methodological approach of this study is described. Next part is related to the research design which consists of an introduction to database from which the target population is determined. Sample of research and data collection methods are also explained in this chapter. The measurement strategy of research and statistical tools used for testing the hypotheses are ending parts of this chapter.

6-2) Research Approach

All research – all knowledge creation- consists of four elements in combinations (Jankowicz, 2005, p.109):

- *An assertion that certain beliefs might be plausible:* the assertion may consists of a belief, a hunch based on past experience, a hypothesis which suggests that two things might be related. Or a set of statements about interconnections which form a part of theory.
- *Information relevant to the plausibility of that assertion:* The information may consist of conclusion arrived at by inference from knowledge already available.
- *Some method for bringing the first two elements together:* when belief and information, are put together by the method of ‘just thinking about it, mulling it over’, one talks of rational thought and decision-making. Here, the rules of logic and of common sense apply.

- *Some means of convincing other people that the outcome you obtained make sense.* Knowledge is by definition public, and ‘research’ requires you to follow rules by which other people can agree (or disagree!) that your beliefs make sense and that all the other factors (your rules for rational thinking, your use of common sense, your decision on what counts as empirical data, your definition of accuracy and reliability, your decision on what counts as an event, and your understanding of technical constraints) appear sensible to them.

Traditionally there are two approaches to knowledge creation by research. The first is **Positivism** which depends on *skepticism* and the second is **Interpretivism** which is based on *conviction* (Jankowicz, 2005). These two approaches are explained in following sections.

6-2-1) Positivism

Positivism philosophy of research involves working with an observable social reality. The emphasis is on highly structured methodology to facilitate replication, and the end product can be law-like generalizations similar to those produced by the physical and natural scientists (Saunders, Lewis and Thornhill, 2007).

According to the Positivism the world is a complicated place and your private impressions aren’t necessarily right (because it is assumed that no-one is perfect and that all human beings are fallible); in fact, it is possible to make mistakes and to delude yourself without realizing it (Jankowicz, 2005). Jankowicz (2005) points out that the way to avoid self-delusion is to be skeptical, by testing your private beliefs according to standards to which other people subscribe, so that:

- The private evidence of researcher can be checked by other researchers seeking same evidence for themselves.

- A public debate can take place, through which the truth will, by and large, tend to emerge.

According to the positivist approach it is assumed that when you do research, the best way of arriving at the truth is to use scientific method or hypothetic-deductive method which consists of (Jankowicz, 2005, p.111):

1. A formally expressed general statement which has the potential to explain things: *the theory*.
2. A deduction that if the theory is true, then you would expect to find a relationship between at least two variables, A and B: *the hypothesis*.
3. A careful definition of exactly what you need to measure, in order to observe A and B varying: *the operational definition*.
4. The making of the observations: *measurement*.
5. The drawing of conclusion about the hypothesis: *testing*.
6. The drawing the implications back to the theory: *verification*.

On methodology selection decision, the positivists tend to apply quantitative research by which the data are collected, classified and analyzed statistically to discover statistically meaningfulness. In other words positivists will be likely to use highly structured methodology for the sake of replication.

Positivism includes cross-sectional studies, longitudinal research and surveys (Collis and Hussey, 2009)

6-2-2) Interpretivism

The researchers who are critical toward positivism argue that rich “insights into the complex world are lost if such complexity is reduced entirely to a series of law-like generalizations”

(Saunders et al., 2007, p. 106). They adopt the Interpretivism approach in which the researcher seeks to understand the subjective reality and meanings of participants and subjects in study. The term “social actors” is quite significant here (Saunders et al, 2007, p. 106), thus the illustration and interpretation of what the researcher hears and perceives from the social actors of study -subjects of study or phenomenon- is a constructive process. Saunders and his colleagues describe this approach by a theatrical metaphor (Saunders et al, 2007, pp106-7):

“The metaphor of theatre suggests that as humans we play a part on stage of human life. In the theatrical productions, actors play a part which they interpret in a particular way (which may be their own or that of the director) and act out their part in accordance with this interpretation. In the same way we interpret our everyday social roles in accordance with the meaning we give to these roles. In addition, we interpret the social roles of others in accordance with our own set of meanings”

The Interpretivist researcher, then, should adopt an empathic stance and enter the social world of his/her research. By interpreting the social roles, the researcher must understand the process by which meanings are constructed and finally he/she makes known what meanings are represented in people’s act. In this approach the researcher does not care about the generalization of research results. According to Collis and Hussey (2009) Interpretivism concerned with case studies, ethnography, grounded theory and participative enquiry.

Table 6.1. highlights some differences in assumptions of these two research philosophies.

Table 6.1) Basic Assumptions of Positivism and Interpretivism (Jankowicz, 2005)

Positivism	Interpretivism
Phenomena can be analyzed in terms of variables.	Phenomena can be analyzed in terms of issues [and roles].
Data can be collected by a dispassionate outside observer.	Data are collected by participants and by observers, all of whom have varying degrees of involvement and detachment.
Given evidence, we are always capable of distinguishing what is true from what is untrue, and are therefore enabled to agree on the real reasons for things if we wish to do so.	Truth can't be determined in any absolute way; we are capable of using evidence to work towards a consensus, but must sometimes agree to differ and sometimes to conclude that the truth is undecidable.
The purpose of enquiry is to build theories; these are general statements which validly explain phenomena.	The purpose of enquiry is to gain sufficient understanding to predict future outcomes.
Once such theories have been developed sufficiently, we should seek to apply them for productive purposes.	There is no need to seek to apply theories; understanding and prediction are already theory-in-action, being theories-from-action.

6-2-3) Positioning of the current study

While this study looks for contributing on existing theories of understanding interfirm knowledge transfer by improving and criticizing existing relevant theories. The constructs of this study are improved by researcher but they are composed by existing measures in the literature. The model of the research is also an improvement of theoretical propositions of previous studies. From structural point of view, the research tries to verify causal relationships among variables by providing logic hypotheses. And finally by implementing statistical tests the researcher aims to have results that could be generalized to the population of study. Then, all these evidences show that the research follows the positivist paradigm.

6-3) Research Design

This study is an explanatory study because it establishes causal relationships between variables (Saunders et al, 2007). For the sake of generalization objective, the survey-based research design is selected for this study. French alliances are the population of research in this study. And the sample is selected by using SDC databases of alliances and joint ventures. Since there are several subjective concepts as relevant variables of study (Dependent, Independent and Control) using an archival set of data e.g. SDC cannot be sufficient. So the questionnaire is used for primary data collection of the study. In this section the sample of study, data collection method, questionnaire development process and measurement strategy are explained.

6-3-1) Sample Determination

To construct research sample, the Securities Data Company (SDC) Database on Joint Ventures and Alliances is used. The SDC database includes the data of all types of alliances and is collected from public sources, including SEC filings, industry and trade journals, and news reports. This database covers the alliances from 1988 onwards. The information collected by this database is not comprehensive since the firms are not asked to report their alliances.

6-3-1-1) SDC Platinum Database¹

The SDC database contains information on a vast range of financial transactions, including securities trading, mergers and acquisitions, and more. The alliance data is one part of the available data of mergers and acquisitions section. SDC collects data from the U.S. Securities and Exchange Commission (SEC) filings (and their international counterparts), trade publications, and news sources (Schilling, 2008) SDC traces a very wide range of agreement

types, including joint ventures, strategic alliances, research and development (R&D) agreements, sales and marketing agreements, manufacturing agreements, supply agreements, and licensing and distribution pacts. Compared to the other databases of alliance data the SDC covers the widest range of industries (SDC has at least one item for each of 1,059 four-digit SIC codes between 1985 and 2005). The SDC data also includes, in addition to agreements between industrial partners, agreements between universities and public research labs, and any other types of combination between those entities. According to SDC manuals, the database covers interfirm alliances from 1988 forward, however the number of alliances reported in the database prior to 1988 is limited, and data is quite few until 1990 (Anand and Khanna, 2000).

One of the main attractive points of SDC is its comprehensive search function. SDC yields more than 200 information fields including the name, SIC code, and nationality of partners, the terms of the deal, and a short summary for each alliance. There are some information fields that are empty for many alliances, either because the data is not reported (e.g., alliance termination dates), or the data is not relevant to the given agreement. There are also sometimes mistakes in coding (e.g., wrong SIC codes for some reported alliances). However, in general the coding is highly accurate, and very useful in helping the researcher identify relevant alliances (Schilling, 2008). Furthermore, the data can be downloaded in a user-defined format, such as an Excel spreadsheet with a personalized set of columns. SDC also provides a reference to the source(s) used in identifying the alliance, which enables the researcher to verify information provided in the database.

¹ This introduction to SDC database is from Schilling (2008).

6-3-1-2) Sample of research

SDC Platinum database is one of the most comprehensive data sources on alliances and is one of the only available data sources that can be used for large-scale empirical research on alliance (see Anand & Khanna, 2000, Sampson, 2007). For determining the population of this study a list of alliances is extracted from SDC in which at least one partner is French (N=4513). Because this database includes all announced alliances and the ultimately not signed cases remain in the database, all observations without effective dates are deleted ($n_1=1401$) from the list. In order to improve the probability of homogeneity of our final sample, alliances were clustered based on their primary SIC code and the observations belonging to those SIC clusters in which there were less than 30 alliances have been deleted ($n_2= 1861$). 1251 alliance cases remained as the target population of the research and the questionnaire is addressed the French partners of those alliances.

6-3-2) Data collection method

A survey is conducted using a questionnaire that has been developed from literature. Its content validity is reviewed by 3 professors of strategic management and alliance. Then through a pilot study over the 20 alliance managers from a sample of firms in Sophia Antipolis Technology Park, the questionnaire is tested in terms of comprehensibility of questions and conformity to different cases of alliances such as the type of industry or the domain of activity (R&D, NPD, Marketing, Manufacturing and Sale). The process of questionnaire development and test is explained in next session. The questionnaire has been made available online for main data collection phase.

Data collection took place during summer and autumn of 2007. After contacting the firms and identifying the alliance managers or the responsible in alliances, the link of questionnaire has been sent by email to respondents and through two rounds reminding call (once a week after

sending the questionnaire and then two weeks after first checking call) 152 questionnaires have been answered, and 114 were applicable to our statistical analysis.

6-3-3) Questionnaire development process

The questionnaire of this study has been developed through following steps:

1. For each variable, its related dimensions and existing scales are taken from literature review.
2. If there is no suitable scale for the variable in the literature, the theoretical and empirical studies were searched to find statements that could be used in this study.
3. **82** Likert-type questions were inserted in the questionnaire and 8 questions are added for capturing the characteristics of firm and alliance.
4. The validity of content of questions has been verified by 3 researchers in strategy and alliance.
5. The questionnaire has been tested through a pilot study in 20 alliances in Sophia Antipolis Technology Park in south of France. Pilot study resulted in following points:
 - a. For every case of alliance in pilot study, one questionnaire is answered in the presence of researcher. Through this step the comments of respondents related to clarification of the questions, unique context of some questions and the opinion of respondent about the whole questionnaire are recorded (see appendix 2). The time required for answering the questions is also registered for an estimation of time needed to allocate to the questionnaire.

6-3-4) Measurement Strategy

Respondents in this research were asked about their degree of agreement to statements on Likert-type scale. Multiple item measures of the constructs under study were developed based on items presented in various literature related to alliance and interfirm knowledge transfer and also through interviews done by practitioners and advisor professors in this domain (during pilot study). Wherever possible, existing measures of the constructs were adapted and used. These scales are described below and the actual measures are presented in questionnaire of research in appendix 3.

Table 6.2 summarizes the variables of this study and their related question reference in final questionnaire.

6-3-4-1) Interfirm Knowledge Transfer

As mentioned earlier, knowledge transfer can be embodied in changes of knowledge base of recipient and some researchers such as Mowery and his colleagues (Mowery et al, 1996) consider the convergence in knowledge bases of partners after alliance as a proxy of interfirm knowledge transfer. These changes could be manifested in technological knowledge, product/technology development competence, knowledge of human resources, efficiency of production (Chen, 2004) and changes in competitive performance of recipient unit (Argote et al, 2000). Another aspect which can be considered as the result of knowledge transfer and has drawn the attention in the literature is the level of satisfaction perceived by recipient about mastering the internalization, exploitation and management of learnt knowledge from other unit or partner (Cummings & Teng, 2003). I try to measure these aspect by developing 10 items ($\alpha = 0.8768$).

6-3-4-2) Explorativeness

The concept exploration in this study is developed from the arguments of Grant and Baden-Fuller (2004). According to the arguments of Grant and Baden-Fuller the essence of exploration in alliance is the intention of at least one of partners to learn from other. Some evidences from literature confirm this proposition, for example Inkpen (Inkpen, 1988) has observed that in some alliances partners have adopted a proactive or aggressive approach concerning internalization of partner's knowledge, on the other hand, in some alliances even in the cases of accessibility of partner's knowledge, firm has chosen to follow a passive approach to knowledge acquisition. In this study I use three Likert-type questions relating to the intention of:

- Exploring partner's knowledge,
- Generating new knowledge with partner, and
- Having access to partner's knowledge without internalizing it (reversed).

Two other questions referring to the need to form further alliance in same domain of knowledge with the same partner after current partnership are also included. If the focal firm intend to internalize the partner's knowledge through the current alliance, further partnership with the same partner in the same domain of knowledge would not be necessary ($\alpha=0.9012$).

6-3-4-3) Partner Diversity

In alliance research this concept has been treated in two main ways. First one concern a bunch of research in which the diversity of partners has been defined as a categorical construct. In this stream of research partners of an alliance were classified into one of two categories: similar or different. These studies try to show the type of value emerged from sharing different resources -which interpreted as complementary resources- and size and scale effects created by accumulating similar type of resources and knowledge by two allies. This

dichotomy has been called in several titles by researchers for example Hennart (Hennart, 1988) call it as *link* and *scale* alliances. Dussauge and Garrette (1999) used *Complementary* and *Additive* alliances, Sakakibara (Sakakibara, 1997) name this dichotomy by *Skill Sharing* and *Cost Sharing* alliances and finally Jolly (2005) applying the sociological concepts calls these two types of alliances as *Exogamy* and *Endogamy*.

Other stream of studies in alliance research consists those works in which the concept of diversity has been operationalized by a continuous construct which shows the level of similarity/dissimilarity of partners resources. In fact, this approach for measuring the diversity is more realistic than categorical measures. Some of prominent examples of this stream of research are the papers which use patent cross citation as the measure of partners knowledge base overlap (e.g. Mowery et al, 1996, 1998, 2002), or those which use the measure of technology diversity between partners (e.g. Sampson, 2007), studies which apply other measures such as RTA (Revealed Technology Advantage) as a measure of cognitive distance between partners (Nooteboom, et al, 2007) and finally questionnaire based measures (Lane and Lubatkin, 1998).

In this research I aim using a continuous measure which I have developed and tested based on questionnaire based survey. By this variable I intend to measure the diversity of partners from knowledge and organizational point of view. It is desired that this construct would be a continuous variable rather than a dummy variable which shows similarity/diversity. In the questionnaire of research three variables are designed for measuring the level of diversity/similarity between partner's resources and their internal organizations:

- Level of complementarity of pooled knowledge.
- Level of similarity of knowledge bases

- Level of organizational diversity.

After reversing the variable of similarity of knowledge bases, for aggregating these three variables the mean of them is calculated. The Cronbach's Alpha related to all item of these three variable in questionnaire is $\alpha=0.85$ which is in a satisfying level.

This construct measures the diversity of internal profile of partners which includes diversity of partners' knowledge/resource and the diversity of shared knowledge by them. Another aspect of internal profile of partners refers to their organizations. In this aspect the diversity of organizational culture and operational mechanisms is intended to observe. One of important aspect of this construct is paying attention to the similarity or diversity of shared knowledge. Because even in alliances in which two partners have similar knowledge bases they could share different knowledge or resources which in turn shows a sign of complementarity motive of alliance. As discussed earlier sharing similar resources is intended when the partners look for scale or size effect by alliance. Then if two partners have common knowledge bases but share different resources, their motives could be interpreted as complementary oriented motives rather than scale or size based motives. In this research the measure of partner diversity has been developed in a manner by which it could consider this type of alliances and it moderate the variable by using the level of diversity of shared knowledge.

This measure has however, a limit. It does not consider the diversity of partners' external environment. Two partners could be similar in their country and also in their industry. This similarity could be interpreted as different way. For example acting in same industry and same country could be a proxy of being direct competitor. In order to controlling this shortage of construct, two dummy variables referring one to diversity of partners nationality and other to acting in same sector of activity are included in the questionnaire. The data of these two dummy variables also are included in the statistical model of research.

6-3-4-4) The interaction of partner diversity and exploration

For testing hypothesis 3-1 and 3-2, two further variables have been developed from the variable of partner diversity. As in hypothesis 3-1 we aim low level of diversity, a dummy variable is created called LODIV, which equals 1 where the amount of partner diversity for the observation is smaller than its first quartile, otherwise 0. Variable HIDIV has been developed in the same manner for showing high level of partner diversity which is 1 where the amount of partner diversity for the observation is larger than its third quartile, otherwise 0.

6-3-4-5) Control Variables

- ***Partner's knowledge Ambiguity.*** Knowledge is subject to barriers and cannot easily be transferred from the source to a recipient (Kogut and 'Zander, 1992). Knowledge transfer effectiveness is a function of how difficult that knowledge can be conveyed, interpreted, and applied (Hamel et al., 1989). Reed and DeFillippi (1990) discuss that a strong barrier of imitation rises from the difficulty of competitors to understand and replicate the skills and knowledge that are sources of competitive superiority. So they define ambiguity as the factors that are responsible for superior (or inferior) performance which acts as a powerful block on both imitation and resource mobility. Barney (1991) asserts "causal ambiguity exists when the link between the resources controlled by a firm and a firm's sustained competitive advantage is not understood or [is] understood only very imperfectly" (pp. 108–109). Causal ambiguity refers to lack of know-why: why an action has been done, and why a given decision leads to a particular outcome (Szulanski, 1993). Simonin (Simonin, 2004) defines knowledge ambiguity as a lack of understanding of the logical linkages between actions and outcomes, inputs and outputs, and causes and effects that are related to technological or process know-how. This ambiguity stems from the nature of knowledge and the ambiguity of causal connections between action and result of it.

Knowledge ambiguity is associated negatively to knowledge transfer in strategic alliance (Simonin, 1999). Reed and DeFillippi present 3 measures for ambiguity (Tacitness, Complexity, and Specificity). But Simonin in his work on the role of knowledge ambiguity and the process of knowledge transfer in strategic alliance,

found no significant support between specificity and ambiguity (Simonin, 1999). For measuring knowledge ambiguity in this research we use 8 questions ($\alpha = 0.764$).

- ***Inter-partner Trust:*** Scholars have demonstrated the importance of mutual trust for efficient knowledge transfer (Doz and Hamel, 1998). In the same vein, Das & Teng (1998) suggested that the level of trust that one company grants to its ally and, at the same time, the level of control it exerts on its ally, both define the confidence level, i.e. the expected intensity of cooperative behaviour. Trust reflects the belief that a partner's word or promise is reliable and that a partner will fulfil its obligations in the relationship (Inkpen, 1998a). Trust among alliance partners, especially in technology alliances, is critical. Trust reduces the fear of opportunism by partners, and then should reduce transaction costs. With trust, the need for monitoring and other control mechanisms is reduced (Norman, 2004). In addition, trust encourages behaviours such as open communication and the willingness to share information. Trust has been shown to increase cooperation and improve flexibility, lowering the cost of coordinating activities and increasing the level of knowledge transfer and potential for learning (Nielsen, 2005). Trust has been discussed frequently in learning literature, Lack of trust can create confusion about whether a partner is really a partner or a competitor (e.g., Powell *et al.*, 1996) or in case of low level of trust accuracy of exchanged information is questionable (e.g., Currall and Judge, 1995). This infers that inter-firm trust is an important antecedent and a form of currency that facilitate knowledge transfer and accessibility (Inkpen, 2000). Consistent with this, in his study of two biotechnology partnership, Dodgson (Dodgson, 1993) found that trust facilitates knowledge exchange between alliance partners. Uzzi (Uzzi, 1996) via a field study found that trust is a governance mechanism of interfirm alliances and facilitates the exchange of tacit knowledge. Gulati also find that having prior relationships with the same partner will reduce the likelihood of equity based governance structure selection for alliance among them, which is the result of trust created by repeated ties (Gulati, 1995). In this research, 6 items are included in the questionnaire concerning mutual trust and having prior relationships with the same partner ($\alpha = 0.744$).
- ***Level of Knowledge Protection:*** Consistent exchange among employees of partners facilitates the information sharing, which increases the probability of that knowledge will be transferred. While restrictions on exchange may block a partner from learning

knowledge from a focal firm, these limitations can be self-defeating because they also limit the ability of the firm to transfer knowledge and learn (Norman, 2002; Rivera Santos et al, 2006). Simonin (2004) has also confirmed empirically that the knowledge protection has negative relation with knowledge transfer in the alliances between competitors. Firms protect their knowledge by direct rules and contractual limits as well as the indirect protection policies that reduce the potential attractiveness of the firm's knowledge to internalize by partner, such as sharing less valuable knowledge in alliances, sharing a costly-to-imitate knowledge, transferring old knowledge to alliance whose risk of leakage is not destructive to owner (Jolly, 2005) limiting the scope of alliance (Oxley and Sampson, 2004) and finally secrecy. In this study 3 items are used to measure knowledge protection ($\alpha = 0.557$). As the Cronbach's alpha is relatively low for this measure we add a count variable which shows the number of domains of activity of alliance which is a proxy for knowledge protection control via scope of alliance (Oxley and Sampson, 2004).

- **National Culture Difference.** Most of problems of international joint ventures could be rooted in the cultural differences of partners (Meschi, 1997). Lyles and Salk (1996), report also that cultural misunderstandings rooted in cultural differences can minimize flows of information and learning. Mowery et al. (1996) point to distance and cultural differences between partners as one of the obstacles to interfirm knowledge transfer. So in this research we control the effect of diversity of partners national culture by a dummy variable which is 1 if partner's nationality are identical, and 0 otherwise.
- **Competition.** Competition effect of partners is controlled by a dummy variable which is 1 if the partners are from the same sector of activity and 0 otherwise. By definition if two partners are similar in their product markets the expected level of diversity would be low. Some previous studies propose that alliance between competing partners would be particularly encouraging context for learning and knowledge transfer (Dussauge et al, 2002) .
- **Equity structure.** Mowery and his colleagues have observed that equity based joint ventures are more effective in terms of interfirm knowledge transfer than contract based cooperation (Mowery et al, 1996). Same researchers in another study based on the same dataset but with different research design found no evidence for contribution of equity based on interfirm knowledge transfer (Mowery et al, 2002). To avoid

ignoring the potential effect of equity based alliance governance structure we consider a dummy variable which is 1 if the alliance is an equity based partnership and 0 otherwise.

- ***Alliance Duration.*** Alliance duration or longevity has been considered in different ways in alliance literature. This variable initially considered as a proxy of alliance performance (Gomes-Casseres, 1987). But recently alliance duration has become a research question per se and researchers try to find and observe the factors affecting that (for a detailed review c.f. Valdés-Llaneza & Garcia-Canal, 2006). Simonin has also found different moderating effect of alliance duration on the relationship of complexity, cultural and organizational distance and prior ties on knowledge ambiguity which in turn affect interfirm knowledge transfer (Simonin). In this research number of years since alliance formation year and its termination (if the alliance is terminated) is taken as a control variable.
- ***Alliance Size.*** Number of personnel working in the alliance has been used as a proxy of alliance size. As the standard deviation of data for this item is too high, we use logarithmic scale and use its natural logarithm in the statistical models.
- ***Functional domain of alliance:*** Alliance function is controlled by 5 dummy variables which concern being or not being R&D, New product development, manufacturing, marketing and sales/distribution alliances. As we noted earlier the sum of the value of these variables for each alliance is taken as scope of alliance.

6-4) Regression Model

Tobit analysis which developed by Tobin (1958) is one of the models which assumed that the dependent variable has a non-negative value and it is bounded or clustered at a limiting value (McDonald & Moffitt, 1980). Tobit regression analysis is also suggested for double truncated dependent variables (Rosett & Nelson, 1975). As the dependent variable is limited between 1.2 and 4.8, and no observation has upper or lower value from this range, Tobit regression has been selected to test the hypotheses, which is suitable for double truncated dependent variables. According to Greene (1997) when the dependent variable is truncated at some value, OLS regression can lead to biased estimates of the coefficients.

Another reason for using Tobit in this research is that, Tobit is not a linear model. Then it suits more than OLS¹ regression for estimating the models in which Y or dependent variable is estimated as a non-linear function of independent variable. In this study the square term of *Partner Diversity* and the multiplied terms related to the interaction of diversity and explorative intent; blur the assumptions on linear relationship between Y and X, and on independence of explanatory variables that are prerequisite for linear regression.

However, OLS regression model is used to verify the robustness of results and no significant difference has been observed.

¹ Ordinary Least Square

Table 6.2) Variables of research

Variable	Themes covered by variable	Type of variable	Cronbach's Alpha	Question of questionnaire	Number of items for each variable
Knowledge Transfer	Knowledge Transfer Performance	Dependent variable	0.8768	1-9 and 16	10
Intent to Explore	Exploration vs. Exploitation	Independent Variable	0.9012	10-15	5
Partner Diversity	Complementarity of shared knowledge	Independent Variable	0.85	18-19	2
	Knowledge base overlap			20-23	4
	Organizational distance			42-43	2
Partner's Knowledge Ambiguity	Tacitness	Control Variable	0.764	26-33	8
	Explicitness				
Trust	Trust	Control	0.744	38-41 and 24-25	6
	Prior Relationship				
Knowledge Protection	Knowledge Protection by Partner	Control	0.557	45-47 and	3
Number of Domains of Alliance	Knowledge Protection	Control	NA	sum of dummies of Q 13	5
Similarity of Nationality of Partners		Control	NA	Q9F and Q9G	2
Similarity of Sector of Activity of Partners		Control	NA	Q9A and Q9B	2
Equity based JV		Control	NA	Q14A and Q14B	2
Age of Alliance		Control	NA	Q15	1
Size of Alliance		Control	NA	Q17	1
R&D Alliance		Control	NA	Q13a	1
NPD Alliance		Control	NA	Q13b	1
Marketing Alliance		Control	NA	Q13e	1
Sale and Distribution All.		Control	NA	Q13f	1
Manufacturing All.		Control	NA	Q13D	1

Chapter 7: Results and Conclusion

7-1) Statistical results

Table 7.1, Table 7.2 and 7.3 report the descriptive summary of data, variance inflation factors (VIF) of variables and bi-variate correlation between all the variables. Since the coefficient of the similarity of industry with partner diversity is high- as expected, a VIF test has been conducted.

Table 7.1) Descriptive statistics of collected data

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std, Dev,</i>	<i>Min</i>	<i>Max</i>	<i>Abbrev.</i>
Interfirm Knowledge Transfer	114	2,820175	0,832119	1,2	4,8	IKT
Explorative Intent	114	2,940351	1,193768	1,2	4,8	EXPLOR
Partner Diversity	114	1,434211	0,828413	0,583333	3,75	DIVERS
Square of Partner Diversity	114	2,737208	2,1882	0	7,5625	DIVERS2
Explorative Intent*Partner Diversity	114	3,817398	2,277074	0,166667	10,81667	EXPLOR* DIVERS
Low Diversity Alliance	114	0,236842	0,427022	0	1	LODIV
High Diversity Alliance	114	0,210526	0,409482	0	1	HIDIV
Explorative Intent*Low Diversity All.	114	0,770175	1,481026	0	4,6	LODIV* EXPLOR
Explorative Intent*High Diversity All.	114	0,398246	0,849569	0	4	HIDIV* EXPLOR
Partner's Knowledge Ambiguity	114	3,54057	0,657558	1,25	4,75	AMBIG
Interfirm Trust	114	3,149123	0,868256	1,333333	4,666667	TRUST
Knowledge Protection by Partner	114	3,356725	0,852689	1,333333	5	PROTECT
Number of Activity Domain of All.	114	2,035088	1,003797	1	5	NUMDOM
Partner From Same Nationality	114	0,447368	0,499418	0	1	SAMENAT
Partner From Same Sector	114	0,385965	0,488972	0	1	SAMESEC
Equity Based Alliance	114	0,140351	0,348884	0	1	EQUITY
Age of Alliance	114	4,482456	2,62133	1	13	DURATION
Size of Alliance (Ln.)	114	4,363353	1,207694	1,098612	8,411833	SIZE
R&D Alliance	114	0,377193	0,486824	0	1	RD
New Product Development Alliance	114	0,894737	0,308247	0	1	NPD
Marketing Alliance	114	0,105263	0,308247	0	1	MRKTNG
Sale Alliance	114	0,219298	0,415598	0	1	SALE
Manufacturing Alliance	114	0,307018	0,463293	0	1	MANUF

Variance inflation factor is one of the tests for detecting multicollinearity (Mansfield and Helms, 1982) it shows the intensity of multicollinearity in an ordinary least squares regression

analysis. The VIF for a variable shows the increase in variance of a variable in an ordinary least squares (OLS) that can be attributable to the fact that this variable is in linear relation to the other independent variables in the model (Greene, 2002). As a rule of thumb, a variable whose VIF values are greater than 10 may merit further investigation (Marquardt, 1970).

Variance inflation factor is calculated under OLS¹ conditions before entering interaction variables (i.e. DIVERS2, EXPLOR*DIVERS). In other words, first a linear regression model is performed without interaction terms because they are by definition not independent from their individual variables (i.e. Diversity, Exploration). In the second step the VIF was calculated for all independent variables used in linear regression (Table 7.2). No multicollinearity effect has been detected, (Mean VIF=1.9, Min VIF=1,15 and Max VIF=3.75). Other coefficients are not considered to be high (above 0.7).

Table 7.2) Variance Inflation Factor

<i>Variable</i>	<i>VIF</i>	<i>1/VIF</i>
DIVERS	3.75	0.266349
SAMESEC	3.16	0.316808
AMBIG	2.42	0.413465
SIZE	2.12	0.471886
EXPLOR	2.08	0.479980
DURATION	1.84	0.544393
PROTECT	1.81	0.551026
TRUST	1.71	0.583689
RD	1.60	0.624217
EQUITY	1.52	0.658859
MANUF	1.50	0.667296
NPD	1.33	0.751851
MARKTG	1.24	0.808416
SALE	1.22	0.817094
SAMENAT	1.15	0.871140
Mean VIF	1.90	

¹ As OLS also has been used to check of robustness, the VIF test is done under the OLS conditions.

Table 7.3) Correlation coefficients (n=114)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 EXPLOR	1																
2 DIVERS	-.408(**)	1															
3 AMBIG	-.427(**)	.572(**)	1														
4 TRUST	0,153	0,115	-0,124	1													
5 PROTECT	-.361(**)	-0,052	.321(**)	-.459(**)	1												
6 NUMDOM	0,108	-0,107	-.463(**)	.361(**)	-.263(**)	1											
7 SAMENAT	0,069	0,100	0,028	0,113	-0,143	-0,067	1										
8 SAMESEC	.337(**)	-.769(**)	-.455(**)	0,009	0,106	0,170	-0,134	1									
9 EQUITY	.186(*)	-.391(**)	-.353(**)	0,179	-0,051	.390(**)	-0,059	.406(**)	1								
10 DURATION	.203(*)	-.260(**)	-.316(**)	.422(**)	-.208(*)	.464(**)	-0,105	.316(**)	.399(**)	1							
11 SIZE	-.287(**)	0,008	-.271(**)	0,178	-0,065	.529(**)	-.204(*)	0,045	.311(**)	.394(**)	1						
12 RD	.338(**)	-0,075	-.204(*)	.372(**)	-.341(**)	.480(**)	0,028	.201(*)	.207(*)	.439(**)	0,177	1					
13 NPD	-0,075	.287(**)	0,092	0,175	-0,181	0,184	.194(*)	-.315(**)	-0,026	0,020	0,030	-0,028	1				
14 MANUF	-0,072	-0,055	-.255(**)	0,157	-0,071	.624(**)	-0,063	0,175	.224(*)	.241(**)	.421(**)	0,110	-0,144	1			
15 MARKTG	-0,117	-0,013	-0,005	0,023	0,148	0,102	-0,021	0,022	0,108	-0,020	0,103	-0,149	-0,162	-0,166	1		
16 SALE	-0,034	-0,153	-.272(**)	0,019	-0,031	.448(**)	-0,093	-0,028	0,030	0,040	.197(*)	-0,063	-0,025	0,107	0,025	1	
17 IKT	.613(**)	-.189(*)	-.438(**)	.695(**)	-.575(**)	.329(**)	0,082	.270(**)	.283(**)	.447(**)	0,025	.407(**)	-0,002	0,131	-0,001	-0,013	1

** . P<0.01 (two-tail).

* . P< 0.05 (two-tail).

As the dependent variable is limited between 1.2 and 4.8, and no observation has upper or lower value from this range, Tobit regression has been selected to test the hypotheses, which is suitable for double bounded dependent variables. As remarked earlier, the OLS regression model is also used to verify the robustness of results.

Tables 7.6 and 7.7 demonstrate the results of tests of hypotheses by OLS. As shown in the OLS tables, no significant difference has been observed between the coefficients and their significance in Tobit and OLS models.

7-1-1) Hypotheses

Table 7.4 reports the results of multiple hierarchical regression models that were used to test hypotheses 1 and 2. In the first step (model 1), all control variables are introduced in the model. As reported, some of the important antecedents of interfirm knowledge transfer of previous studies have been re-confirmed via this model. Partner's knowledge ambiguity is observed as a barrier to effective transfer and this is consistent with the study of Simonin (Simonin, 1999).

Knowledge protection also shows a negative and significant effect on interfirm knowledge transfer which is expected according to previous research (Norman, 2002); (Rivera Santos et al, 2006), (Simonin, 2004). However, in contrast with Oxley and Sampson (Oxley & Sampson, 2004) no relation has been observed among the number of domains of alliance and knowledge transfer. There is also no change in insignificance of this variable in the other models. As remarked in several previous studies, the role of trust (Dhanaraj et al. 2004, Szulanski et al. 2004) has been corroborated by the results of this study. Equity based alliances are observed without any effect on interfirm knowledge transfer effectiveness. This point is contrary to the findings of Mowery and his colleagues (Mowery et al, 1996; Sampson,

2007) but is not completely unknown because there is some evidence showing no significant effect of equity structure on interfirm learning (Mowery et al, 2002).

Model 2 of table 7.4 confirms the first hypothesis which predicts a positive relationship between the level of exploration in alliance and interfirm knowledge transfer ($p < 0.01$, $\Delta LL = 17.65$). As the construct of explorativeness has been developed according to Grant and Baden-Fuller's definition (Grant and Baden-Fuller, 2004) we also cannot reject their proposition of absence or lower level of interfirm knowledge transfer in exploitation alliances¹.

Model 3 of the table 7.4 shows the effect of partner diversity on interfirm knowledge transfer and as it is noted, the effect of this variable does not improve the model as considerably as the level of exploration ($p < 0.05$, $\Delta LL = 2.7$). By introducing the square term of partner diversity in model 4, the decreasing return of partner diversity on interfirm knowledge transfer has been confirmed ($p < 0.01$, $\Delta LL = 3.71$).

Model 5 of table 7.4 shows a negative and significant interactive effect of partner diversity and intent to explore. However it cannot be determined whether this negative effect is the result of diversity on exploration or vice versa. Thus, by this model we cannot confirm hypotheses 3-1 and 3-2.

¹ For checking this proposition I have converted the variable of explorativeness into a dummy variable whose value is 1 when the value of explorativeness for the observation is greater than or equal to the average of it ($n_{\text{explore}} = 58$), otherwise the value is 0 which is then called exploitation alliance ($n_{\text{exploit}} = 56$). I found that the interfirm knowledge transfer is significantly higher in explorative alliances (at the confidence level of 99.99).

Table 7.4) Tobit Regression Results (1). Dependent Variable: Interfirm Knowledge Transfer.

Variables	1	2	3	4	5
EXPLOR		0.2711***	0.2852***	0.2406***	0.4290***
		(0.0421)	(0.0416)	(0.0433)	(0.1011)
DIVERS			0.1943**	0.6882***	1.0706***
			(0.0831)	(0.1955)	(0.2675)
DIVERS2				-0.1957***	-0.2122***
				(0.0706)	(0.0698)
EXPLOR*DIVERS					-0.1226**
					(0.0597)
AMBIG	-0.3320***	-0.1661**	-0.2452***	-0.2581***	-0.3280***
	(0.0920)	(0.0825)	(0.0881)	(0.0852)	(0.0905)
TRUST	0.5119***	0.5152***	0.4897***	0.4779***	0.4504***
	(0.0605)	(0.0517)	(0.0517)	(0.0502)	(0.0511)
PROTECT	-0.2598***	-0.1782***	-0.1746***	-0.1215**	-0.1166**
	(0.0629)	(0.0552)	(0.0541)	(0.0557)	(0.0547)
NUMDOM	0.0532	-0.0322	-0.0971	-0.1457	-0.1292
	(0.1705)	(0.1462)	(0.1459)	(0.1421)	(0.1399)
SAMENAT	-0.0133	-0.0107	-0.0104	0.0091	0.0114
	(0.0899)	(0.0768)	(0.0752)	(0.0731)	(0.0718)
SAMESEC	0.1656	0.0906	0.2792**	0.3146**	0.2938**
	(0.1151)	(0.0991)	(0.1262)	(0.1227)	(0.1209)
EQUITY	0.1071	0.0452	0.1010	0.0903	0.0491
	(0.1481)	(0.1268)	(0.1267)	(0.1226)	(0.1222)
DURATION	0.0351*	0.0253	0.0325*	0.0363**	0.0247
	(0.0211)	(0.0181)	(0.0179)	(0.0174)	(0.0180)
SIZE	-0.1490***	-0.0247	-0.0320	-0.0205	-0.0008
	(0.0437)	(0.0421)	(0.0413)	(0.0401)	(0.0406)
RD	-0.0037	-0.0572	-0.0346	0.0225	-0.0162
	(0.1855)	(0.1588)	(0.1558)	(0.1521)	(0.1506)
NPD	-0.2635	-0.1255	-0.0860	-0.0705	-0.1282
	(0.2500)	(0.2147)	(0.2108)	(0.2040)	(0.2023)
MARKTG	0.0358	0.1609	0.2036	0.2776	0.3373*
	(0.2231)	(0.1916)	(0.1884)	(0.1842)	(0.1832)
SALE	-0.1885	-0.0837	0.0170	0.0624	0.0831
	(0.1880)	(0.1613)	(0.1639)	(0.1593)	(0.1569)
MANUF	-0.0656	0.0918	0.1334	0.1841	0.2011
	(0.2366)	(0.2036)	(0.2001)	(0.1944)	(0.1911)
Constant	3.8655***	1.7202***	1.7173***	1.5216***	1.2457**
	(0.4556)	(0.5114)	(0.5011)	(0.4896)	(0.4994)
Observations	114	114	114	114	114
LL	-66.66	-49.01	-46.31	-42.60	-40.52
chi2	149.65***	184.96***	190.35***	197.78***	201.93***
Standard errors in parentheses.					
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$					

We need to study the diversity in its two extremes to understand the type of interaction with exploration. For this study we use models 4 and 6 of table 7.5 in which the interaction of exploration with two dummy variables regarding low diversity (LODIV*EXPLOR) and high diversity (HIDIV*EXPLOR) are included. As it is shown in high level of diversity the exploration effect on interfirm knowledge transfer is decreasing (H. 3-2) and in high level of similarity the effect of exploration is positive (H. 3-1). Note that the two dummies of high diversity and high similarity have no significant effects on interfirm knowledge transfer.

Table 7.5) Tobit Regression Results (2). Dependent Variable: Interfirm Knowledge Transfer.

Variables	1	2	3	4	5	6
EXPLOR		0.2711*** (0.0421)	0.2694*** (0.0418)	0.1901*** (0.0475)	0.2703*** (0.0429)	0.3324*** (0.0493)
LODIV			-0.1906 (0.1376)	-1.5208*** (0.4459)		
HIDIV					-0.0108 (0.1077)	0.5776** (0.2681)
LODIV*EXPLOR				0.3839*** (0.1229)		
HIDIV*EXPLOR						-0.3069** (0.1286)
AMBIG	-0.3320*** (0.0920)	-0.1661** (0.0825)	-0.1825** (0.0828)	-0.3555*** (0.0974)	-0.1641* (0.0850)	-0.1066 (0.0860)
TRUST	0.5119*** (0.0605)	0.5152*** (0.0517)	0.5027*** (0.0521)	0.4718*** (0.0510)	0.5158*** (0.0520)	0.4904*** (0.0518)
PROTECT	-0.2598*** (0.0629)	-0.1782*** (0.0552)	-0.1578*** (0.0567)	-0.1376** (0.0549)	-0.1774*** (0.0558)	-0.1528*** (0.0553)
NUMDOM	0.0532 (0.1705)	-0.0322 (0.1462)	-0.0763 (0.1485)	-0.0480 (0.1432)	-0.0320 (0.1462)	-0.0120 (0.1426)
SAMENAT	-0.0133 (0.0899)	-0.0107 (0.0768)	-0.0068 (0.0763)	-0.0058 (0.0733)	-0.0106 (0.0768)	0.0076 (0.0752)
SAMESEC	0.1656 (0.1151)	0.0906 (0.0991)	0.1814 (0.1181)	0.2245* (0.1144)	0.0888 (0.1007)	0.0472 (0.0997)
EQUITY	0.1071 (0.1481)	0.0452 (0.1268)	0.0830 (0.1288)	0.0258 (0.1256)	0.0449 (0.1268)	0.0453 (0.1234)
DURATION	0.0351* (0.0211)	0.0253 (0.0181)	0.0323* (0.0186)	0.0108 (0.0192)	0.0252 (0.0181)	0.0237 (0.0176)
SIZE	-0.1490*** (0.0437)	-0.0247 (0.0421)	-0.0226 (0.0418)	-0.0032 (0.0406)	-0.0246 (0.0421)	-0.0050 (0.0418)
RD	-0.0037 (0.1855)	-0.0572 (0.1588)	-0.0285 (0.1589)	-0.0780 (0.1536)	-0.0568 (0.1588)	-0.0840 (0.1551)
NPD	-0.2635 (0.2500)	-0.1255 (0.2147)	-0.1132 (0.2131)	-0.1807 (0.2061)	-0.1264 (0.2148)	-0.2444 (0.2151)
MRKTNG	0.0358 (0.2231)	0.1609 (0.1916)	0.1942 (0.1916)	0.2802 (0.1862)	0.1618 (0.1918)	0.1924 (0.1873)
SALE	-0.1885 (0.1880)	-0.0837 (0.1613)	-0.0330 (0.1642)	0.0217 (0.1591)	-0.0844 (0.1614)	-0.0729 (0.1572)
MANUF	-0.0656 (0.2366)	0.0918 (0.2036)	0.1194 (0.2029)	0.1357 (0.1952)	0.0923 (0.2036)	0.1030 (0.1985)
Constant	3.8655*** (0.4556)	1.7202*** (0.5114)	1.7614*** (0.5083)	2.6549*** (0.5672)	1.7141*** (0.5149)	1.3190** (0.5280)
Observations	114	114	114	114	114	114
LL	-66.66	-49.01	-48.05	-43.35	-49.00	-46.23
chi2	149.65***	184.96***	186.87***	196.27***	184.97***	190.52***

Standard errors in parentheses.

p*, 0.10; ** *p*, 0.05; * *p*, 0.01

Table 7.6) OLS Regression Results (1). Dependent Variable: Interfirm Knowledge Transfer.

	1	2	3	4	5
EXPLOR		0.2724*** (0.0452)	0.2853*** (0.0450)	0.2401*** (0.0471)	0.4241*** (0.1105)
DIVERS			0.1727* (0.0884)	0.6754*** (0.2124)	1.0485*** (0.2922)
DIVERS2				-0.1985** (0.0767)	-0.2148*** (0.0763)
EXPLOR*DIVERS					-0.1197* (0.0653)
AMBIG	-0.3127*** (0.0972)	-0.1503* (0.0877)	-0.2164** (0.0928)	-0.2316** (0.0904)	-0.2991*** (0.0966)
TRUST	0.5071*** (0.0646)	0.5115*** (0.0554)	0.4878*** (0.0560)	0.4760*** (0.0546)	0.4490*** (0.0559)
PROTECT	-0.2573*** (0.0672)	-0.1758*** (0.0593)	-0.1720*** (0.0585)	-0.1184* (0.0605)	-0.1134* (0.0598)
NUMDOM	0.0292 (0.1814)	-0.0513 (0.1563)	-0.1140 (0.1574)	-0.1620 (0.1541)	-0.1465 (0.1524)
SAMENAT	-0.0224 (0.0959)	-0.0177 (0.0823)	-0.0194 (0.0812)	0.0011 (0.0793)	0.0031 (0.0783)
SAMESEC	0.1616 (0.1231)	0.0872 (0.1064)	0.2538* (0.1352)	0.2916** (0.1322)	0.2705** (0.1311)
EQUITY	0.1398 (0.1563)	0.0703 (0.1346)	0.1267 (0.1358)	0.1138 (0.1321)	0.0743 (0.1323)
DURATION	0.0352 (0.0225)	0.0253 (0.0194)	0.0317 (0.0194)	0.0357* (0.0189)	0.0243 (0.0197)
SIZE	-0.1494*** (0.0468)	-0.0243 (0.0452)	-0.0308 (0.0447)	-0.0192 (0.0437)	0.0001 (0.0444)
RD	0.0180 (0.1977)	-0.0406 (0.1700)	-0.0161 (0.1681)	0.0404 (0.1648)	0.0033 (0.1641)
NPD	-0.2415 (0.2668)	-0.1077 (0.2301)	-0.0679 (0.2278)	-0.0536 (0.2215)	-0.1094 (0.2209)
MARKTG	0.0565 (0.2381)	0.1776 (0.2053)	0.2200 (0.2036)	0.2938 (0.1999)	0.3527* (0.2001)
SALE	-0.1517 (0.1991)	-0.0546 (0.1716)	0.0426 (0.1764)	0.0867 (0.1723)	0.1078 (0.1706)
MANUF	-0.0437 (0.2525)	0.1096 (0.2182)	0.1512 (0.2162)	0.2014 (0.2110)	0.2186 (0.2087)
Constant	3.8064*** (0.4851)	1.6637*** (0.5475)	1.6460*** (0.5398)	1.4530*** (0.5299)	1.1811** (0.5441)
Observations	114	114	114	114	114
R-Squared	0.73	0.80	0.81	0.82	0.83
Adjusted R2	0.69	0.77	0.78	0.79	0.79

Standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 7.7) OLS Regression Results (2). Dependent Variable: Interfirm Knowledge Transfer

	1	2	3	4	5	6
EXPLOR		0.2724*** (0.0452)	0.2709*** (0.0451)	0.1960*** (0.0515)	0.2707*** (0.0463)	0.3349*** (0.0534)
LODIV			-0.1821 (0.1484)	-1.4418*** (0.4817)		
HIDIV					-0.0226 (0.1159)	0.5873** (0.2905)
LODIV*EXPLOR				0.3641*** (0.1329)		
HIDIV*EXPLOR						-0.3172** (0.1391)
AMBIG	-0.3127*** (0.0972)	-0.1503* (0.0877)	-0.1653* (0.0883)	-0.3259*** (0.1036)	-0.1462 (0.0906)	-0.0894 (0.0921)
TRUST	0.5071*** (0.0646)	0.5115*** (0.0554)	0.4994*** (0.0562)	0.4694*** (0.0555)	0.5127*** (0.0561)	0.4868*** (0.0560)
PROTECT	-0.2573*** (0.0672)	-0.1758*** (0.0593)	-0.1562** (0.0612)	-0.1368** (0.0597)	-0.1742*** (0.0601)	-0.1492** (0.0599)
NUMDOM	0.0292 (0.1814)	-0.0513 (0.1563)	-0.0941 (0.1597)	-0.0709 (0.1549)	-0.0506 (0.1571)	-0.0274 (0.1541)
SAMENAT	-0.0224 (0.0959)	-0.0177 (0.0823)	-0.0143 (0.0822)	-0.0149 (0.0795)	-0.0175 (0.0827)	0.0023 (0.0815)
SAMESEC	0.1616 (0.1231)	0.0872 (0.1064)	0.1738 (0.1275)	0.2131* (0.1242)	0.0834 (0.1086)	0.0411 (0.1080)
EQUITY	0.1398 (0.1563)	0.0703 (0.1346)	0.1075 (0.1377)	0.0582 (0.1345)	0.0694 (0.1354)	0.0663 (0.1326)
DURATION	0.0352 (0.0225)	0.0253 (0.0194)	0.0320 (0.0201)	0.0115 (0.0208)	0.0252 (0.0195)	0.0236 (0.0191)
SIZE	-0.1494*** (0.0468)	-0.0243 (0.0452)	-0.0223 (0.0451)	-0.0039 (0.0442)	-0.0242 (0.0454)	-0.0041 (0.0453)
RD	0.0180 (0.1977)	-0.0406 (0.1700)	-0.0125 (0.1711)	-0.0561 (0.1664)	-0.0401 (0.1709)	-0.0705 (0.1678)
NPD	-0.2415 (0.2668)	-0.1077 (0.2301)	-0.0953 (0.2298)	-0.1556 (0.2235)	-0.1097 (0.2315)	-0.2341 (0.2331)
MRKTNG	0.0565 (0.2381)	0.1776 (0.2053)	0.2100 (0.2065)	0.2948 (0.2023)	0.1792 (0.2065)	0.2084 (0.2026)
SALE	-0.1517 (0.1991)	-0.0546 (0.1716)	-0.0050 (0.1759)	0.0526 (0.1716)	-0.0565 (0.1728)	-0.0485 (0.1692)
MANUF	-0.0437 (0.2525)	0.1096 (0.2182)	0.1366 (0.2187)	0.1556 (0.2119)	0.1104 (0.2193)	0.1189 (0.2148)
Constant	3.8064*** (0.4851)	1.6637*** (0.5475)	1.7009*** (0.5469)	2.5358*** (0.6109)	1.6518*** (0.5535)	1.2522** (0.5696)
Observations	114	114	114	114	114	114
R-squared	0.73	0.80	0.80	0.82	0.80	0.81
Adjusted R2	0.69	0.77	0.77	0.79	0.77	0.78

Standard errors in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%

7-2) Discussion and Conclusion

This section starts with a brief review of the origin of this study. It continues with a synthesis of the contribution of research.

7.2.1) Origins of study

Zeng and Hennart (Zeng and Hennart, 2002) and Grant and Baden-Fuller (Grant & Baden-Fuller, 2004) have discussed two approaches to learning alliances in their theoretical papers. They attempt to evolve the second aspect of KBV of the alliance. According to KBV of interfirm alliance, inter-partner learning is considered as the purpose of alliance formation (Inkpen, 2002). The idea of knowledge transfer from one partner to another is discussed by Hamel (1991) as internalization of a partner's knowledge by the firm. In this approach, partners compete to be the first to internalize their counterpart's knowledge. According to Hamel (Hamel, 1991), it is likely that an alliance will be concluded by the firm which is the most rapid to internalize their partner's knowledge and resources. It is for this reason that this approach is sometimes called a learning race (Hamel 1991), (Khanna, Gulati and Nohria, 1998). The approach of knowledge internalization was considered the dominant definition of knowledge transfer and learning in the 1990s. More recently however, researchers (Zeng & Hennart, 2002) (Mowery et al, 2002) (Grant & Baden-Fuller, 2004) have defined a second category for alliance-based learning. They distinguish knowledge internalization purpose of alliances from what they call cooperative specialization (Zeng & Hennart, 2002), or knowledge accessing approach of interfirm alliance (Grant & Baden-Fuller, 2004). Their main

proof came from the results of Mowery and his colleagues' study (Mowery et al, 1996)¹. Based on their empirical analysis of the evolution of joint ventures, Mowery and his colleagues conclude that internalization arguments "are based on extraordinarily broad generalizations from minimum evidence" (p.81) and consistent with the argument that alliance activity can promote increased specialization; they found that the capabilities of partner firms become more divergent in a substantial subset of alliances (Mowery et al. 1996). The same phenomenon is observed by Nakamura and his colleagues (Nakamura, Shaver, and Yeung, 1996) among Japanese-US joint ventures. They found that in joint ventures where partners intend to and engaged in interfirm learning technological knowledge of partners converge. But they found that in alliances where partners pool dissimilar but complementary knowledge, partners' technological knowledge diverge over time. This lead Zeng and Hennart (Zeng & Hennart, 2002) to challenge the internalization or learning race view of interfirm joint ventures and to call for a redirecting of current alliance literature from the knowledge based view. They argued that knowledge transfer in alliance literature has been considered to be equal to a race to internalization of one partner's knowledge by another. They contend that the normative suggestion of this view that partners should enter a joint venture with a racing mindset is not always justified and they suggest cooperative specialization as a more real phenomenon versus comparing it to a learning race (p.190). Proponents of the internalization (learning race) view have advised managers to use joint ventures and alliances as a shortcut to achieve this objective. They suggest internalizing a partner's know-how as quickly as possible and dissolving the joint venture when the firms have reached this goal. Managers are encouraged to carefully limit their contribution to the joint venture while making maximum efforts to internalize their partner's know-how, so precipitating learning races (Zeng &

¹ It should be noted that the concept of cooperative specialization has been also recognized by Teece (1992) who says "alliances facilitate reciprocal specialization among firms" (p.20). But it was empirically evidenced for first time in 1996 (Mowery et al, 1996).

Hennart, 2002, p.191). But internalizing one's partner's know-how is not the only way to solve the problem of missing capabilities. A firm that has to obtain certain capabilities does not always need to internalize them. In many cases, all that may be needed is simple access to them (Zeng & Hennart, 2002, p.191). Zeng & Hennart give an example and argue that in order for a biotechnology firm that has found a new chemical substance for a drug to recognize completely its product's side effects, it can choose to form an alliance with a pharmaceutical firm to have access to its clinical test capabilities. Through the joint venture, the biotechnology firm would obtain access to clinical trials know-how without having to internalize it. This is what Zeng & Hennart call "cooperative specialization" (Zeng & Hennart, 2002).

Grant and Baden-Fuller (Grant & Baden-Fuller, 2004) referring to the research of Mowery and his colleagues (Mowery, et al, 1996) and to the concepts of exploration and exploitation (March, 1991) present knowledge accessing versus knowledge acquisition approach of interfirm alliances. Grant and Baden-Fuller being inspired by March's dichotomy present their knowledge accessing approach as an exploitative approach of learning by alliance and state knowledge internalization or knowledge acquisition as explorative learning by alliance. Grant and Baden-Fuller argued that internalization or acquisition is close to the concept of exploration (March, 1991) or knowledge generation (Spender, 1992). In addition, having access to knowledge or cooperative specialization is radically similar with the concept of exploitation (March, 1991) or knowledge application (Spender, 1992). Knowledge generation refers to the partnership as a channel of learning in which each firm uses the alliance to learn and internalize the partner's knowledge. In the same vein, exploration or knowledge access refers to a type of "knowledge sharing in which each firm gets access to its partner's stock of

knowledge in order to exploit complementarities, but with the intention of maintaining its distinctive base of specialized knowledge” (Grant & Baden-Fuller, 2004, p64).

In this study by taking exploration and exploitation as two ends of a continuum the ideas of Grant and Baden-Fuller are tested. I show that exploration leads to knowledge transfer.

This research has not only confirmed the role of exploration, but also the role of the factors which influence the exploration of external knowledge as well. The partial role of partner diversity as a source of new knowledge to be learned has been evidenced as a determinant of effectiveness of interfirm knowledge transfer. I found there to be a decreasing return of partner diversity on interfirm learning. A bounded level of relative absorptive capacity can explain the diminishing role of high diversity as novelty. Through the third hypotheses of this paper, we studied the interaction of intent to explore and the importance of diversity. It was found that the interaction of similarity and intent to explore has new effects that can be explained by the depth of exploration. According to the results, partner similarity can have a positive effect on interfirm learning only when I consider its interactive role with intent to explore. The findings also show that high diversity has no significant impact on the effectiveness of interfirm learning but surprisingly I observed the interactive effect of high diversity and intent to explore is negative and significant. This finding shows the bounded capability of firms in exploring external new knowledge in a broad scope. Still another conclusion that can be drawn from the interactive effect of high diversity and intent to explore is that in trying to learn from a highly different partner is a wrong strategy.

Control variables in this research are composed of the factors which can facilitate or impede interfirm learning. In order to achieve more precise results, the types of alliance and some characteristics of alliance have also been controlled.

7.2.2) Contributions

The research findings are consistent with extant interfirm learning theories and several prior empirical studies. The first contribution of this paper is its presentation of empirical evidence for confirmation of Grant and Baden-Fuller's approach by which they claim that interfirm knowledge transfer occurs in explorative alliances (Grant & Baden-Fuller, 2004). Exploration by definition concerns the experimentation, flexibility, discovery, variation and re-configuration for creation of new knowledge. I can therefore conclude that it facilitates interfirm knowledge transfer through two ways:

- a) *Process of exploration.* Through explorative alliance the knowledge would be decomposed, and also would be manipulated along with the partner's knowledge elements. In order to be experimented, the partner's knowledge would be also decomposed and become accessible to the alliance or even to the focal firm. This process would make the partner's knowledge more accessible and comprehensible and because of the focal firm's intent, the exploring and learning of the partner's knowledge would be possible.
- b) *Result of exploration.* The result of an explorative alliance would be a new knowledge for partners, which is a source of novelty and the partners would have joint control of it. This new knowledge has a significant opportunity to get absorbed by partners because its root and elements come from the partnering firms and according to the concept of absorptive capacity, its integration of the parent firms' knowledge bases is not only possible but to some extent expected.

The second contribution of the research deals with the role of partner diversity. Partner diversity measures have been studied several times in several contexts in alliance literature

(Mowery et al, 1996; Cummings and Teng, 2003; Nooteboom et al, 2007; Sampson, 2007). Although the inverted U-shape relationship between diversity of partners' technological knowledge bases and innovative performance has been confirmed by some studies (Nooteboom et al, 2007; Sampson, 2007), the same type of relationship between partner diversity and interfirm knowledge transfer has not been confirmed clearly (Cummings and Teng, 2003). In this research I reconsider this construct and by adding a new dimension- the diversity of shared knowledge, I try to improve its precision. Unlike the study of Cummings and Teng (Cummings and Teng, 2003), the predicted inverted U-shape is confirmed. As it is observed, increasing partner diversity has different patterns according to its relation with interfirm knowledge transfer. The positive effect of diversity could also be interpreted as being complementary in nature to the knowledge. When both knowledge and resources are complementary in nature, they can be combined and pooled together in order to yield a new service, new knowledge or new product. When the partners share resources which are complementary by nature, if they are different in terms of isolating mechanisms (such as protection or ambiguity) the possibility of different forms of transfer of shared resources to partners is not unexpected. This potential has been discussed recently in RBV as appropriated relational rent (Lavie, 2006). In such cases, sharing resources by partners blur the assumptions of imperfect immobility of resources and the firm's full control of its own strategic resources (Lavie, 2006). I argued that the decreasing return of partner diversity is due to the decreasing level of relative absorptive capacity, but two other reasons can also interpreted from it. First, when the partners are complementary in their outputs, they could profit from the synergy of sharing their heterogenic outputs. In such cases, the only motive of alliance formation is combining final outputs of each firm because of their complementarity in use, supply and market (Cantwell & Colombo, 2000). Further specialization of each partner through alliance could also be the second explication for decreasing level of interfirm knowledge transfer by

increasing diversity. In such cases, partners' resource and knowledge bases are complementary but too complex and distant in nature. While each of the partners needs the complement resource and cannot master it by its own, they mutually outsource the needed resources via alliance (Zeng and Hennart, 2002; Nakamura et al, 1996).

The third contribution of this research concerns the mutual influence of partner diversity and exploration on knowledge transfer effectiveness. Before any discussion about the third contribution, it is important to first review the theoretical clarification which is presented in Chapter Five.

In Chapter Five, I have presented a clarification on the concept of exploration and exploitation (as input, process and output) for showing the role of novelty of knowledge as an input in the exploration/exploitation dichotomy. Based on empirical evidence, I concluded that the presence of novelty or new knowledge is not necessary for exploration. What is important however is the process composed by explorative activities. The main argument was that by performing explorative activities we can have explorative results (or novelty in output) whatever the inputs are. In other words, performing exploratory activities on existing knowledge or on new knowledge (inputs) leads to new knowledge creation. This means for example that in order to have explorative output (new knowledge), the intention to explore and to implement exploratory activities are more determinant than the presence of novelty. Following this argument and the classification of Grant and Baden-Fuller (2004), I modify Figure 5.1 for alliance context as below (Figure 7.1). Figure 7.1 shows the three aspects of exploration and exploitation in alliance context. Note that presence of novelty in alliance context refers to partners sharing different knowledge and resources. Furthermore, the absence of novelty refers to partners with similar knowledge bases. In order to test this

argument, I applied the concept of depth and breadth of exploration (Katila and Ahuja, 2002) to alliance level.

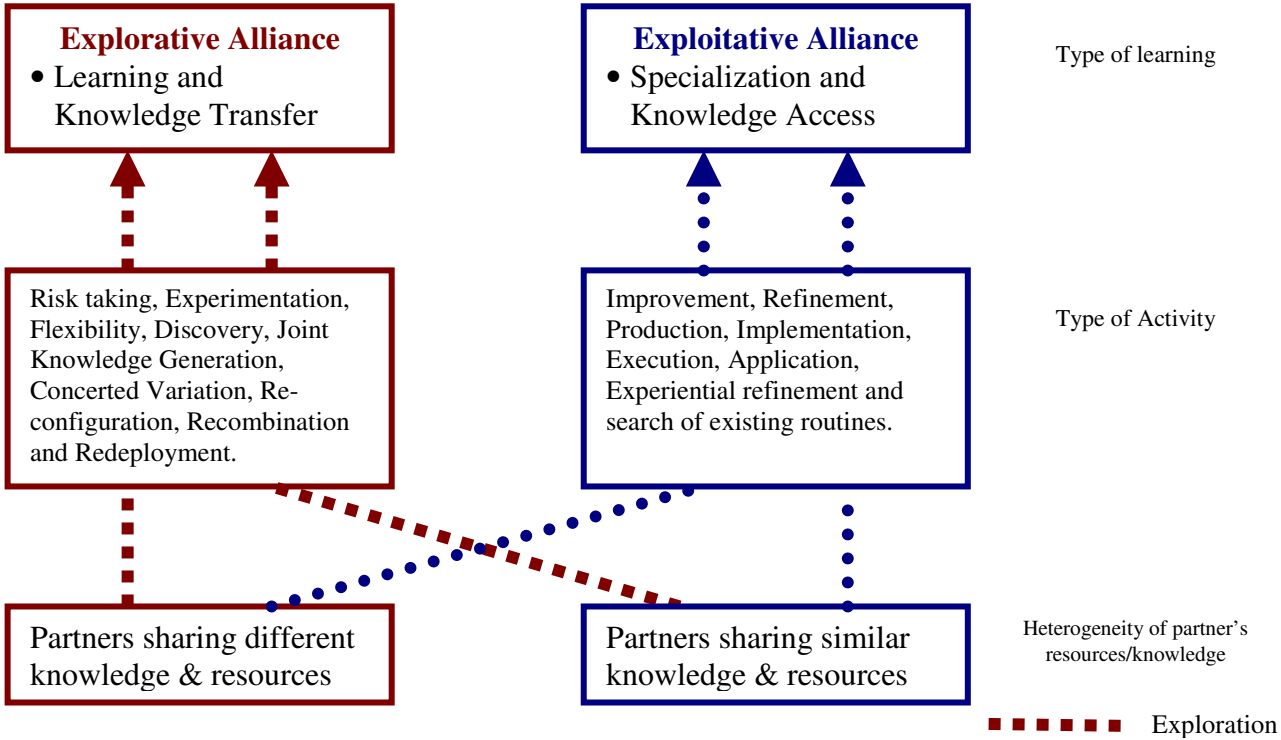


Figure 7.1) Three aspects of explorative and exploitative alliances.

In the organizational learning context, the depth of search has been cited as one of the influential factors of exploration (Katila & Ahuja, 2002). Depth of search refers to prior experience about the knowledge elements involved in the explorative process. This experience deepens the understanding about knowledge elements and reduces the likelihood of errors in generating new knowledge and solutions. Absorptive capacity is linked closely to this experience (Macher and Boerner, 2006). Cohen and Levinthal (1990) argue that a firm's absorptive capacity is largely a function of the firm's level of current knowledge stock. They further point out that a firm's commitment to R&D activities helps improve its absorptive capacity by building up relevant expertise and enlarging its knowledge stock. If we can assume the similarity of partners as a proxy for prior familiarity or experience, we can justify the use of similarity measures in alliance research as relative absorptive capacity (Lane &

Lubatkin 1998), (Nooteboom et al, 2007). What is missing here however is that without studying the interactive effect of similarity and intent to explore, we cannot conclude that this similarity has played an active role in interfirm learning because without the intention to explore, there is no intention to profit from this similarity. It is my belief that the interactive effect of high similarity of partners and intent to explore shows the realized contribution of relative absorptive capacity on interfirm learning due to the depth of their respective search for learning. The research results related to hypothesis 3.1 support this argument. I find that despite the lack of novelty in high similarity, intent to explore has a positive effect on interfirm learning effectiveness. In other words, the absence of novelty is not impeding the explorative output in alliances with highly similar partners but that of explorative intent.

Another moderating effect of partner diversity on explorative results of alliance is augmented by hypothesis 3.2 and confirmed by my findings. Through these results, I challenged the concept of novelty for learning and exploration in alliance.

I find that high diversity has no significant effect on interfirm learning. I observed that the intent to explore has a negative and significant effect in the case of alliances with highly diverse partners. This effect can be explained by the limited capacity of knowledge integration of the firm (Grant, 1996) and by the concept of scope of exploration (Katila and Ahuja, 2002). I conclude that in the case of high diversity, trying to explore extremely distant input (distant knowledge) by a focal firm would be costly and ineffective, and will thus reduce the learning productivity. In other words, in high diversity of partners, novelty does not have a positive effect on learning. Furthermore when a focal firm intends to explore their partner's knowledge, the effectiveness of learning is also decreasing.

7-3) Managerial Implications

Having a learning objective for interfirm alliances is the obvious managerial suggestion of this research. Simple observation does not lead to learning and it should be accompanied by analytical and analogical examinations. A firm with a learning objective explores every point of its contact and relation with its partner to obtain information and new knowledge to elaborate and to integrate into its knowledge base. The commitment of an alliance manager should be to the goal of establishing a learning alliance and avoiding rapid decisions based on easy-to-measure financial criteria. Such a goal will reinforce the explorative intent of the firm toward its partner.

Balance between similarity of knowledge bases of partners and the magnitude of the novelty of partner have to be seriously considered in partner selection phase because these two factors impact the learning achievement targeted by the alliance. Too much similarity is a positive situation for mutual understandings but in this situation lack of novelty will reduce the amount of new knowledge development by the alliance.

Diversity between partners could be a sign of novelty but it should be noted that this diversity should be first understood and analyzed. For example, the diversity of partners coming from the same sector of activity can have contribution to interfirm knowledge transfer but maybe this diversity set within an inter-industry context would be less effective for knowledge transfer. If within inter-industry alliances knowledge development and learning is targeted for partner selection factors such as the level of simplicity, explicitness and protection mechanisms of partner's knowledge should be taken into account because the positive effect of absorptive capacity in these cases would be limited. Contractual commitments to transfer and teaching from partners may also be helpful.

In extreme cases, the managerial suggestion of the third hypothesis is that explorative goals for alliances between highly diverse partners are decisions to be avoided.

7-4) Future Research Perspectives

From research perspective, repeating this research with patent and cross citation data might be useful. However measuring some of the control variables will be difficult when relying only on archival data. It must be pointed out however that the precision of patent data and the results of research in technological context will improve the insights that have been obtained as a result of this study.

The final important contribution made by this research is the use of the combination of two variables of similarity/diversity and exploration/exploitation to provide 4 generic contexts (See Chapter 4). In this scenario, the effects of each of the affecting factors on knowledge transfer and learning vis-à-vis specialization or exploitative learning can be studied and the results will contribute to our understandings about defining and identifying different forms of learning alliances (Inkpen, 2002).

One important issue which is taken for granted in this study is the positive role of interfirm knowledge transfer on firm's performance. This study concentrates on interfirm knowledge transfer effectiveness without any question about its role on performance. Recently some evidences are questioning this role and showing no relationship between interfirm knowledge transfer and related outcomes such as innovative performance (Van Wijk, Jansen and Lyles, 2009). I believe that new sources of archival data (Patent Data, Cross-Citation, National and European Innovation Surveys etc.) and also different types of surveys can open the possibility to verify the role interfirm knowledge transfer on firms' performance. What is vital in future studies is recognizing different types of interfirm learning and their roles on different

dimensions of performance. A methodological way for determining the size and magnitude of external knowledge contribution to different dimensions of performance is also a matter of high interest.

Understanding the mechanisms by which different aspects of partners diversity influence interfirm knowledge transfer is another topic of research which is interesting for further investigation. In other words, determining and verifying the mediating variables between partner diversity and interfirm knowledge transfer could be the research issue for a new stream of studies in this domain.

7-5) Limitations of the Study

The main limitation of this study resides on its generalization power which is restricted by its sample size. This limitation is one of the historical lacks of questionnaire based surveys but also it could be related to particular difficulty of data collection by questionnaire in alliance research. There are two problems linked to use questionnaire in alliance research:

1. Identifying alliances, verifying their survival or termination.
2. Identifying the appropriate person in all partners of alliance who could answer the questions considering the alliance and finding the contact channel

Using archival and other types of secondary data can improve the shortages of primary data collected by questionnaire.

The second significant limitation of this study is in its source of data. All data about alliance is provided by one partner not by all allying firm in the alliance. Because of this, the information provided about alliance could be biased by the opinion of respondent who is from

focal firm. Concentration on a group of partnering firms in dual level and in a given industry may be more informative and precise.

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Appendices

Appendix 1. Knowledge Based View

This appendix is a review of origins of KBV and the research trends in this domain, adopted from Eisenhardt and Santos (2006)¹.

The Origins of Knowledge Based View

Organizational Learning

Organizational learning is part of the foundation that underlies knowledge -based thinking. Learning can be defined as the process by which new information is incorporated into the behavior of agents, changing their patterns of behavior and possibly, but not always, leading to better outcomes. The initial focus of learning theory was on individuals, using the mechanism of stimulus-response (Weick, 1991). More recently, it has been conceptualized at the organizational level as well, where it is viewed as a key process in the adaptation of

¹ Eisenhardt, K. M., & Santos, F. M. 2001. Knowledge-based view: a new theory of strategy? In Pettigrew, A., Thomas, H., Whittington, R. (Eds.), Handbook of Strategy and Management. London: Sage

organizations to the environment (Argote, 1999). Penrose's seminal work on the growth of the firm (1959) is an important starting point for understanding organizational learning. Penrose describes how learning processes create new knowledge and form the basis of the growth of organizations through the recombination of existing resources. Shortly thereafter, Cyert and March (1963) developed significant thinking around the concept of organizational routines. Organizational routines form the basis of collective learning in organizations. They are seen as executable capabilities for repeated performance that have been learned by an organization in response to selective pressures (Cohen, Burkhart et al., 1996). These routines represent a manifestation of organizational memory in that they encode inferences from history, and guide individual and group behavior in organizations. Organizational learning is thus perceived as an adaptive change process that is influenced by past experience, focused on developing and modifying routines, and supported by organizational memory (Nonaka and Takeuchi, 1995).

Nelson and Winter (1982) were among the first to integrate organizational knowledge and routines with the notion of dynamic competitive environments. In their approach to evolutionary economics, the firm is understood to be a repository of knowledge, which is represented by routines that guide organizational action.

Cohen and Levinthal (1990) related organizational learning and innovation to the evolving knowledge base of the firm. The authors define absorptive capacity as the ability to recognize the value of external information, assimilate it and apply it to commercial ends. According to the authors, absorptive capacity is largely a function of the level of the firms' prior knowledge (which emphasizes the cumulative nature of knowledge) and is history or path dependent (which emphasizes the importance of earlier decisions). Important determinants of absorptive capacity are the internal channels of communication, the distribution of knowledge in the environment and in the firm, and the pattern of R&D investment decisions. Specifically, in an environment where knowledge development is widely dispersed and learning requires a strong knowledge base, internal R&D efforts will more significantly contribute to absorptive capacity.

Brown and Duguid (1991) proposed a unified view of working, learning and innovation, which links individual and organizational levels of knowledge. They argue that learning theory should be distanced from codified, transferable and objective notions of knowledge, and focus instead on knowledge in context. In their view, meaningful knowledge is deeply related to daily work, and the acquisition of new knowledge (i.e., learning) is socially

constructed from working practices. This social construction of knowledge occurs within informal communities-of practice, where knowledge is freely shared through collaborative mechanisms such as narration and joint work.

In a nutshell, this stream of studies pointed out that an organization is a multiple communities of practices which are engaging in experimental and interpretative activities with the environment from which sense-making emerges, leading to adaptive behavior (Eisenhardt and Santos, 2006).

Dynamic Capabilities

The dynamic capabilities approach is a second foundation that underlies knowledge-based thinking. In the traditional economic vision of the firm, managers' decisions are based on a set of productive and environmental conditions. Since this is an equilibrium-based perspective, theory does not need to explain how knowledge in organizations is created or how it changes over time (Nonaka and Takeuchi, 1995). The increasing dynamism of the environment, with its frequent and rapid changes in technology, customer preferences, and competition, has led a number of researchers (e.g., Eisenhardt, 1989; D'Aveni, 1994) to question the sustainability of superior performance of any given strategic position, bundle of resources or set of moves. This means that understanding superior performance at a point in time explains very little of how superior performance is consistently achieved over time (Grant, 1996) or indeed, if it can be achieved at all (D'Aveni, 1994; Eisenhardt and Martin, 2000). In high-velocity environments, an extreme form of dynamic markets where even basic industry characteristics such as boundaries, competitors and customers are in flux, no specific advantages are sustainable. Rather, superior performance occurs by continuously creating temporary advantages. In these situations, the ability to learn quickly in order to alter the resource configuration in adaptation to market change becomes crucial to performance (Eisenhardt & Santos, 2006).

Given these observations, strategy theorists began a quest for a dynamic theory of strategy, a theory that could reveal the sources of superior performance in dynamic environments (Porter, 1991; Spender, 1996; Teece, Pisano et al., 1997; Brown and Eisenhardt, 1998). This quest was approached both by developing new strategic paradigms like complexity approaches to strategy (Brown and Eisenhardt, 1998), as well as by extending existing ones, like the dynamic capabilities extension to the resource-based view (Teece, Pisano et al., 1997). The

dynamic capabilities approach argues that competitive advantage is dependent on particular organizational and managerial processes, termed 'dynamic capabilities' that are defined as the firm's ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments (Teece, Pisano et al., 1997). The main challenges for strategy researchers have been to define the construct of dynamic capabilities, test their contribution to performance, and understand the evolution of capabilities over time (Eisenhardt and Martin, 2000).

Eisenhardt and Santos based on dominant conception of "Knowledge as Resource" and with the dominant conception of KBV as theory of strategy in which these knowledge processes are the source of sustained competitive advantage and superior performance, classified empirical studies of KBV in four stream of research (Eisenhardt and Santos, 2006): Knowledge Sourcing, Internal Knowledge Transfer, External Knowledge Transfer, Knowledge Integration.

Research Trends in Knowledge Based View

Knowledge Sourcing

These studies on knowledge sourcing suggest that external linkages are important for a variety of innovation-related outcomes such as patents, patent citations, speed of product development, quality of the product pipeline, and introduction of new products. External linkages appear to help managers become aware of the content and location of new technical knowledge, and gain insight into the trajectory of their industry. Thus, in dynamic environments, searching for, identifying, accessing, and sharing new knowledge are important activities for innovative performance.

These external linkages include incentives that motivate scientists to stay connected with the larger scientific community (Henderson, 1994), formal network relationships (Powell, Koput et al., 1996; Brown and Eisenhardt, 1997; McEvily and Zaheer, 1999), exploratory products (Brown and Eisenhardt, 1997; Jett, 1999), gatekeepers (Allen, 1977; Katz and Tushman, 1981), and informal networks (Henderson and Cockburn, 1994; Liebeskind, Oliver et al., 1996; Tripsas, 1997; Rosenkopf and Nerkar, 1999). Finally, the concept of a portfolio of external knowledge sourcing activities emerges. A diverse portfolio of such activities increases opportunities for experimentation and learning (Brown and Eisenhardt, 1997), especially when the knowledge probes are low-cost and so create occasions for small failures. Such portfolios are particularly relevant when the knowledge objective is to have a broad

insight into the trajectory of future product and market arenas, rather than some specific piece of cutting-edge (often technical) knowledge.

Internal Knowledge Transfer

This research explores how knowledge transfer within an organization depends upon the characteristics of that knowledge, the sender, the recipient, and their mutual relationship. This is an important stream of research because the efficacy of knowledge transfer within organizations is a primary rationale for KBV as both a theory of organization (Kogut and Zander, 1992; Grant, 1996; Kogut and Zander, 1996) and a theory of strategy (Grant, 1996a). This stream of studies indicate that knowledge characteristics affect the efficacy of internal knowledge transfer. These characteristics include tacitness (Zander and Kogut, 1995; Lord and Ranft, 1998), causal ambiguity (Szulanski, 1996), and complexity (Hansen, 1998), which impede knowledge transfer, and strategic value (Brown and Eisenhardt, 1998; Gupta and Govindarajan, 2000), which enhances knowledge transfer.

These diverse findings of this category of research suggest that when knowledge is relatively simple and static, top-down enforcement and incentives improve knowledge transfer by dealing with motivation issues. When that knowledge is also strategically valuable, transfer will enhance performance (Lord and Ranft, 1998). In contrast, when knowledge is complex, knowledge and relationship characteristics dominate the motivational issues in knowledge transfer (Szulanski, 1996). Further, when knowledge is varied and changing, context setting activities, through organizational structures and cultural norms that make managers aware of knowledge transfer opportunities, are effective, but incentives to collaborate are not. Such incentives may not only be ineffective in knowledge transfer (Gupta and Govindarajan, 2000), but they may also negatively impact performance by encouraging managers to waste time and resources transferring non-strategic knowledge (Eisenhardt and Galunic, 2000).

External Knowledge Transfer

A third stream of research addresses knowledge transfer across firm boundaries through alliances and acquisitions. This stream is significant because it sheds light on several fundamental theoretical assertions of KBV as a theory of strategy and of organization, namely that effective knowledge transfer is a source of sustained competitive advantage and that it is more effectively accomplished within organizations rather than markets.

Taken together, these and other studies of external knowledge transfer (e.g., Simonin, 1997; Capron, 1999; Dyer, 1999; Kale, Dyer et al., 1999) indicate that knowledge transfer is affected by knowledge characteristics and by the relationship between the sender and the recipient. As such, these studies replicate the studies of internal knowledge transfer. In particular, the tacitness (Inkpen and Dinur, 1998; Ranft and Lord, 1998; Simonin, 1999), complexity, and ambiguity of knowledge (Simonin, 1999) reduced knowledge transfer. The relationship between the sender and recipient also affected knowledge transfer as it did in the internal knowledge transfer literature. Similarities in general knowledge base (Mowery, Oxley et al., 1996; Lane and Lubatkin, 1998), organizational structures (Simonin, 1999) including similar lower level management and research structures (Lane and Lubatkin, 1998), organizational culture (Mowery, Oxley et al., 1996; Simonin, 1999), and strategy (Inkpen and Dinur, 1998) improved knowledge transfer. Further, integrative mechanisms such as meetings, personnel exchange, bilateral contracts, and personal interaction were effective in overcoming the challenges of transferring tacit and/or complex knowledge (Mowery, Oxley et al., 1996; Inkpen and Dinur, 1998) and the organizational differences (Almeida, 1996; Ranft and Lord, 1998). Conversely, structural and procedural barriers (Dyer, 1999) can inhibit knowledge transfer in both alliances and acquisitions (Capron, 1999). Firms that have translated their experience into know-how (Simonin, 1997; Simonin, 1999) that is embedded in organizational structures (Kale, Dyer et al., 1999) have more successful knowledge transfers.

But, the research on external knowledge also suggests some twists. One of such twist is the emergence of specialization among alliance partners (Mowery, Oxley et al., 1996; Lorenzoni and Lipparini, 1999) such that relationships that may have begun as knowledge transfers become ones of knowledge access and integration. This divergence and specialization suggests that alliances can be a way to gain access to knowledge (Powell, Koput et al., 1996),(Zeng and Hennart, 2002)(Grant and Baden-Fuller, 2004) without transfer of that knowledge into the organization. Further, it suggests that networks of alliance relationships can become complex adaptive systems in which different firms co-evolve into specialized roles to form highly adaptive networks. Since limited evidence (Brown and Eisenhardt, 1998; Eisenhardt and Galunic, 2000) indicates that the emergence of specialized, coevolving actors can also occur inside corporations, comparison of this phenomenon inside and outside organizations is an intriguing research opportunity.

Knowledge Integration

The fourth stream of research focuses on how specialized knowledge is integrated from different sources to generate new knowledge or to apply that knowledge to the creation of new products and services. In particular, much of this research centers on how individuals from different communities-of-practice integrate their specialized knowledge. As such, it emphasizes the micro-processes of interaction, mostly within organizations, that enable the integration of knowledge. This stream of research is especially relevant to KBV because of the assertion that knowledge integration (especially integration of the tacit knowledge that is held by individuals) is a primary source of superiority of firms over markets and a major way in which competitive advantage is achieved (e.g., Grant, 1996).

These studies highlight the importance of concrete and tangible expressions of knowledge, especially in the context of actually solving real problems, for knowledge integration within and across firms. Such expression of knowledge in realistic contexts appear to be an important way to overcome the challenges of knowledge integration created by the existence of different knowledge, different modes of knowing, and different ways of expressing knowledge. The extensive use of artifacts (Hargadon and Sutton, 1997), real-time operating information (as opposed to abstract accounting data) (Eisenhardt, 1989), joint customer visits (Dougherty, 1992), specific alternatives (Eisenhardt, 1989; Hargadon and Sutton, 1997), and tangible representations of problems (Hargadon and Sutton, 1997; Bechky, 1999) helped in breaking down communication barriers while increasing analogic thinking and related understanding, so that knowledge integration became more effective.

With a few exceptions (e.g., Eisenhardt, 1989), the research on knowledge integration lies outside the traditional strategy literature despite the theoretical importance of knowledge integration to KBV arguments (Grant, 1996). Not surprisingly then, this research stream does not address key issues of strategy such as the nature of competitive advantage and implications for firm performance.

Appendix 2. Lesson learned from pilot study (French)

Première Répondant : M Jean-Yves COURTOIS (Dirigeant de TEMEX) :

1. Deux questionnaires ont été rempli, mais dans **90 minutes !!!!**
2. Deux premières pages sont très longues à juger et à répondre (les questions pour reconnaître Endogamie et Exogamie).
3. Dans la question d il faut ajouter après des buts... **officiels ou non officiels.**
4. Il faut considérer l'année de démarrage d'alliance: parfois on est dans les étapes premières de cycle de maturité d'une alliance et on ne peut pas dire que par exemple, en matière de transfert de connaissances on a abouti ou pas!
5. Option 15 de question C n'est pas claire ; M Jean-Yves COURTOIS a proposé le mot **MATERIELLS** au lieu de ressources tangible.
6. Le mot **SIGNIFICATIVE** doit être expliqué clairement (au début).
7. Question 13 n'est pas claire.
8. Question 16 : il a changé sa première réponse.
9. Question 34 : il a changé sa première réponse.
10. Question 39 : il a changé sa première réponse.
11. Question 40 : il a changé sa première réponse.
12. Question 43 : il a changé 2 fois sa première réponse. 4 – 2– 4
13. Question 73 : il a changé sa première réponse.
14. Question 73 : dans le cas de répondre par un dirigeant cette question ne s'applique pas.
Il faut ajouter après **nos patrons**, les mots : notre **conseil d'administration, ou nos actionnaires.**
15. Question 77 : transfert vers JV ou à partir de JV vers nous ???
16. Dans ce cas – Joint Venture entre Temex et Chine- la connaissance transférée à partir du partenaire est la connaissance de marché et la compétence managériale.
17. Apparemment les deux premières pages ont besoin des discussions pour mieux connaître le type car parfois il y a d'autres moyens de mise en commun des ressources par les partenaires (par exemple, achat conjointement d'un fonds de commerce).

18. Deuxième Répondant : M Dominique BONTOUX (Wireless Strategic Alliance Manager, TEXAS INSTRUMENT).

1. Un questionnaire est rempli en 40 minutes.
2. Dans ce cas, l'alliance n'est pas une Joint Venture. C'est une collaboration contractuelle pour échanger des licences et des propriétés intellectuelles, sans d'avoir mis en commun les ressources. Donc la réponse en deuxième pages n'est pas utile pour notre recherche. De plus le répondant n'a pas répondu les questions de page seconde en pourcentage.
3. Le concept de taille optimale (C3) n'était pas clair pour le répondant.
4. **un point de vue intéressant pour la question 9 (les exploratoires vs. les exploitatives) : *Dans les alliances exploratoires on ne sait pas trop à propos de résultat, à ce point on a peur de mettre trop en commun avec un partenaire qui pourrait être notre concurrent potentiel.* (Risk of knowledge leakage or knowledge strip !).**
5. Dans la question 29 le concept de *Qualité de nos ressources humaines* n'était pas assez clair pour le répondant.
6. Le répondant pour ne pas oublier la mesure de réponses est revenue deux fois à la page première de questions de type Likert.

Troisième Répondant : M Jacques GROS (Directeur du Site IBM La Gaude, European Business Solutions Center Exécutive).

1. Un questionnaire est rempli en 25 minutes.
2. Le questionnaire a été rempli considérant une coopération qui s'appelle [Tourism@](http://www.tourisma.org) (www.tourisma.org); M Gros m'a introduit le site, et il m'a dit c'est une coopération entre des entreprises IT de Sophia Antipolis pour promotion le rôle d'IT dans le secteur de tourisme. Mais je pense que ce n'est pas un cas intéressant pour notre objectif.
3. Il a dit : si vous visez une joint venture, nous n'en avons pas. Mais je lui ai expliqué que l'on a visé les partenariats et les alliances en générale.
4. Il était très pressé ; et il a répondu les questions avec moins d'attention.
5. En répondant les deux premières pages il est devenu fâché et il m'a dit « c'est **un questionnaire de 20ième siècle** ». Parce qu'il toujours pose les questions en considérant une entreprise de **fabrication**.
6. En protestant les deux pages premières il a dit : « **C'est à propos de Chine, ça** ».
7. apparemment, les questions de deuxième page en pourcentage n'est pas facile et intéressant à répondre.
8. Beaucoup de questions ne s'appliquent pas au cas.
9. Il a ajouté le développement des marchés (nouveaux usages) en tant qu'un objectif de l'alliance.
10. La connaissance clé et non clé n'est pas claire pour le répondant.
11. Le mot exploitatives n'est pas clair pour le répondant.

Quatrième Répondant : M Harvé PARMANTIER d'ORACLE (Directeur solutions PME/PMIs vente applications EMEA).

1. Un questionnaire a été rempli en 1 heure.

2. Il a eu beaucoup cas d'alliance, mais elles ne sont pas des alliances technologiques. Et elles sont des alliances commercial avec pas mal de PME/ PMI.
3. Le mot joint venture ne s'applique pas pour les cas de M Parmentier.
4. Le mot de bas de connaissance n'était pas clair pour le répondant.
5. au début « le transfert de connaissances » n'avait pas aucun sens.
6. Il a répondu à beaucoup de questionnaire 3 (sans opinion).
7. La deuxième page était très difficile à répondre pour lui. Notamment en pourcentage.
8. Il m'a dit « ce mot me gêne beaucoup **LA CONNAISSANCE TRANSFERE** » !
9. Les mots **exploitatives et exploratoire** n'étaient pas clair pour lui.
10. A propos de question numéro 65 : il a dit nous avons des réunions régulières mais pas nombreuses.
11. A propos de différence de la langue entre les partenaires ; il a dit : ce qui est important est différence **de terminologie de business** qui peut affecter les relations et peut-être transfert de connaissances.

Cinquième Répondant: M Marc ALCANTARA

Directeur stratégie et développement, PRECEPTEL

PRECEPTEL est une petite entreprise active dans le domaine de développement des applications de voix dans le téléphone portable qui travaille en collaboration avec une entreprise qui est spécialiste dans le domaine des applications qui peuvent être installées dans le Smartphones.

1. Un questionnaire a été rempli en 35 minutes.
2. Le mot *Joint Venture* ne s'applique pas au cas.
3. Le cas est un cas d'échange de connaissance
4. L'objectif de cette collaboration est l'augmentation et l'amélioration de la compatibilité entre des applications de voix et de Smartphone.
5. D'après le répondant le but de cette coopération n'est que le transfert de connaissances et l'apprentissage.
6. Je trouve que plus le répondant est jeune, d'avoir les réponses sans aucun malentendu et aucun tension dans les définitions des concepts.
7. Il n'est pas compris la question 24.
8. D'après lui les questions 27 et 28 sont identiques.
9. Il pense que ce questionnaire est un questionnaire pour les cas de joint venture, pas pour les cas de collaboration comme celle de **PRECEPTEL**.

Sixième Répondant: M Laurent LONDEIX

Responsable du laboratoire DIAM, Recherche & Développement, France Télécom.

1. Un questionnaire a été rempli en 40 minutes.
2. Le questionnaire a été rempli en considérant un partenariat avec AXA avec des motifs comme co-innovation, augmentation de pouvoir de marché et augmentation de niveau de fidélisation des clients.
3. Répondre en pourcentage était difficile pour le répondant.
4. Le mot Joint Venture ne s'applique pas à ce cas.
5. cette alliance a développé les relations avec le même partenaire dans le domaine de la technologie qui est bien interne pour la France Telecom.
6. Au point de vue de co-innovation, avoir accès aux managers de partenaire est difficile. Ils ont peut-être peur d'être futur concurrent.

7. l'un de problème de cette alliance était comment partager les résultats de recherche commune.
8. D'après le répondant il y a un saut dans les questions 27 et 28 qui coupe l'harmonie de pensé de répondant (avant et après ces questions-là on est dans une alliance, mais dans cette partie, on est à la fin d'alliances).

Septième Répondant: M Etienne DEBAECKER, Philips France.

1. Un questionnaire rempli en 30 minutes.
2. Les questions ont été répondues en considérant la partie concernée directement par l'alliance. (la joint venture de Crolles: Freescale, Philips and STMicroelectronics).
3. Les questions de la deuxième page peuvent être répondues correctement dans les cas de joint venture
4. La question numéro 9 (Exploratoire vs. Exploitatives) était incompréhensible.
5. D'après le répondant le premier but de l'alliance est l'acquisition de connaissance de partenaire et le deuxième but était avoir accès à la connaissance complémentaire de partenaire.
6. Cette alliance peut considérer comme une alliance endogamique.
7. La question numéro **25** ne s'applique pas au cas. Parce que l'équipe est une équipe mélangée des personnels des partenaires.
8. Cette alliance n'est pas encore finie donc le répondant ne pouvait pas répondre à propos des résultats de cette joint venture (les questions numéro 27et 28).
9. D'après le répondant la question numéro 35 doit être expliquée. Parce qu'il croyait que l'apprendre de connaissance de partenaire en réalité à partir des documents est possible mais en fait dans cette alliance ce n'est pas se produit pour l'instant. (Mais je pense cette une question de protection de connaissance ou des connaissances tacites.)
10. La question numéro 48 a été modifié par le répondant comme : ***Nous recherchons exactement les mêmes connaissances que notre partenaire.***
11. La question numéro **65** ne s'applique pas au cas. Parce que l'équipe est une équipe mélangée des personnels des partenaires.
12. La question numéro **76. l'objectif de cette alliance est la création de connaissance.**
13. D'après le répondant il faut que j'ajoute des questions à propos de la propriété intellectuelle, brevet et l'accord des partenaires à propos de brevet.

**Huitième Répondant: M Massimo LUCCHINA
Directeur, Technology Center Europe. CISCO SYSTEMS.**

1. Un questionnaire rempli en 34 minutes.
2. Un motive qui a été ajouter par le répondant est : ***Faciliter la commercialisation de produits.***
3. A propos de questions d'effectif global, ce qui a été répondu est l'effectif de la partie concerné directement dans l'alliance.
4. Toutes les questions de la page troisième n'étaient pas claires pour le répondant. En fait, l'origine de répondant était italienne.
5. Je pense que le concept de capacité d'absorption ne s'applique pas aux entreprises d'IT qui cherche à avoir un simple accès à la connaissance de partenaire. Parce que capacité d'absorption est très importante en cas d'internalisation de connaissance de partenaire. Je pense que la hyper complexité des produits d'IT nécessite un tel

partenariat pour augmenter l'intégralité et l'interopérabilité finale de service ou de produit. Autrement dit, la majorité des partenariats dans le secteur d'IT concerne essentiellement par les Standards.

6. D'après le répondant Cisco a appris deux choses très importantes dans l'alliance :
 - a. Eviter d'entrer dans le nouveau marché.
 - b. Eviter d'utiliser la connaissance de partenaire dans les affaires de CiscoDonc d'après lui, ces deux choses sont stratégiques et importants pour eux. Et on peut dire la performance de transfert de connaissances dans cette alliance est faible mais il y avait l'apprentissage stratégique pour Cisco.

Neuvième Répondant: M Bruno Des Fontaines. Sales & Marketing director RMS & CRC Division, Hospitality Business Group, Amadeus

1. Le questionnaire a été rempli en 14 minutes
2. Le répondant a répondu les questions en considérant l'**acquisition** d' Hogatex (une entreprise qui était concurrente d'Optims avec l'effectif de 80 personnes et le chiffre d'affaires de 8 M Euro). Le répondant n'avait pas l'expérience d'alliance ou de joint venture. Hogatex était une entreprise vraie ressemblante à Optims mais ses marchés étaient géographiquement différents. Optims couvrait tous les pays francophone dans l'Europe et dans l'Afrique de nord. Mais Hogatex couvrait les pays non francophone de la même zone qu'Optims. Un marché commun de toutes les deux entreprises était Accor Hôtel. Donc pour Optims l'acquisition de telle entreprise était très important. En 2003 Optims a acheté 30 pourcent des actions d'Hogatex pour la bien connaître et puis en 2004 Optims a acheté le reste. En ce moment-là l'effectif d'Optims était 200 personnes avec le chiffre d'affaires de 200 M Euro).
3. la page deuxième n'a pas été répondue.
4. Le mot Exploratoire n'est pas clair pour le répondant.
5. La question numéro 13 ne s'applique pas au cas car c'est un cas de l'acquisition.
6. En générale, la majorité des réponses de cet entretien sont relié à durée de l'acquisition partielle d'Hogatex (2003-2004).

Dixième Répondant: M Jean Louis BRELET. Xilinx, APD Strategic Engagements.

1. Le questionnaire a été rempli en 30 minutes.
2. Les questions ont été répondues en considérant une alliance de type des relations client-fournisseur.
3. C'était impossible de répondre à toutes les questions de la page deuxième.
4. L'unité dirigée sous la direction de M Brelet a été établie afin de rassembler et internaliser les connaissances apprises à partir des partenaires. Le plus important outil de cette unité est des questionnaires.
5. Les questions qui sont longue (plus d'une ligne) ne sont pas très faciles à répondre. Je pense que ce type de questions nécessite plus de concentration.
6. La question 75 n'était pas claire pour le répondant.
7. Les questions 28, 36 ,75 ne sont pas claires pour le répondant.

Onzième Répondant: M Jean-Claude GIANNOTTA - CARMA

- 1- un questionnaire rempli en 45 minutes avec discussion.
- 2- Le mot JOINT VENTURE est un peu choquant pour lui car ils n'ont pas.
- 3- Le mot AFFECTER a un sens négatif. Mais je l'ai utilisé dans des certains de questions avec un sens positif.
- 4- Les questions qui ont composées de deux lignes sont difficile à répondre rapidement.
- 5- Le répondant a raconté une histoire de l'une des relations de CARMA avec une entreprise dont le homologue répondait aux besoins de CARMA ni réellement ni justement.
- 6- Il faut éviter des mots comme Beaucoup, nombreuse, et etc. qui sont imprécis.
- 7- La Capacité d'absorption de notre partenaire n'a pas importance pour moi, mais à travers de cette question je dois connaître le niveau de chevauchement entre mes bases de connaissances et celles du partenaire.
- 8- Ils avaient les réunions régulières mais pas nombreuses.
- 9- Il ma dit que quand on parle avec nos client ou nos fournisseurs étrangères en Anglais on reste juste dans les choses superficielles. (même après 6 mois de réunion) .

Synthèses


- A. La reste des questionnaires de l'étude pilote ont été envoyé par poste ou email et les répondant les ont rempli sans commentaires spécifiques
- B. Ce questionnaire a besoin un *cover letter* assez explicative.
- C. Il faut utiliser le mot alliance (et pas de Joint Venture).
- D. Je dois expliquer que le transfert de connaissances et l'apprentissage à partir de partenaire sont le même concept. (transfert à partir d'alliance ou de partenaire vers notre entreprise)
- E. Mesures doivent être répéter dans chaque pages.
- F. Les motives doivent être reconsidérer d'un point de vu de partenariats en R&D et en fabrication.
- G. Augmentation et amélioration de la compatibilité de produits des partenaires dans le secteur d'IT est une motive très importante pour les partenaires.
- H. Pour la question 65 il faut sélectionner entre les mots « nombreuse » et « régulière ». Par contre cette question ne s'applique pas aux « *equity based joint ventures* » car l'équipe travaille ensemble.
- I. il y a un saut dans les questions 27 et 28 qui coupe l'harmonie de pensé de répondant (avant et après ces questions-là on est dans une alliance, mais dans cette partie, on est dans des questions proche à la fin d'alliance).
- J. Je pense que le concept de capacité d'absorption ne s'applique pas aux entreprises d'IT qui cherche à avoir un simple accès à la connaissance de partenaire. Parce que capacité d'absorption est très importante en cas d'internalisation de connaissance de partenaire. Je pense que la hyper complexité des produits d'IT nécessite un tel partenariat pour augmenter l'intégralité et l'interopérabilité finale de service ou de produit.

- K.** Les questions qui sont longue (plus d'une ligne) ne sont pas très faciles à répondre. Je pense que ce type de questions nécessite plus de concentration.
- L.** Le mot AFFECTER a un sens négatif. Mais je l'ai utilisé dans des certains de questions avec un sens positif.
- M.** questions mieux précis pour la complexité de connaissance de partenaire et sa spécificité.
- **Dans quelle mesure cette alliance dépend de connaissance complexe et particulière de partenaire.**
- N.** Une question montrant la similarité de but d'alliance est nécessaire pour identification d'endogamie.
- O.** Parmi les questions de variable dépendent il n y a aucune question qui montre le transfert de l'alliance vers le parent. (From EJV to the Parent Firm: example Knowledge created by NUMMI and transferred to GM).
- P.** Acquisition dans la langue française n'est pas égale à internalisation. On achète quelque chose sans savoir comment cela marche ou sans savoir la logique derrière cette chose.
- Q.** Les questions 14 et 15 doit être poser en considérant le partenaire visé pour ce questionnaire.
- A travers de cette alliance nous et notre partenaire avons amélioré chacun son propre spécialisation de connaissance.
 - Nous cherchons à internaliser la spécialité du partenaire chez nous.
 - Nous pouvons compter sur notre partenaire pour fournir sa spécialité en cas de besoin.
 - A travers de cette alliance nous bénéficions la spécialité de notre partenaire pour mieux accomplir notre affaire.


Appendix 3. Questionnaire of Research (French)

Survey Editor

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1. Design 2. Settings 3. Launch

Go to Step 2

Survey Design: Blue/Yellow (Default)

Language: French

Question Numbering: ON (Default)

Save Changes

Transfert de connaissance dans une alliance interentreprises Edit Title & Introduction

CERAM Sophia Antipolis
European School of Business

Etude réalisée par [Dominique JOLLY](#) et [Hamid MAZLOOMI](#), CERAM Sophia Antipolis.

Ce questionnaire s'adresse aux managers qui sont ou ont été engagés dans une alliance interentreprises.

L'objectif de cette enquête est de comprendre les principaux facteurs affectant le transfert de connaissance entre deux partenaires au sein d'une alliance. Dans toutes les questions, le mot **Connaissance Transférée** met l'accent sur les connaissances apprises par un partenaire de l'autre. Nous vous demandons répondez aux questions en considérant un cas particulier d'alliance de votre entreprise.

Le questionnaire sera traité en respectant de façon absolue votre confidentialité. Nous vous remercions par avance sincèrement du temps que vous allez consacrer à cette étude.

Page 1 - Delete this entire page!

Insert a Question ↑

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1) **Transfert de connaissance**

	Pas du tout d'accord 1	Plutôt en désaccord 2	Sans opinion 3	Plutôt d'accord 4	Tout à fait d'accord 5
1- La connaissance transférée a contribué à notre processus de développement de nouveaux produits.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2- La connaissance transférée a contribué à notre processus de développement de nouvelles technologies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3- La connaissance transférée a amélioré notre efficacité de production.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4- La connaissance transférée a eu un bon impact sur la	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

qualité de nos ressources humaines.



Move Question

5- Nous sommes satisfaits par les connaissances transférées à partir de notre partenaire.

6- La connaissance transférée nous confère un avantage distinctif par rapport à nos concurrents.

7- Nous avons appris plus que nous attendions.

8- Nous savons ce que nous allons faire avec les connaissances apprises dans l'alliance.

9- Nos personnels se sont appropriés les connaissances transférées.

Add a Question Below ↓

Page 2 - [Delete this entire page!](#)

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2)

Exploration versus Exploitation

Pas du tout d'accord 1 Plutôt en désaccord 2 Sans opinion 3 Plutôt d'accord 4 Tout à fait d'accord 5

10- Notre but dans cette alliance est l'acquisition et l'internalisation des connaissances du partenaire.

11- L'objectif de notre alliance est tout simplement d'avoir accès à de connaissances complémentaires de partenaire.

12- Notre objectif dans cette alliance est la création de compétences nouvelles pour développer un produit ou un processus nouveau en commun avec notre partenaire.

13- Après une première alliance, une nouvelle



Move Question

coopération avec le même partenaire n'apporterait rien en matière de transfert de connaissance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	↓
<hr/>						
14- Nous pouvons compter sur notre partenaire pour fournir sa spécialité en cas de besoin.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<hr/>						
15- En général, les bases de connaissance de notre partenaire recourent les nôtres.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<hr/>						
16- A long terme, les bases de connaissance du partenaire et les nôtres tendent à converger.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<hr/>						
17- Notre but dans cette alliance est similaire à celui de notre partenaire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Add a Question Below ↓

Page 3 - Delete this entire page!

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3) **Capacité relative d'absorption des partenaires**

	Pas du tout d'accord 1	Plutôt en désaccord 2	Sans opinion 3	Plutôt d'accord 4	Tout à fait d'accord 5
18- Nous recherchons exactement les mêmes connaissances que celles possédées par notre partenaire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19- Nous avons apporté des connaissances tout à fait identiques à celles de notre partenaire dans l'alliance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20- Nous avons les bases nécessaires pour comprendre la connaissance du partenaire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21- Notre partenaire a les bases nécessaires pour comprendre nos connaissances.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

↑
Move Question

22- Du fait de la différence entre nos bases de connaissance et celles de notre partenaire, la discussion entre nous est un peu difficile.



23- Nous avons fait pas mal d'efforts avant de former cette alliance pour aborder les connaissances transférées.

24- Dans le passé, nous avons eu des relations avec le même partenaire dans ce champ de connaissance.

25- Dans le passé, notre entreprise a eu des rapports avec le partenaire, mais dans d'autres domaines.

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4) **Ambiguïté de connaissance**

	Pas du tout d'accord 1	Plutôt en désaccord 2	Sans opinion 3	Plutôt d'accord 4	Tout à fait d'accord 5
26- La plupart des connaissances que nous avons transférées ont été apprises à travers des supports écrits de notre partenaire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27- La plupart des connaissances transférées ont été apprises en travaillant avec les personnels de notre partenaire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28- De nouveaux personnels en R&D peuvent apprendre cette connaissance en consultant les documents existants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29- La connaissance transférée est composée de plusieurs éléments inter-reliés.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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30- Nous identifions facilement les éléments de connaissance transférée dans l'organisation de notre partenaire. ↓

31- Nous accédons facilement aux membres de l'organisation partenaire pour recueillir des informations ou des compléments d'information.

32- Dès que nous avons recueilli les éléments nécessaires de la connaissance transférée, nous les avons recomposés chez nous, assez parfaitement et de façon satisfaisante.

33- Nous avons eu beaucoup d'interactions avec notre partenaire pour comprendre la totalité et les relations des éléments de connaissance transférée.

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5) **Intention d'apprendre**

	Pas du tout d'accord 1	Plutôt en désaccord 2	Sans opinion 3	Plutôt d'accord 4	Tout à fait d'accord 5
34- Nous avons été souples dans nos objectifs d'apprentissage et de transferts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
35- Au cours de cette alliance, notre hiérarchie a soutenu les buts d'apprentissage et de transfert de la connaissance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
36- Pour mesurer la performance de cette alliance nous avons essentiellement mesuré son impact financier.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
37- Nous avons engagé les moyens (ressources humaines, techniques,					



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financiers) pour le rapatriement des connaissances de chez notre partenaire dans notre organisation.

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6)

Confiance

	Pas du tout d'accord 1	Plutôt en désaccord 2	Sans opinion 3	Plutôt d'accord 4	Tout à fait d'accord 5
38- Nous échangeons ouvertement des informations avec notre partenaire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
39- Nous avons une bonne coordination des tâches avec notre partenaire pour gérer nos activités conjointes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
40- Nous avons beaucoup d'accords informels avec notre partenaire pour la définition des objectifs communs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
41- Entre nous et notre partenaire, il n'y a pas de conflits importants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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7)

Distance culturelle

	Pas du tout d'accord 1	Plutôt en désaccord 2	Sans opinion 3	Plutôt d'accord 4	Tout à fait d'accord 5
42- Les cultures et styles de gestion des partenaires sont très différents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
43- Les mécanismes opérationnels de notre partenaire ressemblent aux nôtres.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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8) **Protection de connaissance**

	Pas du tout d'accord 1	Plutôt en désaccord 2	Sans opinion 3	Plutôt d'accord 4	Tout à fait d'accord 5
44- Nous avons des règles strictes à propos des limites de ce qui doit être partagé entre nous et notre partenaire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
45- Le partenaire a des règles internes strictes à propos du partage d'information dans ses relations interentreprises.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
46- Les personnels de notre partenaire ne sont pas assez ouverts en face de nos demandes d'information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
47- Les personnels dans l'alliance ont besoin de l'accord de leur patron pour diffuser une information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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9) **Type d'alliance**

D'où votre partenaire vient t-il? (choix multiples)

- A) Entreprise du même secteur.
- B) Entreprise d'un secteur différent.
- C) Il est notre fournisseur.
- D) Il est notre client.
- E) Il est notre concurrent.
- F) Il est de la même nationalité que nous.
- G) Il est de nationalité étrangère

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10) **Secteur d'activité d'entreprise**
 Précisez votre secteur d'activité (votre code APE ou SIC si vous le connaissez)

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11) **Existence de but du transfert de connaissance**

Le transfert de connaissance est-il :

- A) Explicite dans les objectifs de l'alliance
 B) Implicite dans les objectifs de l'alliance
 C) Non prévu dans les objectifs de l'alliance

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12) **Motifs d'alliance**
 Quels sont les objectifs de cette alliance? (choix multiples)

- 1- Réduction des délais et des dépenses de commercialisation
 2- Atteinte d'une masse critique
 3- Atteinte d'une taille optimale
 4- Augmentation conjointe des économies d'échelle
 5- Partage des couts entre les partenaires
 6- Étalement des risques entre les partenaires
 7- Accroissement du pouvoir de marché
 8- Définition d'un standard technologique commun
 9- Développement d'une même fonction pour plusieurs unités
 10- Spécialisation mutuelle des tâches
 11- Union de différents types de connaissances
 12- Union d'acheteur et vendeur
 13- Union de lignes séparées de produits ou de services
 14- Fusion de territoires géographiques distincts
 15- Acquisition (internaliser) la connaissance du partenaire
 16- Accès à des connaissances complémentaires
 17- Accès à des matériels complémentaires
 18- Commercialisation de résultats scientifiques
 19- Développement de nouvelle connaissance / technologie
 20- Echange de connaissance ou de technologie existante
 21- Développement d'une nouvelle affaire
 22- Expansion du marché

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13) **Domain d'activité d'alliance**
Quel est le domaine d'activité de l'alliance ? (choix multiples)

- Recherche
- Développement de produit/service
- Achats
- Fabrication
- Marketing
- Ventes et service après vente



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14) **Forme juridique d'alliance**
 A) Avec capital-actions (Equity-based) B) Sans capital-actions



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15) **Durée d'alliance**

*En quelle année l'alliance a-t-elle démarré ?
En quelle année s'est-elle terminée (si cela s'applique)



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16) **Effectif global de votre entreprise**
 Moins de 50 salariés De 50 à 499 salariés 500 salariés et plus



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17) Combien de personnes chez vous et votre partenaire sont directement concernées par l'alliance? (chiffre)

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VU LES RAPPORTS ETABLIS PAR :

Monsieur Pierre DUSSAUGE, Professeur, HEC Paris, Paris XVIIème

Monsieur Emmanuel JOSSERAND, Professeur, HEC Genève, Suisse

Le Président de l'Institut National Polytechnique de Lorraine, autorise :

Monsieur MAZLOOMI KHAMSEH Hamid

NANCY BRABOIS
2, AVENUE DE LA
FORET-DE-HAYE
BOITE POSTALE 3
F - 5 4 5 0 1
VANDŒUVRE CEDEX

à soutenir devant un jury de l'INSTITUT NATIONAL POLYTECHNIQUE DE LORRAINE,
une thèse intitulée :

« Intention d'apprendre et diversité des partenaires : effets simples et combinés sur le
transfert de connaissance entre alliés »

en vue de l'obtention du titre de :

DOCTEUR DE L'INSTITUT NATIONAL POLYTECHNIQUE DE LORRAINE

Spécialité : « Génie des Systèmes Industriels »

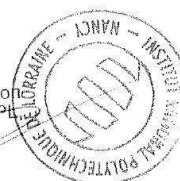
Fait à Vandoeuvre, le 22 avril 2010

Le Président de l'I.N.P.L.,

F. LAURENT

Pour le Président par délégation
Le Secrétaire Général de l'INPL

J.Y. RIVIERE



TEL. 33/03.83.59.59.59
FAX. 33/03.83.59.59.55

Résumé de la thèse

Intention d'apprendre et diversité des partenaires: Effets simples et combinés sur le transfert de connaissances entre alliés

RESUME

En adoptant l'approche basée sur la connaissance, cette recherche étudie les effets de trois éléments préalables pour le transfert inter-organisationnel de connaissances (TIC). Ces trois éléments sont: l'intention de l'entreprise à explorer la connaissance du partenaire, la diversité entre les partenaires qui représente la source de nouveaux apprentissage, et enfin les effets mutuels de ces deux éléments. Une enquête auprès de 114 entreprises françaises montre un impact positif de l'intention d'exploration sur l'efficacité du TIC. Nous avons également trouvé une relation en U inversé entre la diversité du partenaire et l'efficacité du TIC. Les interactions entre ces deux éléments sont étudiées sur la base de deux hypothèses complémentaires: la variation de l'intention d'explorer a un impact positif sur le TIC dans un contexte de faible diversité des partenaires; au contraire des alliances avec forte diversité entre les partenaires dans lesquelles la variation de l'intention d'explorer influence négativement le TIC.

Les résultats de ces dernières hypothèses correspondent à deux approches d'exploration : la profondeur, et l'étendue de l'exploration. Lorsqu'une entreprise, ayant une intention exploratoire, fait une alliance avec des partenaires similaires, elles profitent de leur profondeur commune d'exploration pour favoriser l'apprentissage et la création de nouvelles connaissances. L'étendue de l'exploration dans une alliance est la mesure par laquelle les partenaires de l'alliance explorent de nouvelles connaissances dans des éléments non-

similaires de leur base de connaissances. Toutefois, nos résultats montrent que la diversité trop élevée entre des partenaires réduit l'effet positif de l'intention d'explorer sur le TIC à cause de la distance importante entre les éléments de connaissances des partenaires à explorer

MOTS CLES :

Exploration, Alliance, Diversité des Partenaires, Capacité d'Absorption, Transfert Inter-organisationnel de Connaissances, Nouveauté, Profondeur, Etendue.

Abstract of Thesis

Learning Intention and Partner Diversity: Simple and Interactive Effects on Interfirm Knowledge Transfer

Abstract

Relying on knowledge based view; this study tests the effects of three concepts as the prerequisites for interfirm learning: Intent to explore, Existence of novelty, and Approach of exploration. The paper defines the existence of new knowledge to be learnt by the level of partner diversity and addresses approaches of exploration by the interactive effect of the explorative intent and partner diversity. The hypotheses are tested based on a survey over a sample of 114 French companies. Determinants of knowledge transfer between partners such as ambiguity of partner's knowledge, knowledge protection and trust are controlled. Using Tobit regression models, the findings show that the intent to explore is positively related with interfirm knowledge transfer. Moreover, an inverted U-shape relationship is observed between partner diversity and the effectiveness of interfirm knowledge transfer. Finally, the negative moderating effect of partner diversity on the relation of exploration and knowledge transfer highlights the effect of two approaches of exploration: depth and scope of exploration. In the accordance with the concept of depth of search we find that the interactive effect of similarity of partners with explorative intent is positive on interfirm learning. We

also find that a broad search scope represented by the interactive effect of partner diversity and intent to explore has negative impact on interfirm learning.

Keywords: Exploration, Alliance, Partner diversity, Absorptive Capacity, Interfirm Knowledge Transfer, Novelty, Depth, Scope.