Anna Krzeminska

Determinants and Management of Make-and-Buy

An Extension to Transaction Cost Economics

Anna Krzeminska

Determinants and Management of Make-and-Buy

Beiträge zur betriebswirtschaftlichen Forschung

Herausgegeben von

Prof. Dr. Dr. h.c. Sönke Albers, Kiel
Prof. Dr. Bernhard Pellens, Bochum
Prof. Dr. Dr. h.c. Dieter Sadowski, Trier
Prof. Dr. Martin Weber, Mannheim

Band 120

Die „braune Reihe", wie die „Beiträge zur betriebswirtschaftlichen Forschung" häufig kurz genannt werden, ist eine der bekanntesten und angesehensten Buchreihen ihres Fachs. Seit 1954 erscheinen hier besonders qualifizierte, oft richtungsweisende Forschungsarbeiten (vor allem Dissertationen und Habilitationsschriften) der jeweils „neuen Generation" der Betriebswirtschaftslehre.

Anna Krzeminska

Determinants and Management of Make-and-Buy

An Extension to
Transaction Cost Economics

With a foreword by Prof. Dr. Thomas Mellewigt

Dla moich Kochanych

Foreword

In her dissertation Anna Krzeminska deals with the determinants and the management of make-and-buy decisions. Make-and-buy describes the simultaneous use of in-house production and external procurement of a good or service. Today make-and-buy can be found in many industries and corporate sectors; the simultaneous use of in-house production and external procurement can, for example, be found in the automotive, telecommunications, and IT industry, as well as in pharmaceutical research-and-development projects, the assignment of sales representatives, and in franchising businesses. Make-or-buy, in contrast, refers to the decision between the alternatives of in-house production versus external procurement (e.g. Boerner and Macher 2002) and has been studied extensively. Studies relating to the make-and-buy perspective, however, are rare. Anna Krzeminska approaches this gap in the literature in the here presented thesis by investigating determinants, management, and performance implications of make-and-buy.

Firstly, Anna Krzeminska reviews the existing research on make-and-buy. She points out that, in spite of a thorough literature research, merely 17 contributions on make-and-buy in the industrial purchasing context could be identified over the last 30 years. Analyzing the existing literature, she discovers an interesting paradox: while there is no evident consensus in the literature on whether transaction cost economics (TCE) is a useful approach to explain make-and-buy, she finds that TCE is by far the predominant approach used to explain this phenomenon. Against this background she proceeds by systematically scrutinize the potential of TCE to explain make-and-buy.

She argues conclusively that asset specificity ("the big locomotive") is well suitable to discriminate between market and hierarchies, but inappropriate in explaining as to why two transactions with equal transaction cost characteristics are organized differently, i.e. simultaneously through market and hierarchy. Anna Krzeminska further argues that Porter's (1980) existing standard reasoning for make-and-buy, i.e. demand uncertainty, cannot be a determinant of make-and-buy, either. An interim conclusion, hence, posits that TCE in its present form does not explain make-and-buy. This initial and conclusively brought forward finding is surprising and novel.

Departing from this first important finding Anna Krzeminska goes on and extends transaction cost theory. The classical TCE perspective understands uncertainty as a moderator in the

relationship between asset specificity and governance form. Concurrently, uncertainty is seen as a difficult construct in extant transaction cost research. Krzeminska, however, succeeds in explaining what used to be an anomaly from the viewpoint of TCE by modeling uncertainty as an independent and autonomous variable in addition to asset specificity. In the course of her work, she further breaks the make-and-buy construct down and distinguishes making-and-buying the same assets and making-and-buying the same type of assets as two different types of make-and-buy. She expands the present literature and explains how each make-and-buy type is affected by different determinants. First, making-and-buying the same assets is a suitable strategy when performance ambiguity is high, since both markets (due to lack of quality assessment capabilities) and hierarchies (due to weak incentives) fail to solve performance ambiguity. Second, she suggests that high technological volatility leads to making-and-buying the same type of assets, as the knowledge of suppliers can be integrated into the existing knowledge base of the buyer best when the same type of assets are simultaneously made and bought. Building on this line of reasoning, she finally explains how these different types of governance forms imply different governance mechanisms and have different performance implications. Overall, these conceptual findings are deduced in 18 hypotheses.

Anna Krzeminska then illustrates how a pilot survey including 34 interviews with managers was conducted as part of the empirical survey and helped to build a more comprehensive understanding of the phenomenon of make-and-buy. The main survey focused on the automotive industry where a total of 89 procurement managers of a major European car manufacturer answered a web-based questionnaire. The results of the empirical study support Krzeminskas' hypotheses in that performance ambiguity increased the likelihood of making-and-buying the same assets, whereas technological volatility increased the likelihood of making-and-buying the same type of assets.

In her dissertation Anna Krzeminska engaged in a practically and scientifically highly relevant research topic and accomplished her research project with excellent result. One particular highlight of her dissertation is the coherent analysis of existing and development of new theory. Krzeminska shows in an impressive and very sophisticated way how classical transaction cost theory is not appropriate to explain make-and-buy. She is the first to do this in such a stringent and skilful way. It is, above all, particularly commendable that she does not eclectically consult other theories to explain the phenomenon. In contrast to many other authors she chooses the more difficult path and expands TCE in a way that enables the theory to encompass the make-and-buy option. The consistency and the analytical excellence of the

theory dissection and conceptual theory development in Krzeminska's thesis outperforms even distinguished dissertations in business sciences.

Moreover, excerpts of the work of Anna Krzeminska have already withstood market tests, since one of her papers "Is transaction cost theory a useful perspective for make-and-buy?" was presented at the Strategic Management Societies' Conference in Orlando, USA in 2005.

Overall, she brings forward a thesis that fully meets the international standards of rigor and relevance. I wish her numerous readers in science and business practice. In my opinion, she deserves it.

Prof. Dr. Thomas Mellewigt

Acknowledgements

> *„Gehe nicht, wohin der Weg führen mag, sondern dorthin, wo kein Weg ist, und hinterlasse eine Spur."*

Jean Paul

Even more challenging than writing the dissertation itself is finding the right words to measure up to all stages of and companions in the enterprise of doing a doctorate. Like many other things in life a doctorate is a unique and individual experience of ups and downs, success and failures, insights and mistakes, and the fact that a certain portion of luck is needed on one's side to make it.

But after the completion of a dissertation, I believe that every new doctor certainly rejoices in being so much richer in many experiences: She or he has not only contributed to research, but has learned a lot about her- or himself and about what counts most; the people who care for us and without whom we would not be where we are.

Hence, I want to thank all those people who made it happen for me:

I want to start with the person who is responsible for the very beginnings of my doctorate, who brought me to the management chair at the University of Mainz and put the PhD bug in my ear: Dr. Roland Roeder. Thank you, Roland, for being such an amiable colleague who always knew how to liaise fun with work and how to attach the appropriate importance to things. In the same breath, I also want to thank my other colleagues from the University of Mainz for their support and the pleasant working atmosphere with them, Ms. Barbara Hell, the kind-hearted soul of the chair, my colleagues Dr. Paulina Jedrzejczyk, Dr. Carsten Schwaab, Mrs. Cyrus Asgarian and Ms. Judith Welter. Many sincerest thanks appertain to my advisor at the University of Mainz, Prof. Dr. Rolf Bronner who with his warm personality granted me free space for personal and research interest development and never hesitated to support me.

The person, however, who mostly influenced this dissertation in various ways, is my doctoral advisor Prof. Dr. Thomas Mellewigt to whom I'm deeply indebted. Thank you, Thomas, for your constructive feed-back and support, for providing me the free space and time necessary for the dissertation project and, of course, for the very timely review of my dissertation. This

Deutsche Zusammenfassung der Dissertation

Die Frage nach Eigenfertigung versus Fremdbezug eines Gutes bzw. einer Dienstleistung (Make-or-buy-Entscheidungen) ist eine elementare betriebswirtschaftliche Entscheidung, die jedes Unternehmen für die verschiedenen Stufen seiner Wertschöpfungskette treffen muss und die sich demzufolge in allen Wirtschaftszweigen und Unternehmensbereichen wieder finden lässt. Nicht zuletzt diese hohe praktische Relevanz hat make-or-buy-Entscheidungen zu einem in der wissenschaftlichen Literatur stark diskutierten Thema gemacht. Dabei werden Eigenfertigung und Fremdbezug in der bisherigen (wissenschaftlichen) Literatur nahezu durchgängig als sich ausschließende gegensätzliche Alternativen betrachtet (z. B. Lewin-Solomons, 1998). Jüngere Studien hingegen identifizieren die simultane Anwendung von Eigenfertigung und Fremdbezug in Unternehmen – also make-**and**-buy – als unter gewissen Bedingungen sinnvolle Strategie und zweifeln demnach die Ausschließlichkeit von "make" und "buy" an (Bradach, 1997; Dutta et al., 1995; Heide, 2003; Parmigiani, 2003). Als Beispiele aus der Praxis seien unter anderem der Einsatz von angestellten und freien Mitarbeitern wie er z.B. bei Medienunternehmen zu finden ist, die simultane Eigenerstellung und der Fremdbezug von Bauteilen und Modulen in der Automobil-, Telekommunikations- und IT-Branche oder aber die intern sowie gleichzeitig extern vergebene Forschungs- und Entwicklungsprojekte von Pharmaunternehmen zur Entwicklung oder bei Klinikstudien von Medikamenten genannt.

Allerdings hat make-and-buy (synonym plural forms) bisher in der wissenschaftlichen Literatur kaum Beachtung gefunden: "Notably, although plural forms are integral and permanent parts of many firms' strategies, they are not well documented from a theoretical standpoint. […] the plural forms phenomenon has generated little empirical research." (Heide, 2003: 18). Es ist somit kaum etwas über Ursachen, Gründe bzw. Bedingungen für diese Strategie, noch wie man sie im Unternehmen sinnvoll managt, bekannt.

An diesem Forschungsdefizit setzt mein Dissertationsprojekt an. Daher beteilige ich mich mit meinem Forschungsprojekt auch an der Grundlagenforschung zu diesem Thema. Die Arbeit ist folgendermaßen strukturiert: Nachdem im einleitenden Kapitel die Motivation, die Forschungsfragen sowie der Aufbau der Arbeit dargelegt werden, erfolgt im zweiten Kapitel die Darstellung der klassischen Kategorisierung ökonomischer Institutionen nach Coase (1937) und Williamson (1985) sowie die Abgrenzung und Definition der Begriffe. Hier wird

besonderes Augenmerk darauf gelegt, make-and-buy klar von anderen Organisationsformen abzugrenzen, insb. den Hybriden, die - oberflächlich betrachtet - als make-and-buy ähnlich empfunden werden könnten. Zentrale Argumentationslogik dabei ist, dass sich make-and-buy nicht als Mischform auf dem make/buy-Kontinuum zwischen den beiden Extremen "make" und "buy" befindet, sondern eine gleichzeitige Anwendung der unterschiedlichen Organisationsformen ist. D.h. obwohl sich die betrachteten Faktoren vollständig oder nahezu gleichen, werden die dazugehörigen Transaktionen auf unterschiedliche Art und Weise organisiert, nämlich sowohl als Markt- als ach als Hierarchietransaktion. Dabei müssen aber nicht immer die Extreme "make" und "buy" kombiniert werden, sondern make-and-buy kann auch bspw. eine Kombination von interner Herstellung und einer Kooperation sein. Bei Forschung und Entwicklung kann zum Beispiel ein internes Forschungsprojekt mit einer Forschungskooperation kombiniert werden. Ob die hybride Form als "make" oder "buy"-Teil von make-and-buy fungiert, muss im Einzelfall über den Grad der Beteiligung an der Kooperation definiert werden. Darüber hinaus widmet sich das zweite Kapitel dem Stand der Forschung. Hier wird schnell deutlich, dass es bisher kaum Forschung zu diesem Thema gegeben hat: Eine umfassende Datenbankrecherche (u. a. in ABI/Inform global, EBSCO; EconLit, KVK) ergab lediglich 17 Beiträge (Zeitschriftenartikel, Arbeitspapiere, Bücher sowie Dissertationen), die sich mit make-and-buy im (industriellen) Beschaffungskontext beschäftigen. Des Weiteren deckt die Analyse dieser Beiträge ein Paradoxon auf: Obwohl in den Texten keine Einigkeit darüber besteht, ob der Transaktionskostenansatz ein geeigneter Ansatz zur Erklärung von make-and-buy ist, ist er die mit Abstand am häufigsten dazu verwendete Theorie. Während einige Forscher die Eignung des Ansatzes befürworten (z.B. Dutta et al., 1995; Lee/Lim 2001), zweifeln andere dies stark an (vor allem Bradach/Eccles, 1989 und Parmigiani, 2003). Noch bedenklicher ist allerdings, dass selbst Forscher, die seine Eignung anzweifeln, diesen Ansatz letztendlich – womöglich aus Ermangelung an Alternativen – doch zur Ableitung ihrer Hypothesen verwenden (z.B. Parmigiani, 2003/2007). Aus diesem Fehlen eines geeigneten theoretischen Gerüsts zur Erklärung dieses Organisationsphänomens ergibt sich des Weiteren, dass die Ergebnisse bisheriger empirischer Forschung nicht in einen theoretischen Gesamtzusammenhang gebracht werden können und daher häufig unsystematisch bleiben. Hierdurch wird der Erkenntnisfortschritt zur Theorie der Firma gehemmt.

Abgeleitet aus diesem Defizit umfasst das dritte Kapitel demzufolge eine umfassende diskursive Prüfung der Erklärungskraft der Transaktionskostentheorie für make-and-buy. Zunächst werden die Verhaltensannahmen sowie die Untersuchungseinheit "Transaktion" auf ihre

Kompatibilität mit dem Phänomen make-and-buy geprüft. Kern des Kapitels stellt jedoch die Prüfung der Determinanten des Transaktionskostenansatzes dar. Der Transaktionskostenansatz stellt in der Betriebswirtschaftslehre den dominanten Ansatz zur Erklärung der Wahl der Organisationsformen Markt und Hierarchie dar (Leiblein, 2003). Ausgehend von der Annahme der begrenzten Rationalität, potentiell opportunistischen Verhaltens der Akteure sowie deren Risikoneutralität, wird angenommen, dass mit steigender Faktorspezifität, Unsicherheit und Häufigkeit der Transaktion die generell vorherrschende Kosteneffizienz des Marktes zur Abwicklung von Transaktionen abnimmt und ab einem gewissen Punkt der Hierarchie unterliegt (Williamson, 1985). Somit wird für spezifische, unsichere und häufig auftretende Transaktionen die Hierarchie als kostengünstiger betrachtet und umgekehrt. Faktorspezifität lässt sich dabei als Quasi-Rente auffassen (Pies,1993): Von einem zu einem bestimmten Zeitpunkt vertraglich vereinbarten Wert eines Faktors oder einer Investition W_1 wird angenommen, er sei höher als der in der zweitbesten Verwendung zu vereinbarende Wert des Faktors W2 und der Schrottwert des Faktors S. Gilt $W_1 > W_2 > S$, dann ist die Differenz $W_1 - S$ die Quasi-Rente und somit die Spezifität des Faktors. Wenn jedoch $W_2 = S$ gilt, dann ist die Spezifität für diesen Faktor maximal. Die Differenz $W_1 - W_2$ ergibt den ausbeutbaren Teil der Quasi-Rente.

Vor dem Hintergrund der Gefahr opportunistischen Handelns in der Transaktionskostenökonomie sind diese Überlegungen bedeutend, da mit steigender Faktorspezifität (d. h. je größer die Differenz $W_1 - W_2$ und je kleiner die Differenz $W_2 - S$ wird) die potentiellen Verluste eines Transaktionspartners aufgrund opportunistischen Verhaltens des anderen Partners steigt. Damit geht einher, dass die ex post Transaktionskosten zur Anpassung, Kontrolle und Durchsetzung des Vertrages steigen und somit die vertikale Integration der Transaktion günstiger wird als die Markttransaktion. Dabei wird die Faktorspezifität als Hauptdeterminante des Transaktionskostenansatzes betrachtet, während die Unsicherheit häufig nur als moderierende Variable die Wirkung der Faktorspezifität auf die Organisationsform verstärkt. Aus den obigen Ausführungen wird deutlich, dass der Transaktionskostenansatz die Organisationsformen Markt (buy) und Hierarchie (make) als sich gegenseitig ausschließend begreift. Die Faktorspezifität ist geeignet zwischen Markt und Hierarchie zu diskriminieren, kann allerdings nicht erklären warum zwei Transaktionen mit denselben Transaktionskostencharakteristika auf unterschiedliche Weise (also über Markt und Hierarchie) abgewickelt werden. Make-and-buy stellt also aus Sicht dieses Ansatzes eine bisher nicht erklärbare Anomalie dar. Als ein Hauptergebnis des dritten Kapitels wird dem aus Transaktionskostensicht agierenden Haupttreiber von Make-or-buy-Entscheidungen, nämlich

der Faktorspezifität, für die Erklärung von make-and-buy keine Erklärungskraft zugespro-
chen. Nach der Prüfung der Transaktionskostendeterminanten werden noch die aus dem
Transaktionskostenansatz ableitbaren, aber bisher vernachlässigten, Managementmechanis-
men auf ihre Erklärungskraft für das Management von make-and-buy untersucht. Dabei
werden die Managementmechanismen aus den kostenrelevanten Charakteristika von alterna-
tiven institutionellen Arrangements abgeleitet, nämlich Ausmaß bürokratischer Steuerung und
Kontrolle, Anreizintensität und autonome sowie bilaterale Anpassungsfähigkeit (Williamson,
1991a, Ebers/Gotsch, 2006). Die identifizierten Managementmechanismen werden dabei als
geeignet für die Erklärung von make-and-buy beurteilt. Dabei geht die Arbeit in Bezug auf
die make-and-buy-Forschung über die bisherige Literatur hinaus, die das Management von
make-and-buy, mit Ausnahme eines einzigen konzeptionellen Artikels, bislang ausgeblendet
hat. Das Kapitel 3 schließt mit dem Zwischenfazit, dass der Transaktionskostenansatz in
seiner bisherigen Form nicht als Erklärungsansatz für make-and-buy geeignet ist.

Folgerichtig wird im Kapitel 4 eine entsprechende Erweiterung der Theorie vorgeschlagen
und es werden Hypothesen über die vermuteten Ursache-Wirkungs-Zusammenhänge formu-
liert. Konkret wird die Unsicherheit, die innerhalb der klassischen Theorie lediglich als
Moderator die Beziehung von Faktorspezifität und Organisationsform verstärkt (Boerner/
Macher, 2002), als gleichwertige unabhängige Variable verstanden und es wird vermutet, dass
insbesondere die Unvorhersehbarkeit zukünftiger technologischer Entwicklungen (technolo-
gical volatility) sowie die Unsicherheit bei der Leistungsbeurteilung (performance ambiguity)
des betrachteten Faktors als Ursachen für make-and-buy wirken. Dabei geht die vorliegende
Untersuchung in mehrerlei Hinsicht über die bestehende Forschung hinaus: Zum einen, wird
der Transaktionskostenansatz so weiterentwickelt, dass er bisher als Anomalie erscheinende
Organisationsformen (theoretisch) erklären kann. Darüber hinaus wird der Transaktions-
kostenansatz nicht wie bisher auf den Zusammenhang zwischen Determinanten und Organi-
sationsform reduziert (reduced form analysis), sondern es werden auch die Management-
mechanismen modelliert, die sich dem Transaktionskostenansatz zufolge aus den Charakte-
ristiken der jeweiligen Organisationsform ergeben.

Zum anderen, wird die bisherige Forschung zu make-and-buy um die Betrachtung verschie-
dener Formen von make-and-buy erweitert. Konkret wird unterschieden, ob sich make-and-
buy auf exakt identische oder nur sehr ähnliche Faktoren bezieht. Diese Unterscheidung
erscheint notwendig, da auch das making-and-buying von Faktoren, die nicht exakt identisch,
aber doch so ähnlich sind, dass sie aus Transaktionskostensicht trotzdem auf die selbe Weise

gesourct werden müssten, eine Anomalie für den Transaktionskostenansatz darstellen. Exakt identische Faktoren stellen dabei im Produktionsprozess perfekte Substitute dar, während sehr ähnliche Faktoren bspw. verschiedene Generationen oder Ausführungen eines Faktors/ Produkts darstellen.

Konkret wird argumentiert, dass das make-and-buy von exakt identischen Faktoren sich dazu eignet, die Unsicherheiten bei der Qualitätsbeurteilung von Faktoren oder Lieferanten zu beseitigen. Bei hoher Unsicherheit bei der Leistungsbeurteilung versagen sowohl Markt als auch Hierarchie: Während das Unternehmen beim Fremdbezug von Gütern, die schwer hinsichtlich ihrer Qualität zu beurteilen sind, Gefahr läuft, dass der Lieferant sich opportunistisch verhält und dies aufgrund der mangelnden Qualitätsbeurteilung nicht oder erst spät bemerkt, herrschen innerhalb der Hierarchie Anreizprobleme, die nicht angemessen gelöst werden können, da leistungsbezogene Vergütung aufgrund mangelnder Leistungsbeurteilung kaum möglich ist (Alchian/Demsetz, 1972; Ouchi, 1980; Heide, 2003; Parmigiani, 2003. Um das Problem der Unsicherheit bei der Leistungsbeurteilung lösen zu können, müssen die Faktoren allerdings exakt identisch sein, da nur dann auch ein Vergleich der intern erstellten und extern bezogenen Leistung möglich ist. Umgekehrt eignet sich zur Abschwächung der Unvorhersehbarkeit zukünftiger technologischer Entwicklungen eher das make-and-buy ähnlicher Faktoren als das make-and-buy identischer Faktoren. Die dahinterstehende Logik ist, dass ein Unternehmen durch make-and-buy ähnlicher Faktoren von seinem Lieferanten aktuelles Produktions-Know-how lernen kann, ohne dabei das der Herstellung der Faktoren zugrunde liegende Wissen zu verlieren. Ein Lernen vom Lieferanten ist allerdings dann besonders gut möglich, wenn die bezogenen Faktoren mit den intern hergestellten nicht exakt identisch sind, aber trotzdem ähnlich genug, um das Wissen des Lieferanten gut in eine verwandte, bereits beim Unternehmen bestehende, Wissensbasis zu integrieren (e.g. Cohen/ Levinthal, 1990; Lane/Lubatkin, 1998; Veugelers/Cassiman, 1999). So kann die Wissensbasis im Unternehmen diversifiziert werden und die Wahrscheinlichkeit von unerwarteter technologischer Entwicklung überrascht zu werden sinkt.

Über die Modellierung der Determinanten von make-and-buy hinaus, enthält das vierte Kapitel auch Hypothesen zum Management der verschiedenen make-and-buy Formen. Dabei wird argumentiert, dass die Managementmechanismen für die verschiedenen make-and-buy Formen unterschiedlich relevant sind. Für make-and-buy von identischen Faktoren wird vermutet, dass die unsicherheitsreduzierende Wirkung bzgl. der Leistungsbeurteilung eher durch eine intensive Steuerung und Kontrolle der Lieferanten sowie anreizsteigender Mecha-

nismen begünstigt wird. Für make-and-buy von ähnlichen Faktoren hingegen wird vermutet, dass die unsicherheitsreduzierende Wirkung bzgl. zukünftiger technologischer Entwicklungen am besten durch verschiedene Anpassungsmechanismen und Koordination erreicht wird. Dabei ist in den Managementhypothesen auch immer enthalten, dass der jeweilige Managementmechanismus nur unter der Bedingung der jeweiligen Unsicherheitsform zum Tragen kommt.

Schließlich werden für die beiden make-and-buy Formen noch Hypothesen zu deren Effizienz formuliert. Da make-and-buy von identischen Faktoren unter der Bedingung von Leistungsambiguität die Unsicherheit der Leistungsbeurteilung senken soll, wird unterstellt, dass die Performance des Lieferanten insgesamt steigt, während potentieller Opportunismus gesenkt wird. Aufgrund der besseren Leistungsbeurteilung sowie geringerer Opportunismusgefahr sinken dann auch die Transaktionskosten. Bei make-and-buy von ähnlichen Faktoren unter der Bedingung von technologischer Volatilität soll die Unsicherheit bzgl. zukünftiger Entwicklungen gemindert werden. Daher wird vermutet, dass sich make-and-buy von ähnlichen Faktoren positiv auf die Flexibilität des Unternehmens auswirkt. Basierend auf der Annahme des Lernens und des Wissenstransfers, der bei make-and-buy ähnlicher Faktoren vermutet wird, wird unterstellt, dass sich Lernkurveneffekte positiv auf Skalen- und Verbundkostenvorteile des Unternehmens auswirken. Ohne eine scharfe Trennung der beiden Kostenarten zu bezwecken, kann tendenziell gesagt werden, dass make-and-buy identischer Faktoren eher transaktionskostenbezogene Vorteile bringt, während sich make-and-buy ähnlicher Faktoren eher auf produktionskostenbezogene Vorteile bezieht.

Da sich die Arbeit nicht auf die theoretische Modellbildung beschränkt, widmen sich Kapitel 5 und 6 der empirischen Überprüfung der hypothetisierten Zusammenhänge.

Das fünfte Kapitel enthält die Erläuterung des Vorgehens bei der Entwicklung der Messmodelle sowie der empirischen Untersuchung einschließlich der Beschreibung der Branche sowie des betrachteten Unternehmens. Die empirische Untersuchung ist dabei als Mix aus Fallstudie und grosszahliger Querschnittsuntersuchung zu verstehen, da die Beschaffungsstrategien zu 89 verschiedenen Bauteilen bei einer Unternehmung, der Volkswagen AG, betrachtet wurden.

Das sechste Kapitel enthält die empirische Analyse des erarbeiten Theoriemodells. Nachdem der Datensatz auf seine Eignung hinsichtlich Größe, Repräsentativität, Nonresponse Rate Bias und Common Method Variance überprüft wurde, wird die Operationalisierung und Reliabilität der abhängigen, unabhängigen sowie Kontrollvariablen eingehend erläutert. Die Prüfung

der Reliabilität sowie der Konsistenz und Unterscheidbarkeit der gemessen Faktoren erfolgt anhand der explorativen Faktorenanalyse sowie der Berechnung des Cronbach's Alpha. Die deskriptiven Statistiken geben einen Überblick über u. a. die Verteilung der erhobenen Organisationsformen, die Anzahl interner und externer Lieferanten, Dauer der Geschäftsbeziehung etc.

Die Überprüfung der Hypothesen wurde in 3 Blöcke aufgeteilt, da die Formulierung der Hypothesen sowie das Skalenniveau sich bei den Hypothesen bzgl. der Determinanten, des Managements sowie der Performance unterscheiden. Zur Überprüfung der Determinanten-Hypothesen wurde eine multinomial logistische Regression gerechnet, da die abhängige Variable der Organisationsform nominal skaliert ist. Abgesehen von den im Modell auch enthaltenen Nullhypothesen, die sich statistisch nicht prüfen lassen, zeigt das Modell eine Bestätigung sowohl der Differenzierbarkeit der verschiedenen make-and-buy Formen als auch die Relevanz deren unterschiedlicher Treiber. Obwohl der Faktorspezifität in der theoretischen Argumentation keine Erklärungskraft zugesprochen wurde, zeigen die Ergebnisse einen klaren positiven Effekt von Faktorspezifität auf make-and-buy. Ungeklärt muss leider bleiben, ob dieser Effekt auf einem tatsächlichen Zusammenhang beruht, oder ob er aufgrund des negativen Zusammenhangs von Faktorspezifität und der Referenzgröße Markt entsteht. Da im Datensatz keine Fälle von rein interner Produktion enthalten sind, können die Ergebnisse nicht mit der Referenzgröße Hierarchie verglichen werden. Die Berechnung der Effektgrößen für die multinomial logistische Regression geht über die bisherige Praxis der Berechnung von Odds Ratios hinaus und weist die Wahrscheinlichkeiten für das Eintreten der untersuchten Organisationsformen aus. Die Überprüfung der Management-Hypothesen erfolgt anhand von Korrelationsmatrizen, da hier kein gerichteter Zusammenhang untersucht wird. Über die Überprüfung der hypothetisierten Zusammenhänge hinaus wird geprüft, ob zum einen die Managementmechanismen auch nur unter der Bedingung hoher Unsicherheit relevant sind und zum anderen, ob sie auch nur mit der jeweiligen make-and-buy Form zusammenhängen. Es kann gezeigt werden, dass die unterstellten Zusammenhänge überwiegend das Theoriemodell stützen. Allerdings ist die Bedingung des Vorliegens hoher Unsicherheit für die Zusammenhänge nicht erforderlich.

Für die Überprüfung der Performance-Hypothesen wurde eine lineare Regression verwendet, da hier die abhängigen Variablen metrisch skaliert sind. Bei der Berechnung des Regressionsmodells wurde das Problem der Endogenität berücksichtigt (Verletzung der Annahme der Unkorreliertheit der Störgröße mit den Regressoren). Während die bei den Ergebnisgrößen für

make-and-buy von identischen Faktoren unterstellten Effekte nicht bestätigt werden konnten, konnte für make-and-buy von ähnlichen Faktoren ein positiver Effekt auf die Flexibilität des Unternehmens nachgewiesen werden.

Das siebte Kapitel liefert abschließend die Zusammenfassung der wichtigsten Erkenntnisse, eine kritische Beleuchtung des entwickelten Modells, zeigt Grenzen der Untersuchung auf und identifiziert den weiteren Forschungsbedarf.

Insgesamt kann festgehalten werden, dass das in der Arbeit entwickelte, erweiterte Transaktionskostenmodell einen ersten, überwiegend geeigneten, Ansatz zur Erklärung von make-and-buy darstellt und unser Verständnis über die Make-vs.-buy-Entscheidungen erweitert hat. Zudem liefert die Arbeit viele Ansatzpunkte für weitergehende Forschung auf dem Gebiet von make-vs.-buy, des Transaktionskostenansatzes sowie der Theorie der Firma.

Table of Contents

List of Figures

List of Tables

List of Abbreviations and Symbols

Adj. .... Adjusted

AERA .... American Education Research Association

AG .... Aktiengesellschaft

Amb. .... Ambiguity

APA .... American Psychological Association

AS .... Asset Specificity

Asymp. .... Asymptotic

ß .... Beta-Coefficient in Regression Analyses

Beh. CaM .... Behavioral Control and Monitoring

Beh. CaM Mech. .... Behavioral Control and Monitoring Mechanisms

Buyer-spec. .... Buyer-specific

Capabil. .... Capabilities

CFA .... Confirmatory Factor Analysis

CIF .... Citation Impact Factor

CIS .... Community Innovation Statistics (Eurostat)

Com .... Commodity

Coord. Bilateral Adapt. .... Coordinated Bilateral Adaptation

Comb. CaM .... Combined Control and Monitoring

Comb. CaM Mech. .... Combined Control and Monitoring Mechanisms

Comb. Coord. Adapt. .... Combined Coordinated Adaptation

Coord. Hierarch. Adapt. ...... Coordinated Hierarchical Adaptation

df .... Degrees of Freedom

DFV .... Deutscher Franchise Verband e.V.

Eco. .... Economics

EFA .... Exploratory Factor Analysis

ed. .... Editor(s)

e.g. .... for example (lat.: exempli gratia)

esp. .... especially

et al. .... and other (lat.: et alii)

et seq. .... and the following (lat.: et sequentes)

Eurostat .... Statistical Office of the European Communities

exp .... Exponential Function

Fig..Figure

Frequ. ....Frequency

Gov. ....Governance

H...Hypothesis

H_0..Null Hypothesis

H_1..Scientific Hypothesis

Hebis......................................Hessisches BibliotheksInformationsSystem

Hierarch. ....Hierarchical

i.e. ....that is (lat.: id est)

Incent. Mech. ....Incentive Mechanisms

Incl..including

Insig. ....Insignificant

ISI...Institute for Scientific Information

k...Theoretical value of asset specificity

$\hat{k}$ ....Theoretical value of specificity that marks the point at the market-hierarchy continuum where the favorability of one governance form reverses to the other

KVK ....Karlsruher Virtueller Katalog

Logit ....Logistic Regression

Mab/S ....Make-and-buy the same assets

Mab/S vs. all others..............Make-and-buy the same assets versus all other governance forms

Mab/ST.................................Make-and-buy the same type of assets

Mab/ST vs. all others ....Make-and-buy the same type of assets versus all other governance forms

Max.......................................Maximum

Mech. ....Mechanism(s)

Min ....Minimum

μ..Population Mean

N...Sample Size

NACE ....Nomenclature générale des activités économiques dans les Communautés Européennes

NCME ....National Council on Measurement in Education

NHST ....Null Hypothesis Significance Testing

OECD ....Organization for Economic Co-operation and Development

OEM ....Original Equipment Manufacturer

OLS ....Ordinary least squares estimation

Opp. .... Opportunism

Org. .... Organizational

Outc. CaM .... Outcome Control and Monitoring

Outc. CaM Mech. .... Outcome Control and Monitoring Mechanisms

Perf. .... Performance

P mab/S .... Probability of make-and-buy the same assets versus all other governance forms

P mab/ST .... Probability of make-and-buy the same type of assets versus all other governance forms

P mab/S vs. all others u.
cond. of high Perf. Amb. ..... Probability of make-and-buy the same assets versus all other governance forms under conditions of high performance ambiguity

P mab/ST vs. all others u.
cond. of high Tech. Vola. .... Probability of make-and-buy the same type of assets versus all other governance forms under conditions of high technological volatility

Powertr. .... Powertrain

Prop. .... Proposition

R&D .... Research and Development

RBV..................................... Resource-based View

S... Brake-up Value of an Investment

SAP MM .... Materials Management module of the SAP Enterprise Resource Planning (ERP) software

s_d .... Estimated Standard Error

SD.. Standard Deviation

Sig.. Significance

Supp..................................... Supplier

Tab....................................... Table

TC.. Transaction Costs

TCE .... Transaction Cost Economics

Techn. Vola. .... Technological Volatility

Tol. .... Tolerance

Uncert.................................. Uncertainty

URL...................................... Uniform Resource Locator

VIF .... Variance Inflation Factor

Vol. .... Volume

vs. .... versus

W_1... Value of a Factor or an Investment

W_2... Value in the second-best Use of the Factor

y... Estimate of μ

1. Introduction

> *"The matter of the decision-making process for*
> *make versus buy decisions is complex."*

> Anderson, et al., 2000: 744.

1.1. Motivation and Research Questions

Consider the following vignettes:

(1) Sun Microsystems, a leading manufacturer and supplier of enterprise computing products that feature networked workstations and servers sees itself confronted with a strong and increased competition and volatile technology. Although the company continues to grow rapidly, this generally has not been reflected in its stock price which trades at a price/earnings ratio more typical of a mature company. The company believes it should trade at a much higher multiple due to its future growth prospects, but Wall Street analysts believe that its workstation growth will be threatened by the technological advance of personal computers (Farlow et al, 1996b; Kraemer/Dedrick, 1999). The company "has established a strategy to be the first-to-market with volume production of new technologies. To do so, it must develop this technology in-house, or rely on suppliers for its development. Full reliance on internal development is risky, since research is such an uncertain endeavor. […] Reliance on suppliers for technology development, however, holds its own set of risks. Proprietary rights to the technology are much harder to obtain [… and the company's …] competitors have access to the same suppliers and therefore the same technology." (Farlow et al, 1996b: 2). How should the firm perform technological development in order to best manage the risks of both internal and external development?

(2) Another firm which is a leading manufacturer in the (mobile) telecommunications industry assesses the following as one most important business risks which the firm may face: „We depend on our suppliers for the timely delivery of components and for their compliance with our supplier requirements, such as, most notably, our and our customers' product quality […]. Our manufacturing operations depend to a certain extent on obtaining adequate supplies of fully functional components on a timely basis. Our principal requirements are for electronic components, such as semiconductors, microprocessors, micro controllers, memory devices and displays, which have a wide range of applications in our products." (Nokia, 2003: 16). As

a consequence Nokia suspects that a "component supplier may fail to meet our supplier requirements, such as, most notably, our and our customers' product quality, safety and other corresponding standards, and consequently some of our products are unacceptable to us and our customers, or we may fail in our own quality controls." (Nokia, 2003: 16). How should Nokia organize procurement and manage its supplier relationships in order to best mitigate the risks of poor component quality and the suspected adverse effect on sales, results of operations as well as reputation and brand value?

In the first case, Sun Microsystems "has adopted a "Make <u>and</u> Buy" approach for some components, such as CPU boards." (Farlow et al., 1996a: 3, accentuation as in the original) The company's purpose in using this dual model is to ensure it understands the technology and can effectively perform design for manufacturability and testability. "Multiple suppliers provide multiple options, as compared to strict reliance on the internal option. By continually scouting among suppliers for technological advances, Sun reduces the risk that it will be forced down a misdirected path." (Farlow et al., 1996b: 2) "Also there is an occasional need to develop a new product in total secrecy, which is easier to accomplish with internal manufacturing." (Farlow et al., 1996a: 3).

In the second case, Nokia "purchases a large proportion of key electronic components such as semiconductors and microprocessors from a global network of suppliers. At the same time, Nokia operates about ten manufacturing plants in nine countries to produce these components." (Du et al., 2006: 245). Thereby, make-and-buy can "mitigate the holdup problem to a substantial extent. In negotiating with the external supplier, the firm can use the backup option of the internal supplier to minimize the holdup problem. At the same time, "the presence of an external supplier can mitigate the internal supplier's problem of lack of incentive. […] In our example, Nokia finds that outsourcing allows it to secure inputs produced with the state-of-the-art technology, but it also involves the risk that the timely delivery of quality components may not be guaranteed. Bi-sourcing allows Nokia to strike a balance between the quality and the security of component supply." (Du et al., 2006: 245)

As the above vignettes show, simultaneously making and buying an asset embodies a relevant governance choice, respectively strategy in practice, due to a number of reasons: In the first example a firm wants to keep up with technological development by exploiting the development capabilities of its supplier(s) and at the same time maintaining technological knowledge and skills in-house. The second example highlights how a firm wants to secure the high

quality and at the same time acceptable prices of a variety of different electronic components which are - at least partly - to be sourced from outside suppliers.

In contrast to this practical significance of make-and-buy (synonymous with plural form, concurrent sourcing, taper(ed) integration), extant management literature still and "almost uniformly treats the choice of organizational structure in either-or-terms" (Lewin-Solomons, 1998: 1). Hence, the established academic conceptualization of organizational forms in either-or terms cannot sufficiently explain the existing variety of organizations in general and "as-well-as" governance forms such as make-and-buy in particular. "Notably, although plural forms are integral and permanent parts of many firms' strategies, they are not well documented from a theoretical standpoint. […] the plural forms phenomenon has generated little empirical research." (Heide, 2003: 18).

In order to contribute to closing this gap, I want to "focus on real important topics, not niche topics" as proposed by Mellewigt (2004: 8). For that reason, in this dissertation I pose **three research questions**:[1]

Initially, I ask: *Why do firms at the same time make and buy an asset?*. This question addresses the **determinants** of make-and-buy and is basic for understanding the conditions which favor or lead to make-and-buy. Also, this question highlights the hitherto lacking theoretical explanations for make-and-buy. Especially, standard transaction cost economics (TCE), being commonly used for investigating make versus buy choices, (Leiblein, 2003) is questioned of whether it can give adequate explanations to deviations from the ideal types of institutions, namely markets and hierarchies. The serious theoretical deficit becomes evident when we consider the missing agreement among researchers in the make-and-buy literature on whether TCE is appropriate to explain plural modes at all.[2] With the appearance and increasing reception of the phenomenon of make-and-buy in the academic discussion, the incapability of available management theories and particularly TCE to give an account of the diversity of institutions challenges the validity of those theories.

My second research question focuses on: *How do firms manage this governance choice?*. Obviously, this question addresses the **management** of make-and-buy. This question is also basically relevant for the make-and-buy research stream due to two reasons: First, there exists only one conceptual contribution which addresses the management of make-and-buy focused

---

1   The research questions which were asked in the extant make-and-buy literature are presented in chapter 2.3.1.

2   See chapter 2.3.1.

on franchising (Bradach, 1997). Hitherto, an empirical investigation of the question of the management of make-and-buy is deficient. Second, in extant research on governance choices in general the focus has often been on causes and motives (= determinants) of the choice of the focal governance forms. A good example for this rather one-sided approach is the outsourcing literature, which entails predominantly contributions concerning its determinants compared to the management of outsourcing (Matiaske/Mellewigt, 2002). In order to not continue this kind of one-sidedness, a more comprehensive approach to make-and-buy is pursued in this thesis.

Third, I ask: *What are the resulting performance implications of such a strategy respectively governance form?*. Since (the explanation of) **firm performance** lies at the heart of Strategic Management, I complete my research agenda with the incorporation of the performance implication resulting from the governance choice and its appropriate alignment with environmental respectively transactional conditions.

In my dissertation, I view make-and-buy as a **distinct governance form** with its **distinct determinants,** its accordingly **distinct governance mechanisms,** and **distinct performance implications** as well. My approach contrasts with the continuum perspective of governance forms, which sets making at one end of a continuum and buying at the other, and suggests that make and buy are substitutes and mutually exclusive (Williamson, 1985; see also Bradach/Eccles, 1989). Therefore, I use a discrete structural alternatives approach to elaborate each governance mode with its distinct set of features highlighting its nature of a distinct governance mode rather than a combination along a make/buy continuum.

Other scholars have investigated the empirical existence of make-and-buy in sales distribution channels (e.g. Dutta et al., 1995; McNaughton, 2002) and in research and development (e.g. Azoulay/Henderson, 2001; Cassiman/Veugelers, 2006). In my thesis, I focus on simultaneously making and buying in the **industrial purchasing,** respectively **production context,** omitting make-and-buy in non-manufacturing sectors (i.e., service sector) or distribution, while the latter to my understanding also includes franchising.

1.2. Contribution and Structuring

In my dissertation I contribute to strategic management research in a number of ways:

(1) First, I provide an overview and **state-of-the-art** on the determinants of make-and-buy, since to my knowledge this is still missing in the respective literature on make-and-buy.

Current works on make-and-buy sporadically refer to prior studies when presenting their determinants; but a **structured outline and analysis** of the determinants, however, does not yet exist. Since only one conceptual study exists regarding the management of make-and-buy, a state-of-the-art cannot be given here.

(2) Despite the fact that it is controversial if TCE is a useful approach to explain make-and-buy, TCE is the most commonly used approach in the make-and-buy literature.[3] Here, I contribute to this research field by **explaining make-and-buy differently than by using orthodox TCE**. After a detailed disquisition of the explanatory potential as to the determinants and the management of make-and-buy,[4] I **extend and adjust the TCE framework** in order to enhance, respectively enable explanatory power of the TCE framework for make-and-buy.[5] Aside from the fact that the development of an extended TCE framework is helpful and necessary for the explanation of make-and-buy, this theory development may help to abolish the "blind spot" of make-and-buy in the TCE framework which hitherto treats this governance form as an anomaly. In doing so, I contribute to theory development of TCE.

(3) Furthermore, I **disentangle the dependent variable make-and-buy** by differentiating the distinct forms of appearance of make-and-buy to demonstrate the diversity of this phenomenon which has been neglected in extant research (e.g. Parmigiani, 2003/2007; Heide, 2003; He/Nickerson, 2006; Gulati/Puranam, 2006). Frequently, make-and-buy studies don't entail an explicit definition of the underlying understanding of make-and-buy, but mostly in these studies make-and-buy is implicitly defined as referring to identical assets. In contrast to that, I argue that based on different conditions (= determinates) different forms of make-and-buy can result from these conditions, incorporating different management (requirements) as well as performance implications. Concretely, I distinguish **two different forms of make-and-buy**, namely making and buying **the same assets** and making and buying **the same type of assets**. Against the background of the partially inconsistent and unsystematic empirical results according to the determinants of make-and-buy,[6] the differentiation in distinct governance modes of make-and-buy enables a reconciliation of the otherwise contradictory results and therefore seems necessary.

---

3   See chapter 2.3.1.

4   See chapter 3.

5   See chapter 4.

6   See chapters 2.3.2 and 2.3.3 for more details.

(4) Since – as already mentioned – only one conceptual study exists regarding the **management of make-and-buy**, this is fruitful but widely ignored path for research. Here, I explore how the two distinct make-and-buy modes are or shall be managed inside and by the firm. In contrast to prior work on (TCE) management mechanisms, I do not only focus on control and monitoring mechanisms as management mechanisms, but **incorporate all TCE governance mechanisms**, i.e., also incentive empowering and adaptation mechanisms (Williamson, 1985; Ebers/Gotsch, 2006).

(5) At least, I do not leave out the **performance implications** of the different make-and-buy modes. Thereby, I do not confine myself to governance choice as dependent performance variable, but consider transaction costs as well as production costs.

(6) Importantly, by means of exploring make-and-buy as governance mode I also aim at providing a **conceptualization and operationalization of the <u>entire</u> TCE framework** for empirical testing of TCE which to my knowledge does not yet exist in the literature in this way. This means that – in contrast to common "reduced form analysis" (Williamson, 1991a: 282) of empirical testing in TCE – I want to conceptualize all TCE core tenets which entail not only the effect of some determinants (mostly only asset specificity) on governance form (concerns also point (5) above), but also and in particular the **interplay of the governance mechanisms with the different governance forms** and of course the effect of an alignment of these variables on performance. Thereby, I provide empirical **measures** of some of the hitherto only or mainly theoretically elaborated **TCE variables**, e.g. adaptability and incentive mechanisms, transaction and bureaucracy costs.

2. The Logic of Economic Organization

2.1. Categorizations of Economic Organization from Coase to date

In his pivotal article from 1937, Coase questions the reason why organizations exist at all, since resources are ostensibly allocated most efficiently by the price mechanism of the market (Coase, 1937: 388). He argues that markets and hierarchies were equivalent institutional arrangements to carrying out a transaction, if they would not entail different costs (Coase, 1937: 388-392). Therefore "[T]he main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism" (Coase, 1937: 390). With this argumentation, Coase contributes to economic theory in a great manner: The distinction between market and hierarchy can be understood as two categories of possible ways of organizing economic transactions, whose favorability is determined by the costs they cause. "[A]s categories come to be defined in terms of different situations in which practitioners might find themselves" (Christensen et al., 2001: 11), the costs which arise when using the price mechanism (market), respectively authority (hierarchy) represent such different situations and are as a result the circumstances to distinguish between the two categories market and hierarchy.

Market   Hierarchy
  ●   ○

Fig. 1:   Dichotomous categorization of economic institutions

Although this insight is fundamental for economic theory, an either-or-perspective is inherent in the dichotomous view of market vs. hierarchy, which therefore includes limitations: Due to the fact that market and hierarchy are conceptualized as mutually exclusive institutions placed at the ends of an imaginary continuum, existing hybrid phenomena[7] cannot be explained sufficiently. Assorted forms of organization will always appear as anomalies that cannot be accounted by any theory, which builds upon the presumption that the ideal types are not combinable (Bradach/Eccles, 1989: 100 et seq., Parmigiani, 2003: 18).

---

7   Coase's categorization of markets and hierarchies has set the course for a numerousness of research based on the recognition that a multitude of organizational forms coexists with markets and hierarchies. In particular, stable long-term relationships like strategic alliances, joint ventures, quasifirms, dynamic networks, and relational contracting have been addressed, to mention only a few subject areas (Bradach/Eccles 1989: 97 et seq.).

An advancement of the dichotomous view is provided by Williamson (Williamson, 1985). Adapted from Coase's categorization of market and hierarchy, Williamson developed the transaction cost economics (TCE)[8]. He refines but also modifies Coase's argumentation by integrating assumptions about human actors (especially opportunism) and by putting the abstract costs of using the price mechanism in more concrete and, to some extent, different terms. In TCE's logic three transaction cost determinants affect the efficiency of the underlying organizational structure. Depending on the parameter value of asset specificity, uncertainty, and frequency of a given transaction either market, hierarchy or hybrids prove as the most efficient institutional alternative. While high levels of the transaction cost variables lead to vertical integration (hierarchy) and low levels of the variables cause outsourcing (market), an intermediate specific, but frequently repeated transaction will be organized in a cooperation (hybrid form).[9] At this point, Williamson goes a step further than Coase and extends the dichotomous view of either market or hierarchy to a tripartite either-or categorization. Thereby Williamson (1985) significantly furthers the understanding of economic organization and the categorization provided by Coase (1937) by figuring out that the cost of using an economic institution (he named these costs transaction costs) are a direct result mainly of the asset specificity of the focal transaction. Hence, different levels of asset specificity represent the circumstances behind the costs of using the price mechanism. Therefore this categorization of market, hierarchy, and hybrids are results of different circumstances of asset specificity and Williamson's contribution consists of discovering the circumstance that differentiates between these categories of economic institutions.

Market ┊ Hybrids ┊ Hierarchy
low ●———Asset Specificity———○ high

Fig. 2:   Tripartite categorization of economic institutions

But it still remains a perspective where the different organizational arrangements are located at distinct stages of one continuum which runs from high to low asset specificity (or vice versa) and are therefore still considered to be mutually exclusive because asset specificity cannot be both, low and high, at the same time. And exactly this assumption contradicts the nature of make-and-buy, where distinct control mechanisms and different institutional arrangements coexist in performing the same transaction. This fundamentally contrasting

---

8   A detailed delineation of TCE will be given in chapter 3.
9   Williamson terms this case "relational contracting" (Williamson 1985: 85).

understanding of economic institutions not being placed on one continuum but in a more than two-dimensional space is necessary to analyze plural form organizations, which are therefore inapproachable for TCE's logic or any other theory based on the either-or perspective.[10] (Parmigiani, 2003: 18) Thus Bradach/Eccles (1989) criticize that "Williamson's amendment to the transaction-cost framework is a stopgap measure which does little to contain a growing number of empirical anomalies. It is becoming clear that market, hierarchy, and relational contracting are not mutually exclusive control mechanisms." (Bradach/Eccles, 1989: 100 et seq.) So, an either-or categorization seems inadequate to understand and explore make-and-buy. A possible inference may be that the circumstance-based categorization scheme in different levels of specificity is not (yet) the ultimate categorization of economic institutions. Classifying economic institutions according to the level of transaction specificity is undoubtedly an extremely useful approach, but there may exist other categorization or refinements of the one at hand that can help to further advance our understanding of the logic of economic institutions and at the same time also incorporate make-and-buy in its explanatory framework.

Before further questioning this point, a definition of make-and-buy and a clear delimitation of make-and-buy and hybrid forms are required in order to achieve a deeper understanding of the nature of plural form organizations (Christensen et al., 2001). This is what the next chapter will provide.

2.2. Definition and Delimitation of make-and-buy

Make-and-buy is an organizational phenomenon which has been strongly neglected in management research (e.g. Dutta et al., 1995: 191; Heide, 2003: 18)[11] and as a consequence is not defined clearly and consistently. What is even more interesting, though, is that only few authors even offer definitions regarding make-and-buy. Although or perhaps due to the fact that research concerning plural form organizations is not very advanced, many different terms are used to describe the same phenomenon which hampers communication between researchers and the development of a congruent research stream. The oldest term in use is "taper(ed) integration", which was introduced by Porter (1980) and Harrigan (1983a). Further synonyms are "plural governance" as well as "concurrent sourcing" as a terminology introduced and exclusively applied by Parmigiani (2003) and finally "plural form(s)/mode(s) (of) organiza-

---

10 A more detailed argumentation of TCE's insufficiency in explaining make-and-buy will be worked out in chapter 3.

11 See also the state-of-the-art on make-and-buy in chapter 2.3.

tion/management". In this work, I will utilize the term "make-and-buy" because it expresses most lucidly the nature of make-and-buy as a sourcing mode, which in contrast to make-or-buy combines the distinct institutional control mechanisms of market (buy) and hierarchy (make), namely price and authority. Hence, by using the term make-and-buy I want to express the nature of make-and-buy as distinct governance form with its distinct determinants as well as different characteristics in comparison to make, buy, or hybrids.[12] Whereas terminologies like "tapered integration" or "taper integration" emphasize the integration aspect, terms like "plural governance" and "plural form(s)/mode(s) (of) organization/ management" express as rather general terms, the pluralism of distinct governance forms (not necessarily restricted to two modes, i.e., make and buy),[13] "concurrent sourcing" tend to confine itself to the purchasing (trans)action itself without articulating the strategic aspect of managing the (trans)action.[14]

The following constitutive criteria result from a review of the relevant literature (esp. Bradach/Eccles, 1989: 97; Parmigiani, 2003: 18 et seq.; Heriot/Kulkarni, 2001: 24; Gulati/Puranam, 2006: 4) and represent the understanding of make-and-buy on which this work is based. Accordingly, a make-and-buy occurs when

- the same assets[15]

- are deliberately

- produced in-house **and** concurrently purchased from outside the firm.

Superficially, make-and-buy may seem to be similar or even equal to hybrid forms. But reconsidered more closely, these two organizational arrangements differ at some very critical points. As mentioned before, in TCE's argumentation hybrid forms prove to be the most efficient bilateral control mechanism when a moderate specific, but frequently repeated

---

12 Nevertheless, terms like "plural mode/form", "tapered integration", and "concurrent sourcing" will be occasionally used as idiomatic alternatives.

13 I understand make-and-buy to be a mutual governance form (see chapter 4) which is a sub-form of plural governance forms.

14 Terminologies for make-and-buy like "dual/hybrid/multiple channels" (Mols, 2000) or "dual distribution" (Dutta et al., 1995) will not be considered further, since they refer to the selling rather than the purchasing context.

15 Existing literature for the most part does either not further specify how identical or similar the focal assets have to be in order to be considered as make-and-buy or choose a narrow definition of concurrent sourcing of only identical assets to be make-and-buy as, for instance, Parmigiani (2003/2007) did. In contrast to that I explicitly take up this dissonance and distinguish two different cases of make-and-buy, namely making and buying the same assets vs. making and buying the same type of assets, since I argue that both are mutual governance forms but differ regarding their causes and effects. See also chapter 3.2.

transaction is carried out by partners who are both profiting from the continuance of their relationship (Williamson, 1985). In contrast to make-and-buy, hybrids can be characterized by two constitutive conditions:

- Legal autonomy on the one hand and

- Mutual interdependence of the involved parties on the other hand (Williamson, 1985: 81-89; Mellewigt, 2003: 9).[16]

The two definitions clarify that hybrids are common transactions of two or more firms, which are indicated by a mixture/conjunction of the two "extreme" institutional arrangements, market and hierarchy, while make-and-buy represents a transaction where inside one single firm these two institutional forms with their distinct control mechanisms, price and authority, are not mixed, but coexist side by side to perform the same transaction (Heide, 2003). Regarding the first criterion, legal autonomy occurs only in the buy function of make-and-buy, since the internal supplier (make function) is not legally autonomous from the buyer.[17] Accordingly, regarding the second criterion, mutual interdependence may only occur in the buy function, since in the make function of the internal supplier there is a rather one-directed dependency of the supplier on the buyer. This does not mean that supplier and buyer do not work cooperatively together, but that this is no collaboration among peers.

Thereby it is important to note that it is not excluded that hybrid governance modes as the buy function coexist with hierarchical organization and thereby build a make-and-buy governance form.

Gulati/Puranam (2006) argue very similarly: "Hybrids are "mixed modes" of procurement in the sense that they display governance characteristics that appear to combine price and authority (Bradach/Eccles, 1989; Hennart, 1993). However, plural sourcing refers to a different phenomenon- a mixing of modes in the sense that firms may simultaneously rely on pure hierarchy (internal procurement) as well as price (market contracts) for the same input. Thus, whereas hybrids refer to procurement of the entire volume from a single mode that exhibits mixed governance characteristics, plural sourcing refers to the splitting up of total volume being procured across multiple modes, each of which may be a pure governance mode." (Gulati/Puranam, 2006: 5).

---

16 Thereby, it is important to distinguish between constitutive and differential criteria such as duration or divided control (Mellewigt, 2003: 9).

17 Make-and-buy is, as the term already suggests itself, a phenomenon which is regarded from the perspective of the buyer.

Furthermore, as theory development in chapter 4 will show, hybrids occur when asset specificity is at a mediocre level and uncertainty is rather low (see also Williamson, 1985; Masters et al., 2004), while make-and-buy occurs at all levels of specificity and high levels of uncertainty.

A further conceptual delimitation is necessary regarding franchising. Franchising is one of the most frequently used examples or cases for plural modes (e.g. Parmigiani, 2003). As indicated already, here make-and-buy shall be examined as general organizational phenomenon, while franchising is just regarded as special case and even more importantly, franchising is a distribution phenomenon while I regard make-and-buy only in (industrial) purchasing contexts.[18] This is important, because general knowledge about this organization form is relatively sparse, especially in comparison with the plenitude of franchising literature.

Therefore, the next section provides a detailed delineation of the state-of-the-art on make-and-buy containing an analysis of used theoretical approaches, methods, and empirical findings.

2.3. Prior Research on make-and-buy

Whereas there exists a multitude of literature concerning the make-or-buy perspective, research relating to the make-and-buy perspective is rare. In order to identify all relevant literature concerning make-and-buy, I performed a wide-range database search including mainly the ABI/Inform global and the Ebsco database. Furthermore, I also included the EconLit database as well as the Web of Science and the relevant German databases like Hebis, KVK, and WISOnet. I searched the databases using not only the terms "make and buy", respectively "make-and-buy", but also "plural governance", "plural sourcing", "bisourcing", "concurrent sourcing", "plural form(s)/mode(s) (of) organization/management", and "tapered integration", "taper integration" or "partial (vertical) integration", respectively "partial outsourcing," since I found these terms were used synonymously in the literature. Due to the small number of articles, I did neither confine myself to articles published in the top journals nor did I restrict the search period but considered all hitherto published articles I could find. Additionally, I comprised four unpublished working papers, one dissertation, and two book chapters on make-and-buy. Since my research focus is the (industrial) purchasing context, I excluded all contributions which did not match this empirical focus, namely all franchising literature and all other studies regarding distribution channels or the like. Espe-

---

18   See introduction in chapter 1.1.

cially in the north-American literature, franchising is considered to be the prime example of make-and-buy, since company-owned and franchised outlets coexist in a franchise system to perform the same transaction (Parmigiani, 2003). Regardless of that, incorporating the franchising literature in my analysis of make-and-buy is not reasonable for two further reasons: First, the distinct franchising literature focuses mainly on the question of the reasonable extent of the use of franchising instead of taking into account the general phenomenon of a plural or dual organizational form (Combs/Ketchen, 2003; exceptions are Yin/Zajac, 2004; and Lafontaine/Shaw, 2001). Second, the North-American, respectively Anglophone understanding of franchising and franchise systems differs from the German understanding of franchising in that the company-owned units are not a part of the franchise system in Germany. In contrast, the American definition of franchise system includes both company-owned and franchised units as parts of the franchise system. Hence, in the German understanding franchise systems incorporate only the buy-function omitting the make-function of make-and-buy (DFV, 2007; Norton, 1988). Notwithstanding these different definitions of franchising, franchising has its seeds in the distribution context where the franchisor "buys" the distribution of trademarks and proven methods of doing business from the franchisee who in return pays the franchisor annual licensing fees and usually a percentage of gross profits. As a consequence, in the following I will concentrate on general make-and-buy, not franchising focused literature.

Table 1 summarizes all studies on make-and-buy with their main questions respectively objectives, the theoretical focus, the used data and method, and condensed proposals or findings. Furthermore, the quality of journal publications is given based on the journal's social sciences citation impact factor (CIF) of 2006[19] in the table for those contributions which were published, otherwise the type of the contribution is specified (i.e., unpublished working paper, dissertation, book chapter etc.).

---

19 See ISI Web of Knowledge, URL: http://portal.isiknowledge.com/.

Nr.	Study (CIF)	Main question/ objective	Theoretical focus	Data/method	Proposals/findings
1	Al-Obaidan/ Scully (1993) (C: 0.522)	Measurement of the efficiency (costs and benefits) of backward integration.	Transaction cost economics, industrial organization, and agency theory	Amongst others an analysis of variance and the Aigner-Chu approach were applied studying 55 petroleum refining firms (30 US-American, rest international) involved in the business of processing crude oil	Semi-integrated firms have higher capital and labour productivity than the highly integrated firms.
					Technical efficiency is lower in highly integrated firms than semi-integrated firms.
					Scale efficiency is little higher in highly integrated firms than in semi-integrated ones.
					Highly integrated firms have lower business risk than semi-integrated firms.
2	Azoulay/ Henderson (2001) (unpubl. Paper)	Exploration of the scope of network theories by examining the structure of buyer-supplier relationships.	Network theories	Mix of qualitative and quantitative methods is used to analyze a sample of 1500 outsourcing contracts in drug development.	Only few firms use the extreme form of market vs. hierarchy, while most firms use tapered integration.
					In the period of 1995-1999 the mean outsourcing propensity is 29 %, the median is 23 %.
3	Bradach/ Eccles (1989) (A: 3.275)	Investigation of how the three control mechanisms that govern economic transactions, namely price, authority and trust, are combined in both the ideal types of organization (market and hierarchy) and plural forms of organization.	Transaction cost economics	Verbal argumentation	In the case of making and buying parts, authority and price are juxtaposed.
					With franchise units and company-owned, a hybrid price-authority mechanism is coupled with an authority mechanism.
					The plural form may be the remedy for the difficulties of using solely market vs. solely hierarchy mechanisms.
4	Cassiman/ Veugelers (2006) (B: 1.687)	Complementarity of internal R&D and external knowledge acquisition in innovation Strategies	'--- Theoretical concepts of absorptive capacity	Multinomial logit and bivariate probit model with Belgian company data from the Eurostat Community Innovation Survey CIS incl. 269 observations	Make-and-buy is a very frequent strategy in R&D. 66 % of observed firms perform make-and-buy.
					The authors confirm complementarity between make and buy activities in innovation supporting the absorptive capacity logic.
					Innovation protection is more effective with make-and-buy strategies.

Nr.	Study (CIF)	Main question/ objective	Theoretical focus	Data/method	Proposals/findings
5	Du/Lu/Tao (2006) (not ranked)	Why do firms conduct bi-sourcing?	Property rights theory	Mathematical analysis	The study shows that in conducting bi-sourcing firms can take advantage of the cross threat effect in trilateral negotiation to mitigate the inherent problems of both insourcing and outsourcing. On the one hand, the firm can use the internal component supplier as a default option to minimize the potential efficiency losses from the holdup problem of the external supplier.
					On the other hand, the external supplier as an alternative source of component provision can force the internal supplier to make relationship-specific investments and improve productivity, which mitigates the lack of incentive problem on the part of the internal supplier.
					Given that bi-sourcing contains the fixed costs of both insourcing and outsourcing, the model predicts that only the most productive firms will be able to adopt bi-sourcing strategy
					Trust is not a necessary variable to explain plural forms.
6	Gulati/Puranam (2006) (unpubl. Paper)	Why firms both make and buy the same thing?	--- Theoretical concepts of: Competition Collaboration Scale Diseconomies Lock-ins	Verbal and formal (mathematical) argumentation	The extent of plural sourcing increases when - incentive and knowledge complementarities are high - constraints imposed by limits to scale and barriers to exit are high The extent of plural sourcing decreases when - transactional hazards are high
7	Harrigan (1983a) (not ranked)	Designing a framework of vertical integration.	---	Verbal argumentation	Advantage of full utilization of firm capacity leaving outsiders to absorb the uncertainties of irregular demand
					Risk of paying price premiums for outside supply or have low priority customer status
					Taper integration works best when - firms can add substantial value to the materials they produce or distribute - raw materials are abundant or subcontractors are readily available - economies of scope of both buyer and supplier are high - underutilized capacity does not incur diseconomies
8	Harrigan (1984) (A: 4.515)	Formulating vertical integration strategies.	---	Verbal argumentation	Taper integration is appropriate when - physical interconnectedness is unnecessary - diseconomies of scale are insubstantial - if the firm seeks technological, quality, or market share leadership in volatile competitive settings - new products needing explanation or infrastructure no outsiders provide

Nr.	Study (CIF)	Main question/ objective	Theoretical focus	Data/method	Proposals/findings
9	Heide (2003) (A: 4.831)	Study of the conditions that motivate firms to deploy plural governance and the manner in which one governance form influences the other when the two coexist in a joint structure.	Agency theory, information economics and signaling theory	175 manufacturer-supplier relationships were analyzed using correlation matrices, logistic regression models, and OLS regression models.	Results suggest that the plural governance originates when information asymmetry problems are to be solved.
					Concerning the influence patterns in plural system it could be shown that the presence of a hierarchical arrangement significantly increased the degree of centralization and formalization in the focal supplier relationship.
10	He/Nickerson (2006) (not ranked)	Why do firms make and buy?	'--- Theoretical concepts of: Efficiency Appro-priability Competition	Probit analysis of 472 observed hauls of a small-sized trucking company	The fact that some carriers invest in correlated but different networks creates the opportunity for efficiency gains by outsourcing those hauls for which other carriers have an informational advantage in generating backhauls.
					Demand-side appropriability concerns create an incentive for the originating carrier to internalize hauls originating from shippers within their information hubs.
					Competition provides an incentive, albeit a weaker one than for appropriability to retain hauls with information hubs as destinations.
11	Heriot/Kulkarni (2001) (not ranked)	To which extent do manufacturing firms use various inter-mediate sourcing strategies?	Transaction cost economics	Exploratory study examines a sample of 209 plant managers by applying a chi-square test.	Firms use intermediate sourcing strategies more frequently than the "polar" strategies.
					The most frequent strategy is taper integration.
					The finding cannot be satisfactorily explained by TCE.
					Firms choose a particular sourcing strategy consciously instead of randomly.
					The sourcing strategy choice is significantly associated with the industry type.
12	Kerschbamer/ Maderener/ Tournas (2002) (C: 0.562)	Studying a firm's continuous choice between full integration, non-integration, and tapered integration, when (i) an idiosyncratic capacity investment is required to produce the essential output and (ii) under non-integration outside opportunities are better.	Combination of transaction cost theory and Grossman/Hart (1986)'s incomplete contracting perspective of vertical integration	Mathematical analysis	The firm's boundary choice depends crucially on its commitment power.
					If the firm can precommit to a particular provision mode, tapered integration will be chosen more frequently.
					Also, with commitment power, the firm will never subcontract only a small part of its input needs.
					In-house capacity is smaller and outside capacity is larger if the firm can precommit.
					Total capacity is never larger in the commitment than in the non-commitment case.

Nr.	Study (CIF)	Main question/ objective	Theoretical focus	Data/method	Proposals/findings
13	Lee/Lim (2001) (unpubl. Paper)	Examination of a firm's outsourcing decision over time.	Game theory and transaction cost economics	Mathematical analysis	Specific learning and the salvageability of specific learning by suppliers as reasons to adopt a make-buy strategy, even when outsourcing is less costly initially.
					In cases of high and moderate specific learning the firms adopt a make-and-buy strategy.
					In cases of low specific learning completely outsourcing is optimal.
					The results suggest that multiple channels arise because of the need to increase channel volumes and not because channel volumes are already large.
					The most important explanatory variable is environmental volatility which is negatively related to the use of multiple channels.
14	Parmigiani (2003) (Dissertation)	When and why do firms both make and buy?	Transaction cost economics and resource-based view	Multinominal logit model analyzing sample of 805 sourcing decisions of 193 U.S. progressive stamping and powder metal firms.	Make-and-buy is more likely when - technological uncertainty is high - economies of scale are low - economies of scope of both buyer and supplier are high - the difference between the supplier's and the firm's expertise is small
15	Parmigiani (2007) (A: 2.632)	When and why do firms both make and buy?	Transaction cost economics, capabilities view and neoclassical economics	Multinominal logit model analyzing sample of 805 sourcing decisions of 193 U.S. progressive stamping and powder metal firms.	Make-and-buy is more likely when - technological uncertainty is high - economies of scope of both buyer and supplier are high - expertise of both the buyer and supplier is high
16	Porter (1980) (Book chapter)	Techniques for analyzing industries and competitors	---	Verbal argumentation	Tapered integration is useful when - volume uncertainty is high - bargaining power shall be strengthened
17	Veugelers/ Cassiman (1999) (B: 1.328)	Examination of innovation strategy of manufacturing firms and the relation between the innovation strategy and industry-, firm- and innovation-specific characteristics	Resource-based view	Multinomial logit (logistic regression) model with Belgian company data from the Eurostat Community Innovation Survey CIS	Firm size is a strong significant factor in sourcing decisions: the reference for combining sourcing strategies over exclusive make or buy strategies is found to increase non-linearly with firm size.
					The results seem to support the absorption capacity view of in-house research. Firms for which internal information sources are very important for the innovation process are more likely to combine the make and buy option instead of solely developing innovations in-house. The actual decision to acquire technology, either exclusively or in combination with internal development, is further determined by the effectiveness of different mechanisms of protection of technology.

Tab. 1: Previous research on make-and-buy

As can be seen, I identified only 17 contributions regarding the make-and-buy phenomenon altogether, comprising 9 empirical studies, 5 conceptual works, and 4 studies based on mathematical models.

The first work, which explicitly considered make-and-buy as an alternative to vertical integration and the make-or-buy perspective, was published in 1980 in a textbook by Porter. He formed the term "taper(ed) integration" and explained it primarily by means of optimal capacity utilization. In Porter's (1980) understanding, firms perform a make-and-buy strategy when their minimum production capacity is exceeded by demand and is therefore to be satisfied by market contracting. This would particularly occur in the form of producing the main portion internally and buying only the residuum. But the compensation of capacity utilization is not the exiting case: Rather the question why firms persist in producing a part of their product internally while purchasing the bulk from the market is interesting and yet unanswered. For instance, Parmigiani (2003) studied make-and-buy in the metal fabrication industry and nearly 39 % of the about 800 firms in her data set performed make-and-buy, whereas about 42 % of the firms that applied both sourcing modes produced the minor portion internally while buying the bigger part of their production at the market.

Since then, only few contributions were made to explore make-and-buy and therefore relevant contributions remain sporadic. However, it seems that the phenomenon is starting to attract a growing scientific interest in recent times as the following figure illustrates by showing the frequency distribution of make-and-buy studies over time.
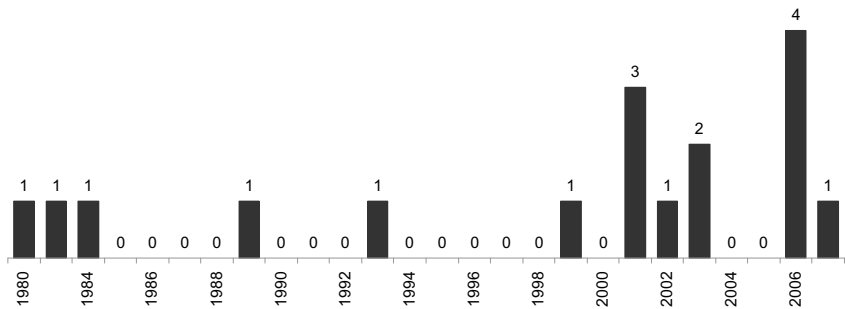
Fig. 3:   Number of make-and-buy studies per year

Concerning different research questions, the following central questions can be identified when reviewing the existing make-and-by literature:

- **Why** or **when** do firms both make and buy? (Parmigiani, 2003/2007; Heide, 2003; Gulati/Puranam, 2006; He/Nickerson, 2006; Du et al., 2006; Veugelers/Cassiman 1999)

- What **determines** the **extent** to which firms whether make or buy? (Heriot/Kulkarni 2001)

- How do the different **structures influence each other**? (Heide 2003)

- What are the **performance implications** of a plural form organization? (Al-Obaidan/Scully 1993)

- How do such organizational forms **evolve dynamically** over time? (Lee/Lim 2001).[20]

As already mentioned in chapter 1, I want to "focus on real important topics, not niche topics" and hence in my thesis I concentrate on the determinants, the management, and performance of make-and-buy.

In the following, the studies are differentiated with regard to theoretical approaches and empirical findings. Subsequently the research deficits are derived.

2.3.1.   *Theoretical Approaches*

As it can already be recognized in table 1, the spectrum of applied theoretical underpinnings to explain make-and-buy is multifaceted. Transaction cost economics is the most frequent theory to be used for explaining the phenomenon (Al-Obaidan/Scully, 1993; Bradach/Eccles, 1989; Heriot/Kulkarni, 2001; Kerschbamer/Maderner/Tournas, 2002; Lee/Lim, 2001; Parmigiani, 2003; Parmigiani, 2007), but also agency theory (Al-Obaidan/Scully, 1993; Heide, 2003), property rights theory (Du/Lu/Tao, 2006), the resource-based view (RBV) (Parmigiani, 2003; Parmigiani, 2007; Veugelers/Cassiman, 1999), information economics (Heide, 2003), network theories (Azoulay/Henderson, 2001), game theory (Lee/Lim, 2001), industrial organization (Al-Obaidan/Scully, 1993), neoclassical economics (Parmigiani, 2007) and signaling theory (Heide, 2003) serve as a basis for research on make-and-buy. Furthermore, some studies do refer to specific theoretical concepts without using a theoretical framework as a whole (Cassiman/Veugelers, 2006; Gulati/Puranam, 2006; He/Nickerson, 2006) while some contributions entail conceptual verbal argumentation without explicit reference to theoretical

---

20   The question "How do or shall firms manage a plural form organization?" has been elaborated by Bradach (1997). But since Bradach's contribution is focused on franchising, it does not apply to my research context of (industrial) purchasing.

concepts (Harrigan, 1983a/1984; Porter, 1980). Note that this classification does not imply any valuation, since especially the works of Harrigan and Porter have importantly influenced and furthered the field. The figure below shows the extant theoretical underpinnings of the make-and-buy literature.
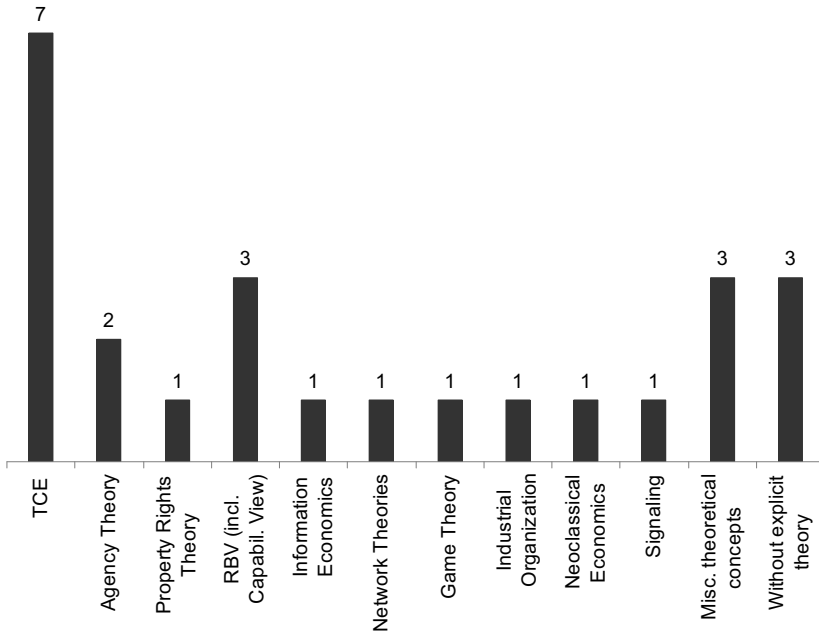
Fig. 4:   Theories used to explain make-and-buy in the extant literature

Despite the explicit predominance of TCE, the diversity of theoretical approaches suggests at first glance that there is no consistent theory of make-and-buy and that no approach can explain the phenomenon completely by itself, why in most studies several approaches are combined. But after careful consideration, a more serious theoretical deficit becomes evident: There even doesn't exist any agreement about whether TCE is appropriate to explain plural modes at all and while some researchers approve the transaction cost logic (e.g. Lee/Lim, 2001) others reject it (Parmigiani, 2003; Bradach/Eccles, 1989). Even worse: Some research-ers keep on using TCE even though they doubt its suitability themselves. For example, although Parmigiani recognizes that TCE "cannot explain why firms would choose to use

both sourcing modes" (2003: 18), she nevertheless derives almost all her hypotheses from transaction cost logic.[21]

As groundwork for the following analysis, all make-and-buy studies are briefly described in the order of the theories applied: Al-Obaidan/Scully (1993) actually want to explore backward integration in the international petroleum refining industry by using TCE among industrial organization explanations and agency theory and find in their empirical analysis semi-integrated firms to be more efficient than highly integrated firms in terms of cost considerations. Since make-and-buy is not the core object of analysis, it remains unclear how the authors define semi-integration and, hence, this study is not directly relevant for our analysis. The work by Bradach/Eccles (1989) is a conceptual attempt to come to terms with make-and-buy as an independent organizational form that distinguishes itself from the ideal types market and hierarchy by a distinct combination of the three control mechanisms that govern economic transactions, namely price, authority, and trust. The authors severely criticize TCE in its ability to explain make-and-buy, because TCE views market and hierarchy as mutually exclusive, while they, in contrast, believe the control mechanism to be combinable in variety of ways which gives rise to "a type of organization largely ignored in the literature: the plural form. […] To understand this form, the analytic focus must move from individual transactions to the broader architecture of control mechanisms." (Bradach/Eccles, 1989: 97).

Heriot/Kulkarni (2001) conduct an exploratory study in which they want to find out to what extent manufacturing firms use various intermediate sourcing strategies. They can show that firms use intermediate sourcing strategies more frequently than the "polar" strategies and the most frequent strategy is taper integration while conceding that their findings cannot be satisfactorily explained by TCE. However, the authors do not provide any explicit explanation concerning potential determinants of make-and-buy, but offer descriptive results concerning the frequency distribution of the use of different sourcing strategies.

By combining TCE and Grossman/Hart's (1986) as well as Hart/Moore's (1990) incomplete contracting perspective of vertical integration Kerschbamer/Maderner/Tournas (2002) analyze a firm's continuous choice between full integration, different degrees of tapered integration, and non-integration under the condition of idiosyncratic investments to be required to produce the essential output. The authors accomplish a mathematical test of their propositions and find mainly "that the firm's boundary choice depends crucially on its commitment power and that tapered integration will be chosen more frequently, if the firm can precommit to a particular

---

21   A tabular overview over all hypotheses can be found on page 89 of her dissertation.

provision mode. Also, with commitment power, the firm will never subcontract only a small part of its asset needs. In-house capacity is smaller and outside capacity is larger if the firm can precommit [and] total capacity is never larger in the commitment than in the non-commitment case." (Kerschbamer/Maderner/Tournas, 2002: 1137) Due to the fact that Kerschbamer et al. work with mathematical and formal systems of equation, their study is only limitedly amenable to my analysis.

Lee/Lim (2001) examine a firm's outsourcing decision over time applying game theory besides TCE. Similar to Kerschbamer et al., Lee/Lim, too, test their hypotheses by mathematical analysis and find that "specific learning and the salvageability of specific learning by suppliers as reasons to adopt a make-and-buy strategy, even when outsourcing is less costly initially." (Lee/Lim, 2001: 1). The authors suggest that in cases of highly and moderately specific learning firms adopt a make-and-buy strategy, while in cases of lowly specific learning completely outsourcing is the optimal strategy, because the higher the specificity of learning in a buyer-supplier relationship, the lower the risk of opportunism on the part of the supplier who normally has a knowledge advantage over the buyer concerning the production process. Accordingly, a make-and-buy strategy enables the buyer to gain know-how regarding the production process and as a result strengthen his bargaining position and mitigate the risk of opportunism in cases of moderate and high learning specificity. Because Lee/Lim conceptualize learning specificity as specific human capital, this type of asset specificity remains an orthodox TCE variable which is bound to the theoretical framework regardless of what kind respectively occurrence of specificity is considered. Whether specificity provides fruitful explanations for make-and-buy will be a germane subject of the subsequent discussion.

Parmigiani (2003) asks in her dissertation "when and why do firms both make and buy?" (Parmigiani, 2003: 16) and provides the most comprehensive and important work in this field. She applies resource-based and TCE explanations and her main results regarding TCE are that asset specificity has no effect on make-and-buy but leads to pure make, which is consistent with TCE logic. Moreover, her results concerning uncertainty are mixed: While she cannot support her propositions regarding a negative effect of volume uncertainty on make-and-buy, her hypothesis that high technological uncertainty leads to concurrent sourcing can be supported empirically. Her results are discussed in detail in the following disquisition.

Compared to her dissertation, Parmigiani (2007) argues differently in several regards. Different than in her initial work, she uses the firm capabilities view and neoclassical economics besides TCE to explain make-and-buy. Thereby, she argues from the viewpoint of TCE that

make-and-buy is likely when the level of asset specificity is mediocre and fails to show that high levels of specificity lead to higher degrees of internalization, in order to protect the firm from supplier opportunism. Moreover, she cannot support her hypotheses that high volume uncertainty and performance ambiguity favor make-and-buy. Instead, she can show that performance ambiguity leads to higher internalization which eases incentive alignment by using authority. The logic that performance uncertainty leads to make-and-buy where the make function serves to better specify the input and the buy function benchmarks internal and external supply is hence rejected in her study. However, she can support her hypotheses that make-and-buy is more likely when technological uncertainty, economies of scope of both buyer and supplier, and expertise of both the buyer and supplier are high.

Heide's (2003) article provides an investigation of the conditions that motivate firms to deploy plural governance and the manner in which one governance form influences the other when the two coexist in a joint structure. He employed agency theory, information economics, and signaling theory in order to arrive at the result that the plural governance form originates when information asymmetry problems are to be solved. According to Heide's expectation, he could show that firms solve information asymmetry problems not by establishing multiple market relationships but by shifting from exclusive reliance on market transactions to a plural form which augments market contracting. Heide based his framework on the assumption that plural modes are inimitable in their ability to eliminate adverse selection and moral hazard problems through "[…] enabl[ing] firms to exploit some of the inherent benefits of market contracting […] without a loss of control." (Heide 2003: 26).

Using property rights theory, Du et al. (2006) find that firms can take advantage of the cross threat effect in trilateral negotiation to mitigate the inherent problems of both insourcing and outsourcing by conducting insourcing and outsourcing simultaneously. On the one hand, the firm can use the internal supplier to minimize the potential efficiency losses from the holdup problem of the external supplier. On the other hand, the external supplier as an alternative procurement source can force the internal supplier to make relationship-specific investments and improve productivity, which mitigates the lack of incentive problem on the part of the internal supplier.

Veugelers/Cassiman (1999) examine innovation strategy of manufacturing firms and the relation between the innovation strategy and industry-, firm- and innovation-specific characte-ristics. Founded on the resource based view, they can show that most firms use a combination of both making and buying technology strategies, although small firms are less likely to

combine these technology sourcing strategies, as compared to the larger firms. The results seem to support the absorption capacity hypothesis. Companies relying on internal information sources in the innovation process are more likely to combine the make and buy option instead of solely developing innovations in-house. The external technology acquisition, either exclusively or in combination with internal development, is further determined by the effectiveness of different protection mechanisms. Especially strong appropriation favors a make-and-buy strategy over an exclusive external knowledge sourcing strategy.

Azoulay/Henderson (2001) provide rather descriptive results concerning make-and-buy in drug development by showing that clinical development is a setting characterized by tapered integration. They find only few firms using the extreme form of market vs. hierarchy, while most firms use tapered integration with. Instead, Azoulay/Henderson (2001) provide interesting evidence concerning uncertainty and relational governance: The authors find that uncertainty surrounding the quasi-rents to be generated in any given buyer-supplier relationship worked as a strong deterrent against the development of relational outsourcing contracts.

In contrast to the above mentioned studies, Cassiman/Veugelers (2006), Gulati/Puranam (2006) and He/Nickerson (2006) do not employ entire theoretical frameworks, but use various theoretical concepts for their reasoning, such as absorptive capacity (Cassiman/Veugelers, 2006) competition, collaboration, scale diseconomies and lock-in (Gulati/Puranam, 2006) or efficiency, appropriability as well as competition (He/Nickerson, 2006). Cassiman/Veugelers (2006) find that make-and-buy is a very frequent strategy in R&D due to the complementarity between make and buy activities in innovation supporting the absorptive capacity logic. Gulati/Puranam verbally argue that the extent of plural sourcing increases when incentive and knowledge complementarities and/or constraints imposed by limits to scale and barriers to exit are high, while the extent of plural sourcing decreases with increasing transactional hazards. In their empirical analysis in the trucking industry, He/Nickerson (2006) find that the fact that some carriers invest in correlated but different networks creates the opportunity for efficiency gains by outsourcing those hauls for which other carriers have an informational advantage in generating backhauls. Demand-side appropriability concerns create an incentive for the originating carrier to internalize hauls originating from shippers within their information hubs, whereas competition provides an incentive, albeit a weaker one than for appropriability to retain hauls with information hubs as destinations.

As pioneers in the field especially Harrigan (1983a/1984) and Porter (1980) provided valuable conceptualization of firm boundaries in general, which at that time naturally included make-

and-buy (= tapered integration). Their arguments are often treated as traditional reasons for make-and-buy (Parmigiani, 2007) and include mainly volume uncertainty and bargaining power. Volume uncertainty shall be solved by leaving outsiders to absorb the uncertainties or irregular demand while reaping the benefits of full utilization of firm capacity. Hence make-and-buy works best when raw materials are abundant or subcontractors are readily available while physical interconnectedness is unnecessary, and when economies of scope of both buyer and supplier are high, respectively diseconomies of scale are insubstantial. Bargaining power is strengthened by the opportunity to benchmark end better evaluate performance of internal and external suppliers.

The subsequent paragraph will show which variables have been applied in the literature throughout all theoretical approaches as determinants of make-and-buy and which of them have gained empirical support.

2.3.2. Empirical Findings

The following figure shows a synopsis of the different determinants[22] of make-and-buy, which found empirical support in the literature. Thereby, the synopsis of empirical findings is structured along different theories and shows the support of different variables also depending on the attribution of the variable to different theories. But note that the empirical findings presented here are restricted to my research focus of purchasing and do therefore not include franchising or distribution literature:

---

22 Due to the lack of studies concerning the management of make-and-buy in a purchasing context and only descriptive results of make-and-buy performance implications of the only study which deals with the performance of make-and-buy, i.e. Al-Obaidan/Scully (1993), a synopsis of results is only possible for the determinants of make-and-buy.

Theory/ Arguments	Variable	Effect on make-and-buy	Studies
TCE Information Economics Agency Theory	Performance Ambiguity	+	Heide (2003); Parmigiani (2003)
		-	Parmigiani (2007)
	Asset Specificity	?	---
	Product Customization	+	Heide (2003)
	Volume Uncertainty	+	Heide (2003)
	Technological Uncertainty	+	Parmigiani (2003/2007)
Capabilities View/ RBV		+	Parmigiani (2003/2007)
	Relative (Complementary) Expertise	+	Parmigiani (2003/2007); Cassiman/Veugelers (2006)
TCE Neoclassical Economics	(Supplier) Scale Economies	-	Heide (2003); Parmigiani (2003)
	Supplier Scope Economies	-	Heide (2003); Parmigiani (2003)
	Firm + Supplier Scope Economies	+	Parmigiani (2003/2007)
	Firm Scope Economies	+	Heide (2003); Parmigiani (2003)

Tab. 2:   Empirically supported determinants of make-and-buy in the literature to date

Parmigiani (2003) and Heide (2003) could show that firms solve information asymmetry, respectively performance ambiguity problems not by establishing multiple market relation- ships, but by shifting from exclusive reliance on market transactions to a plural form, which augments market contracting. This framework is based on the assumption that plural modes are inimitable in their ability to eliminate adverse selection and moral hazard problems through "[…] enabl[ing] firms to exploit some of the inherent benefits of market contracting […] without a loss of control." (Heide, 2003: 26). In contrast to her dissertation, the data in Parmigiani (2007) seem to support the view that high performance ambiguity leads to higher degrees of internalization than to make-and-buy.

Concerning asset specificity no empirically supported findings exist in the make-and-buy literature. The only evidence on the effect of asset specificity on make-and-buy is provided by Dutta et al. (1995) in the distribution context. The authors argue that in a lock-in situation supplier opportunism would traditionally lead to vertical integration, but they pose a quiet different proposition: Instead of mitigating the risk of opportunism by replacing the market transaction, a firm can or should supplement/augment the market transaction with hierarchy, which would lead to make-and-buy. Hence, the internal function serves as a safeguard against lock-in risks coming from highly specific investments combined with the external supply.

Though they can empirically support their hypothesis, their reported reasons are not persuasive, because they do not explain clearly why a firm should use external supply in the face of high asset specificity. Since the results of Dutta and colleagues may apply for the distribution context, it is not clear if and how their results are generizable for other contexts, e.g. purchasing. Instead, Parmigiani (2003/2007) argues that "in cases of highly specific assets, either internalization or significant relational safeguards will be used to subdue high-powered market incentives in favor of coordinated incentives and adaptation. Since concurrent sourcing involves both coordinative and autonomous incentives, it's unlikely that this sourcing mode will be preferred when specific assets are required." (Parmigiani, 2003: 81) She was not able to support her hypothesis empirically, neither in her dissertation nor in her paper.

Similarly to asset specificity, there are also different assumptions concerning the effect of volume uncertainty on make-and-buy: According to Parmigiani (2003) make-and-buy can be difficult to manage when disputes are likely and she identifies volume uncertainty to be a main driver of disputes. Consequently, she hypothesizes that with increasing volume uncertainty, make-and-buy becomes unlikely. Again, she cannot support her hypothesis. In contrast, Heide (2003) does not explicitly hypothesize that volume uncertainty drives the likelyhood of make-and-buy, but finds it supported in his data. Furthermore, he uncovers a positive effect of volume uncertainty in the presence of buyer-specific investments on the likelihood of make-and-buy, while Parmigiani (2003) assumes that volume uncertainty and specificity would lead to make, an effect she again cannot support.

Furthermore, Heide (2003) could show that product customization increases the likelihood of plural governance, since particular aspects of the buying situation may influence a firm's sourcing approach. For example, purchases involving technically complex products and/or products that have revenue and risk implications may require greater degrees of buyer control.

Concerning technological uncertainty, especially Parmigiani (2003/2007) provides evidence: She argues that in cases of technological uncertainty firms will have both a wider range of knowledge sources and adaptive responses by concurrently sourcing internally and externally, which is also a feasible strategy to deal with technologically uncertain future from the point of view of the supplier. While she argues from a TCE perspective in her dissertation, she uses the capabilities view for a very similar argumentation in her 2007 paper. So, she postulates a positive correlation she can in addition support empirically.

Concerning expertise Parmigiani (2003/2007) hypothesizes that the smaller the difference between the supplier's and the firm's expertise the more likely the firm will concurrently

source. Thereby, the make function serves to leverage competencies, while buying helps to learn from suppliers. She could support this in her studies. Also, Cassiman/Veugelers (2006) find that internal and external innovation developments are highly complementary activities in R&D.

Regarding scale economies, Heide (2003) and Parmigiani (2003) could show a negative effect on make-and-buy, based on the assumption that with an increasing external supplier's cost advantage, the make function of a plural governance strategy becomes less attractive to a buyer.

Evidence concerning to supplier scope economies is somewhat tricky: While Dutta et al. (1995) and Parmigiani (2003) agree on the fact that the disincentive to source internally increases when the supplier can provide greater economies of scope, Parmigiani poses that the greater the scope economies of both the internal and external suppliers, the more likely the sourcing firm will concurrently source the input. Both hypotheses are supported empirically. Hence, the effect of supplier scope economies on make-and-buy ostensibly changes depending on the firm scope economies. She can support this logic in her 2007 paper.

Empirical evidence on the remaining variables is not in all studies as strong or significant as of the aforementioned ones: Consistently to the correlation of supplier scope economies, firm scope economies are expected to have a positive effect on make-and-buy which could only be moderately supported.

The presentation of prior research on make-and-buy reveals a somewhat mixed picture. The main research deficits that follow from the state-of-the-art are elaborated on in the next section.

2.3.3.   Research Deficits

As inference of the analysis of existing research displayed in the previous two sections the following 3 key deficits of existing research on make-and-buy can be derived:

Missing sufficient theoretical underpinning
Although most of the investigated determinants are core TCE variables or at least refer to TCE as do the production cost variables, no agreement about whether TCE respectively asset specificity is appropriate to explain make-and-buy does exist in the literature. While the empirical results are not particularly inconsistent, it remains unclear how the results act together in shaping a theory of make-and-buy. This is especially true, as the main driver of

TCE, i.e., asset specificity has not yet received an empirical test regarding make-and-buy in the purchasing context. Thereby, the dilemma is that TCE would normally be the standard approach to examine governance forms like make-and-buy (Leiblein, 2003), but is in its current composition at least by some researchers doubted in its suitability to explore make-and-buy which occurs as anomaly in the TCE framework. Hence, a theoretical framework is missing which enables structuring and arranging the different "stand-loose" variables and thereby helps to explore and understand the phenomenon of make-and-buy.

Unsatisfactory or missing answers to fundamental questions

Whereas several studies exist exploring the determinants of make-and-buy, contributions elaborating the management as well as the performance implications of make-and-buy are still lacking. As a consequence, answers to fundamental and basic questions concerning make-and-buy like "how do or should firms manage make-and-buy?", and "what are the performance implications of such governance form?" are unsatisfactory. Therefore, this thesis tries to contribute to closing this gap.

Neglect of potential knowledge, flexibility or other explanations

Since the largest part of the variables that are employed in the existing literature to explain make-and-buy are derived from or at least are related to TCE, the neglect of potential non-TCE explanations for make-and-buy, such as knowledge-gaining or flexibility enhancement, is inherent in most extant studies. Although there are some studies which plausibly argue that theoretical constructs, e.g., competition or absorptive capacity are relevant for the explanation of make-and-buy, a consistent integration of those constructs in a coherent theory framework as well as empirical testing of those hitherto predominantly verbal arguments is missing.

The latter 2 deficits can all be traced back to deficit number one, i.e., missing sufficient theoretical underpinning, since with a more appropriate and consistent theoretical basis (1) the fundamental question of a research field could be answered and (2) - depending on which theory builds the basis for a make-and-buy framework - different than core TCE explanatory variables could be used for the exploration of make-and-buy.

As groundwork for the development of a theoretical framework that allows the examination of make-and-buy, TCE has to be scrutinized thoroughly with regard to its potential capabilities and deficits as to the explanation of make-and-buy, because the development or choice of an eligible theoretical framework must be based on the detected deficits and surpluses of existing approaches. Since TCE is not only the absolutely most applied approach in the make-and-buy literature, but also is regarded as standard approach to analyze make vs. buy deci-

sions in the management literature (Leiblein, 2003), I will focus my revision of theories in the next chapter on TCE.

3. Determinants and Management of make-and-buy: Potential TCE Explanations

Over the last two decades, the standard approach to analyze the choice of organizational governance forms has been transaction cost theory (Leiblein, 2003). Under the assumption that economic actors are boundedly rationale, opportunistic, and risk neutral, TCE argues that the efficiency of an organizational arrangement depends on the three characteristics of the underlying transaction: (1) asset specificity, (2) uncertainty, and (3) the frequency of the transaction (Williamson, 1975/1985). In case of high levels of asset specificity, uncertainty, and frequency of the given transaction, hierarchy is considered to be the efficient institutional arrangement, while market exchange proves best when an un- or little specific transaction is carried out rarely with only few elements of uncertainty. This distinction of institutional arrangements traces back to preliminary reasoning by Coase, who has treated economic institutions as dichotomous and mutually exclusive, since market and hierarchy were conceptualized as two ends of a continuum (Coase, 1937). Williamson subsequently extended the view of either market or hierarchy to a tripartite either-or categorization, including additionally hybrid forms of organization (Williamson, 1985). He argues that an intermediate specific, but frequently repeated transaction shall be organized in a hybrid form such as a cooperation or strategic alliance to accomplish the transaction cost minimizing and hence most efficient organizational mode. His perspective, still, implies that different organizational arrangements are located at distinct stages of a one-dimensional continuum and are therefore considered to be mutually exclusive. Thereby, the underlying assumption is that the governance modes market, hierarchy, or hybrids are substitutes (Pies, 1993: 222) that are subjects to a discrete choice. This postulation contradicts the nature of make-and-buy where two distinct institutional arrangements with distinct control mechanisms are complementing each other and coexist in performing the same transaction. One could superficially address this point by including make-and-buy as an additional organizational alternative in the comparative analysis of discrete governance choices. But this would derange the one-dimensional spectrum of conceivable governance modes, which is fundamental to TCE. Make-and-buy, however, does not fit into this system, since it is no intermediate of make and buy, but a combination of them in their full manifestation. Furthermore, this continuum serves furthermore as a basis for the transaction cost determinants, whose parameter value (high, interme-

diate, or low) can be one-dimensionally assigned to different stages of the spectrum, which subsequently indicates the transaction cost minimizing governance form.

Consequently, at first glance, this fundamentally contrasting understanding of economic institutions not being placed on one continuum, but in a different logical configuration, turns make-and-buy out to be inapproachable for TCE's logic or any other theory based on the either-or perspective. Indeed, TCE was never meant for explaining the concurrent use of distinct governance modes. So it shouldn't astonish, if TCE in fact wasn't a proper approach to explore make-and-buy, which would indicate that researchers using TCE to explain make-and-buy are wrong and not TCE reasoning in general to be wrong.

The rest of this chapter is organized as follows: After checking the validity of the assumptions of TCE for an explanation of make-and-buy, the governance mode of make-and-buy will be sorted into TCE's framework by addressing the question if make-and-buy can be understood as one transaction from the point of view of TCE. Then, the explanatory power and adequacy of the TCE determinants will be analyzed in detail, in order to shed light onto TCE's explicatory power concerning make-and-buy. While examining TCE's framework, also production costs and management mechanisms inherent in TCE will be integrated into reflection. Finally, the chapter closes with a preliminary conclusion.

3.1. TCE Assumptions

Before going into detail whether and how transaction cost variables can potentially explain make-and-buy, I want to check whether make-and-buy possibly requires different theoretical assumptions than those inherent in TCE. For example, it could be argued that make-and-buy is not an anomaly from the point of view of TCE since it violates the assumptions of TCE and when altering respectively interpreting these assumptions differently make-and-buy turns out to be a standard TCE economic institution. Therefore the next section analyzes the three basic TCE assumptions (e.g. Chiles/McMackin, 1996; Tsang, 2006) – bounded rationality, opportunism, and risk neutrality – concerning their meaning for make-and-buy.

First, TCE relies on the semi-strong form of rationality, namely bounded rationality, which means that "economic actors are assumed to be "*intendedly* rational, but only limitedly so" (Simon, 1961, p. xxiv)." (Williamson, 1985: 45, accentuation as in the original). As a consequence, economic actors are not able to over- and foresee all eventualities of their actions and contracts are incomplete. In this logic, governance forms are most efficient when they allow an inexpensive and flexible adaptation to changing circumstances. Based on a wide range of

evidence, in economic literature it is largely unanimous that bounded rationality is important and the most appropriate description of human cognition in the context of governance choices (Williamson, 1975, 1985, and 1993; Conlisk, 1996). Since "The matter of the decision-making process for make versus buy decisions is complex." (Anderson et al., 2000), it cannot be expected that the decision maker is able to incorporate all currently relevant as well as future contingencies (Conlisk, 1996). Therefore, it is not plausible that significant differences in bounded rationality or even unbounded rationality of the involved economic actors are causative for make-and-buy.

Second, opportunism as the most criticized (Ghoshal/Moran, 1996; Hill, 1990) TCE assumption is defined as "self-interest seeking with guile" (Williamson, 1985: 47). Several arguments have been put forward, opposing the assumption of opportunism: In terms of a positive theory, it is doubted whether opportunism does reflect the true human nature adequately and whether it therefore lays a proper groundwork for studying economic institutions. In terms of a normative theory, the assumption of opportunism is excoriated due to the resulting undesirable implications for practice, since actions to meliorate opportunism, like hierarchical fiat and control may instead stir up opportunistic behavior as a self-fulfilling prophecy (Ghoshal/Moran, 1996). Moreover, Hill (1990) for instance, argues that "in the long run, the invisible hand deletes actors whose behaviors are habitually opportunistic. Consequently, as markets move toward the state of competitive equilibrium, the risk of opportunism will be low, even for transactions supported by specific asset investments." (Hill, 1990: 500). Nevertheless, the assumption of opportunism is the lynchpin of argumentation in TCE, as the absence of opportunism in TCE would make specificity explanations obsolete. Because the risk of opportunism represents the basis for all transaction cost arguments in TCE, it serves as a "conditio sine qua non" for TCE logic.[23]

Proponents of opportunism counter that it is costly to find out the transaction partner's propensity to act opportunistically ex ante and it is therefore economically reasonable in terms of precaution to bargain for opportunism by implementing corresponding safeguards (Williamson, 1993; Ebers/Gotsch, 2006). As will be argued in chapter 3.3.2.1., opportunism underlying behavioral uncertainty is crucial for the explanation of make-and-buy, because opportunism is exactly what makes markets and hierarchies fail under conditions of high uncertainty. But, since opportunism has different impacts depending on the type of uncertainty, the transaction partner's (here: supplier) opportunism will be integrated in data collec-

---

23   See also chapter 3.3.2.1. This approach is proposed by e.g. Ebers/Gotsch (2006) and Nooteboom (1996).

tion.[24] This approach accounts for the – to my understanding – legitimate critics of opportunism as a stiff assumption and is understood as a step towards assumption-based theory testing (Tsang, 2006). As a result, the general assumption of the existence and importance of opportunism is necessary for an exploration of make-and-buy and will basically remain untouched in the course of the thesis.

In TCE it is assumed that transactors are risk neutral and for reasons of simplification it is assumed that this assumption holds true for all transactors (Williamson, 1985). Although it is acknowledged here that this simplifying assumption of risk neutrality is not necessarily an appropriate behavioral assumption which is equally distributed across all economic actors (Chiles/McMackin, 1996), a differing assumption is not reasonable for an explanation of make-and-buy for the following reasons: Assuming risk aversion or risk taking as equally distributed across decision makers is just as unduly simplifying as is the assumption of risk neutrality. Hence, individual risk preferences would have to be modeled in order to overcome this limitation (Chiles/McMackin, 1996). But, differing individual risk preferences are not expected to explain make-and-buy, because the decision to simultaneously make and buy is made by one decision maker or as a agreement of a group of decision makers in one firm. Hence, inter-individual differences in risk preferences are not able to explain make-and-buy, since the differences would have to be intra-individual which seems not very plausible. And even if there are intra-individual risk preferences of individual decision makers inside a group they are leveled by the final agreement of the group. Furthermore, assuming one risk preference across decision makers seems acceptable here, because the empirical analysis is restricted to a single firm in which the sourcing decision is made by one sourcing committee.[25] As a consequence, variable individual or firm-level risk preferences will not vary systematically across the investigated sourcing decisions.

The following figure displays the scheme of behavioral assumptions in TCE:

Bounded rationality affects both transactor and transaction partner, while opportunism is only relevant for governance choice when it occurs on the side of the transaction partner and risk neutrality is only influencing governance choice as characteristic of transactor himself.

---

24 For details see chapters 6.2.1. and 6.2.2.3.

25 See chapters 5.1 and 5.2.

Relevance of behavioral assumptions on the different sides of the transaction	
Transactor	*Transaction partner*
Bounded rationality	
	Opportunism
Risk neutrality	

Fig. 5:   Scheme of behavioral assumptions in TCE

3.2. Is make-and-buy one Transaction? Structuring the Unit of Analysis

Williamson defines a transaction as the "transfer of a good or service across a technologically separable interface" (Williamson, 1985: 1). This is a quiet insubstantial characterization, since it comprises every move of "assets across discrete stages of a multistage production process" (Ramstad, 1996: 415). Let's consider a firm that is producing a certain percentage X of its good or service (= assets) internally, while sourcing 100-X % of these assets from an outside supplier. When making, assets are transferred across discrete production stages inside the firm which is a different transaction than transferring a contracted payment to the outside supplier as a countermove to receiving the asset that has been moved across the production process of the outside supplier. While the assets may be the same in the end, the technologically separable interface is surely not.

Consequently, make-and-buy in the above described manner, i.e., making and buying the same asset, must be considered as two individual but intertwined transactions with the same characteristics according to TCE, but which are nevertheless carried out in different organizational arrangements. Continuing this line of thought from the point of view of TCE, at least one transaction must be organized inefficiently, since only one governance form is adequate for one set of transaction characteristics. Due to its unit of analysis, TCE is blind to the possibility that even if a transaction is organized in an inefficient manner, looking at the isolated transaction, it could still turn out to be efficiently organized when considering two or more intertwined transactions. Thus, in order to analyze TCE's explanations for make-and-buy, it is necessary to broaden one's view to two or more intertwined transactions. Importantly, note that make-and-buy represents a new and own distinctive organizational form and not an intermediate form between make and buy.

This argumentation pertains especially to make-and-buy in a strictly speaking sense, i.e., making and buying the identical asset. However, making and buying simultaneously can also refer to not identical but very similar assets, respectively the same type of assets, such as different generations of a product. In the case of making and buying similar but not identical assets, TCE would also treat make-and-buy as two distinct transactions. Accordingly, making and buying the same assets and making and buying the same type of assets represent two different cases of make-and-buy; in the following discussion on TCE's adequacy to explain make-and-buy, I will consider both. Thereby, I assume that the same assets do possess the same degree of asset specificity, while the same types of assets are unlikely to ever be totally the same as regards to asset specificity. It becomes even less likely that specificity of the same type of assets will be the same if other aspects, e.g., producer expertise or number of suppliers, are taken into account. But the focal types of assets have to possess at least very similar levels of specificity. Otherwise this case does not represent a make-and-buy pheno-menon, since making and buying of similar assets with different levels of asset specificity are two different transactions that are governed differently, exactly because the assets in question have distinct transaction characteristics, i.e., asset specificity. Hence, this is the typical TCE case and does not reflect make-and-buy.

Accordingly, the following argumentation classifies make-and-buy as different phenomena depending on whether the same or the same type of asset is simultaneously made and bought and it will be assumed that make-and-buy can appear in one of the two cases:

(1) Making and buying the same assets (with same levels of specificity)

(2) Making and buying the same types of assets with comparable levels of specificity.[26]

These two cases can be distinguished according to the criterion of substitutability: Whereas same assets serve as perfect substitutes for each other, same types of assets are imperfect substitutes and can serve each other as substitutes only in the long run. "Same type of asset" in this understanding means that production of the end product is possible with both types of assets but production facilities have to be adjusted to work with similar assets, which does not work immediately.

---

26 Asset specificity levels need not necessarily be identical to promote the same governance choice, they merely both have to be either higher or lower than $\hat{k}$. $\hat{k}$ represents a theoretical value of specificity that marks the point at the market-hierarchy continuum where the favorability of one governance form reverses to the other, i.e., favorability changes from hierarchy to market for values below $\hat{k}$ and vice versa (Williamson, 1985).

3.3. Determinants

3.3.1. Asset Specificity

In transaction cost logic, asset specificity is considered to be the main predictive variable (Williamson, 1985; Riordan/Williamson, 1985) and its theorized relationship to choices of governance form has received strong and consistent empirical support (Williamson, 2000; David/Han, 2004; Leiblein, 2003). Specificity can be described as the extent to which an asset can be redeployed in another application without losses and also be interpreted as quasi-rent that may be subject to hold-up behavior. It is assumed that the value of a factor or an invest-ment W_1 is higher than the value in the second-best use of the factor W_2 and the brake-up value of the factor S. If $W_1 > W_2 > S$ applies, then the difference W_1- S is the quasi-rent and thus the specificity of the factor. If, however, in the extreme case $W_2 = S$ applies, the asset or factor is of merely breakup value in its second-best use, which would be equivalent to maxi-mum asset specificity for this factor. The difference W_1-W_2 results in the exploitable part of the quasi-rent (Klein et al, 1978; Pies, 1993).

Dutta and colleagues (1995) studied the effect of lock-in problems due to specific investments in the dual distribution of a manufacturer's products through house accounts and representa-tives. The authors assert a positive effect of specific investments on a make-and-buy strategy in terms of establishing house accounts in the territory of the representative, because "house accounts are a safeguard that allows the firm to continue enjoying the cost and motivational benefits of the rep channel. In effect, one form is needed to use the other (desired) form." (Dutta et al., 1995: 194). Dutta et al. can support their hypothesis empirically. However, their hypothesis is restricted to the regional use of concurrent sourcing, since house accounts are only established in the territory of a concrete representative.

Lee/Lim (2001) formally analyzed the effect of human capital specificity on make-and-buy over time. They could show that in cases of lowly specific learning a firm would choose to buy, while in cases of moderately and highly specific learning the firm would start with a make-and-buy strategy. Although the authors argue that the subsequent change of the previously chosen sourcing strategy now depends on the transferability of the specific learn-ing, this logic does not become evident in their reasoning: When specific learning effects in the buyer-supplier relationship themselves are moderate, the make-and-buy strategy should be followed by a buy strategy, regardless of a high, respectively low transferability of the learned know-how. Similarly, in cases of high learning specificity, the firms should choose either a

make-and-buy strategy followed by making only or a making strategy right from the start independent of the salvageability (= the ability to save and use) of the know-how. Further-more, the authors do not address probable interaction effects between specificity and trans-ferability, since according to TCE logic, specific assets are expected to be restricted in porta-bility, which is pivotal for the whole opportunism and rent appropriation difficulty in TCE. Insofar, the assumption of salvageability and learning specificity being independent is doubt-ful.

McNaughton (2002), instead, poses the opposite hypothesis, subdivides specificity in know-ledge-based and physical assets and asserts a negative relationship between the two kinds of specificity and the use of multiple export channels due to protection of knowledge and the reduction of the policing effect of the market when idiosyncratic investments in physical assets are required (McNaughton, 2002: 195). Whereas the negative effect of physical assets could be proven, the empirical analysis shows no significant effect of knowledge-based assets. McNaughton interprets this result as the firms' ability to protect their knowledge-based assets in multiple channels (2002: 200).

Similarly, Parmigiani (2003/2007) assumes an increasing likelihood of making and a decreasing likelihood of concurrently making and buying, the greater an asset's specificity (Parmigiani, 2003: 81). She, however, cannot support the negative impact of specificity on concurrent sourcing empirically. Her argumentation is that in cases of high asset specificity, the firm would, according to TCE, source the asset internally from an inside supplier and even in situations, where a highly specific asset is procured from an outside supplier, "only one external supplier is involved, due to the large investment required in the specific asset" (Parmigiani, 2003: 80). Though, whenever high specificity is present, TCE's "fundamental transformation" leads to a bilateral relationship of the firm to either one internal supplier (make) or one external supplier (buy). "Since concurrent sourcing involves at least two suppliers (one internal and one external), this sourcing mode will be less amenable to condi-tions of high asset specificity." (Parmigiani, 2003: 80). Here, Parmigiani implicitly recognizes that concurrent sourcing entails two separate transactions, but she doesn't elaborate on this fact in her work.

To sum up the existing empirical results concerning the effect of asset specificity on make-and-buy, we can assert that evidence is completely contradictory: While Dutta et al. (1995) find specificity to be positively correlated with plural sourcing, but not in the procurement context, Parmigiani (2003) affirms a positive effect of specific investments on make,

McNaughton's results concerning distribution channels distinguish between the kind of asset specificity, and Lee/Lim (2001) finally introduce a temporal perspective which presumes a positive association of moderate, respectively high specificity with make-and-buy as an entry strategy that develops over time to one of the polar strategies make versus buy depending on the degree of specificity. To capture these inconsistencies, I will discuss the adequacy of specificity to contribute to the explanation of make-and-buy from a theoretical standpoint.

Abstractly, Leiblein/Miller (2003) reason that "in equilibrium, all firms facing a given set of transactional attributes will reach similar conclusions regarding which activities to execute internally and which activities to outsource. This proposition is untenable." (2003: 841). Recalling that asset specificity is the chief explicatory variable of the transactional attributes, one may conclude that all firms facing a given degree of specificity will end up with similar results concerning their make-or-buy decision. Metaphorically speaking, we put the given amount of asset specificity on the scales and the deflection of the needle shows us whether market, hybrid, or hierarchy is the right thing to do. As argued already, this reflects the fact that the particular transaction is the unit of analysis of TCE, why asset specificity is a discri-minating variable on the single transaction level, while make-and-buy represents two distinct transactions. But when the level of specificity leads c. p. to one efficient institutional arrangement, how can it be explained that firms perform two identical transactions with identical levels of asset specificity in different governance forms like in the case of make-and-buy?

Consider the following make-and-buy cases separately:

(1) Given that same assets possess the same degree of specificity, making and buying can on the one hand pertain to highly specific assets and on the other hand to lowly specific assets. Regarding highly specific assets, TCE recommends hierarchy. Here, the puzzle is why shall there be any external production? Since highly specific investments drive the risk of opportu-nistic behavior of external suppliers, there must be other (external) reasons, e. g., internal capacity constraints, and unexpected changes in market demand or behavioral uncertainty, which could lead a firm to make-and-buy highly specific assets. But the reasons mentioned here are rather embraced by uncertainty, i.e., another transaction characteristic which will be discussed in the next section. Furthermore, in these cases, make-and-buy would not appear reasonable in the long run, since a firm would seek to avoid the risk of opportunism as long as these costs are higher than the benefits or cost savings through make-and-buy. Therefore, making and buying the same highly specific assets is only a useful strategy when the costs

and risks are outweighed by the benefits and cost saving of the "buy" function, which cannot be explained by specificity considerations.

Regarding lowly specific assets, TCE recommends market exchange. So, the puzzle here is why shall there be any internalization? Since market exchange offers the advantages of scale economies as well as high incentives, restrictions in supply or other barriers to external purchasing could, for instance, be a reason for internal production. But when market supply restrictions prevent supplying full volume from outside suppliers, then in the long run it would be probably more reasonable to completely insource in order to allow for in-house scale and/or scope economies and thereby reduce costs instead of dividing supply. Therefore, only if both market and hierarchy fail to carry out a transaction with unspecific assets, e.g., due to high performance ambiguity, then make-and-buy represents a reasonable and expedient case for make-and-buy in this thesis.[27] Similarly to the argumentation above, make-and-buy is only beneficial in cases when extra costs due to higher coordination or impeded scale or scope economies are outweighed by the benefits of this strategy. With respect to lowly specific standard commodities, conditions that justify a make-and-buy sourcing strategy like performance ambiguity may occur rarely, but are not inexistent or irrational per se. To sum up, it is assumed that identical assets possess identical degrees of asset specificity from the point of view of TCE what makes distinct sourcing, i.e. making as well as buying these identical assets an anomaly in the TCE framework.

(2) In contrast, the reverse conclusion is not valid, because it cannot be inferred that specificity imply that the focal assets are identical as well. As a consequence, similar but not identical assets with the same level of specificity which are concurrently made and bought as well represent an anomaly from the viewpoint of TCE. Furthermore, in TCE normally the specificity of assets does not even has to be exactly identical to lead to the same governance choice. Specificity levels of assets merely both have to be either higher or lower than $\hat{k}$.

---

27 In section 4.1.1.1 I will get back to this case in detail.
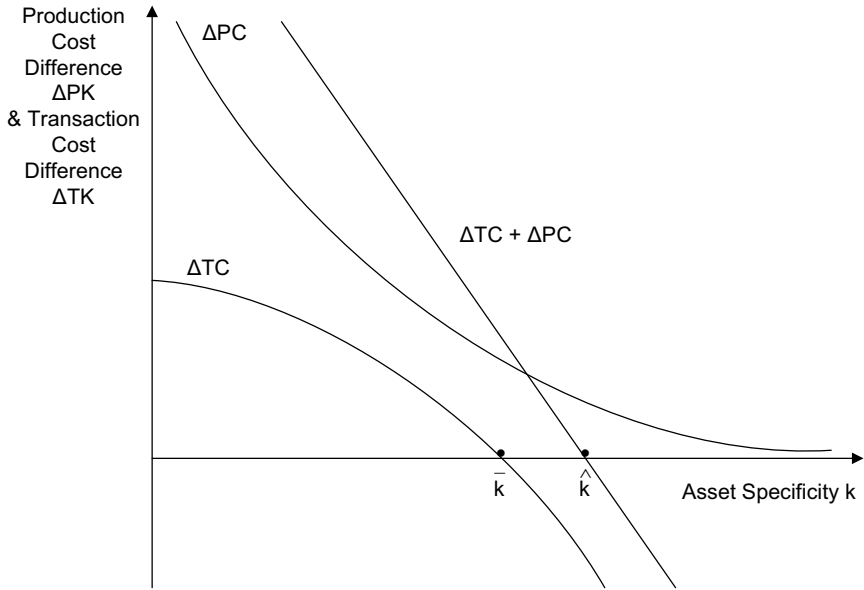
Fig. 6:   Relationship of production costs and transaction costs with asset specificity[28]

$\widehat{k}$ represents a theoretical value of specificity that marks the point at the market-hierarchy continuum, where the favorability of one governance form reverses to the other, i.e., favorability changes from hierarchy to market for values below $\widehat{k}$ and vice versa (Williamson, 1985). Hence, similar assets with levels of specificity being both either higher or lower than $\widehat{k}$ which are sourced differently, i.e., are concurrently made and bought, have to be interpreted as an anomaly from the viewpoint of TCE as well. Given that same types of assets have to possess at least very similar degrees of specificity (to represent a make-and-buy case), but are unlikely to be totally identical in regard of specificity, TCE proponents could easily argue that making and buying the same type of assets is attributed to unobserved differences in the level of specificity. Having identified and distinguished these cases where differences in specificity[29] are not significant enough to explain the use of distinct governance forms, i.e.,

---

28   See Williamson (1985: 93).

29   While it is admittedly difficult to determine whether assets are exactly identical, it could be empirically handled by defining constitutive specifications that allow comparing assets. Such specifications are usually available esp. for physical assets. See the chapter 6.2.2.1 for details of how this was handled in the empirical analysis.

making and buying the same types of assets with similar levels of specificity, asset specificity consequently would not be a driver of a make-and-buy strategy.

Boiling this stream of argumentation down to the essence allows making two different inferences:

(I) Make-and-buy cannot be explained by asset specificity at all, as specificity cannot discriminate between make-and-buy and its alternatives, because an as-well-as perspective is simply not inherent in TCE's world of ideas. Leiblein/Miller (2003) conclude for their own work that additional, firm-specific characteristics influence the governance choice. Yet, this argument is expedient for make-or-buy but not suitable for make-and-buy, too, since the transactions are carried out by, respectively inside one single firm as a market as well as an intra-firm exchange. Given that asset specificity is stripped of explicatory power, we can presuppose that TCE is utterly unqualified to provide explanations concerning make-and-buy.

(II) TCE has so far been incompletely understood in a one-sided way adopting an either-or perspective, since specificity has always been treated as "the big locomotive", whilst neglecting the other variables. Therefore the following remarks will scrutinize whether the remaining transaction cost determinants offer some clarification.

Independent from the fact which of the two conclusions one draws, the following first proposition will be deduced from the above stream of argumentation:

Proposition 1: Asset specificity is no determinant of make-and-buy.

3.3.2. Uncertainty

In TCE, uncertainty is divided into two different types, i.e., behavioral and environmental uncertainty. As distinct from environmental uncertainty, behavioral uncertainty is considered to be a deliberate "strategic" action which arises from opportunism (Williamson, 1985). Environmental uncertainty, however, is seen as "innocent" and "non-strategic" and has therefore no opportunistic background. Furthermore, environmental uncertainty is – following Koopmans (1957) – divided into primary and secondary uncertainty. While primary uncertainty addresses the lack of knowledge about states of nature, which includes technological and regulatory uncertainty, secondary uncertainty means a lack of knowledge about the (innocent) actions of other economic actors such as customers, competitors, and suppliers in general.

But according to transaction cost reasoning, uncertainty develops its impact on governance choice only in the presence of specific investments, since uncertainty poses as a moderator in the relationship of asset specificity and the choice of governance modes (Coles/Hesterly, 1998; Boerner/Macher, 2002). Here, "market governance (classical contracting) thus holds across standardized transactions of all kinds, whatever the degree of uncertainty." (Williamson, 1985: 79). By committing oneself to this strict, true to original handling of TCE logic, TCE becomes inhibited to explore make-and-buy, since regardless of how astute uncertainty's arguments were to explain make-and-buy, they would be annulled in the absence of specificity. But before completely denying TCE any capability to comprehend plural organizational forms, the potential explanatory power of uncertainty will be examined in the following. Furthermore, though it can be already expected that even if TCE presents possible explanatory contribution to make-and-buy, it won't be exclusively in a position to explain make-and-buy. Here, uncertainty can provide further assistance, since it is inherent in many other economic theories which could also offer explications to the make-and-buy phenomenon.

3.3.2.1. Behavioral Uncertainty

Behavioral uncertainty is the crucial uncertainty type in TCE because it reflects the risk of opportunism which is the basis for all transaction cost arguments. Opportunism relates to incomplete or distorted passing on information, especially to intentional attempts to deceive (Williamson, 1985). Opportunism-based reasons for make-and-buy can be found in the literature basically in terms of a remedy of information asymmetry, respectively performance ambiguity problems. According to Heide's expectation he could show that firms solve information asymmetry problems not by establishing multiple market relationships but by shifting from exclusive reliance on market transactions to a plural form which augments market contracting. Heide based his framework on the assumption that plural modes are inimitable in their ability to eliminate adverse selection and moral hazard problems through "[…] enabl[ing] firms to exploit some of the inherent benefits of market contracting […] without a loss of control." (Heide, 2003: 26). Dutta and colleagues refer to internal uncertainty, which is similar to measurement uncertainty or performance ambiguity. The authors suggest that uncertainty about the independent manufacturers' representatives' (rep channel) performance favors the implementation of house accounts (direct channels), because this internal uncertainty refers to an information asymmetry of which the rep can take advantage when no house accounts exist (Dutta et al., 1995: 193-195). Performance ambiguity seems to be an important

determinant of make-and-buy in particular and of organizational forms in general,[30] since both articles succeed in supporting their hypotheses empirically. Although performance ambiguity as a type of behavioral uncertainty is core to the TCE framework it has been mostly taken up by distribution oriented (marketing) literature than in industrial purchasing contexts (Boerner/Macher, 2002).

In TCE reasoning, vertical integration contributes to the reduction of opportunism and therefore behavioral uncertainty, due to the possibility to adapt contracts less risky and costly in hierarchical systems. In order to analyze the explicatory power of behavioral uncertainty, classical TCE recommendation is examined concerning which governance mode is favorable when behavioral uncertainty in conjunction with asset specificity is low, respectively high.

Fig. 7:   Governance choice recommendation according to traditional TCE logic

On the one hand, following TCE reasoning, the figure shows that in each case when specificity is high, the transaction cost efficient form is hierarchy; while in cases of low specificity, market is the recommended organizational mode. "The influence of uncertainty on economic organization is conditional. Specifically, an increase in parametric uncertainty is a matter of little consequence for transactions that are nonspecific. Since new trading relations are easily arranged, continuity has little value, and behavioral uncertainty is irrelevant." (Williamson, 1985: 59). Since the figure demonstrates really nothing surprising from the point of view of TCE, it elucidates the paradoxical insignificance of behavioral uncertainty in contrast to specificity in TCE, albeit behavioral uncertainty is central to TCE's argumentation as the direct consequence of opportunism, which serves as a "conditio sine qua non" for TCE logic and whose absence would make specificity explanations obsolete. On the other hand,

---

30   See discussion in chapter 4.1.1.1.

Williamson claims at the same time that behavioral uncertainty results from the interaction of opportunism and bounded rationality omitting the influence of specificity (Williamson, 1985: 67; see also Williamson, 1975: 40). As a consequence, this critique of TCE elucidates the particularly ambiguous handling of uncertainty in TCE, which is important for the development of arguments later in this thesis.[31] Hence, in the absence of specificity, the question is why there would be any internalization.

(1) Considering the different make-and-buy cases, TCE recommends market exchange regarding the sourcing of the same assets when asset specificity is low even though uncertainty is high. A reason to also provide internal supply could be that by making and buying the same asset performance ambiguity can be resolved and thereby risk of opportunism of external supply can be reduced. Since neither market nor hierarchy does resolve performance measurement uncertainty by itself, the augmenting of external procurement with internal supply gives the sourcing firm the possibility to better assess performance of each supplier by benchmarking them against each other. Thereby, firms are able to understand and control costs of external supply. Furthermore, the credible threat of complete internalization, respectively outsourcing, increases incentive intensity of the internal, respectively external production. However, this logic works especially/only regarding highly specific assets, since performance ambiguity (or behavioral uncertainty in general) of lowly specific assets could more cheaply be resolved by multiple outside suppliers. Hence, performance ambiguity does not justify internalization when assets are unspecific, but could explain make-and-buy of highly specific assets.

(2) As argued above, same types of assets are not perfect substitutes for each other. Therefore, it is not possible to benchmark production performance of similar but not identical assets, because the efficiency of input-output ratios can only be assessed when at least either input or output is known. In cases of behavioral uncertainty, particularly the input, e.g., performance of workers, absence of shirking or other types of moral hazard, is difficult to evaluate. Thus, in order to reduce exactly this risk of not being able to supervise the input, the output has to be measured. But this is not possible when outputs are not the same, which is the case for same types of, but not identical assets. Hence, by making and buying the same types of assets performance ambiguity (or behavioral uncertainty in general) cannot be solved.

Due to the inseparability of the effect of behavioral uncertainty from specificity in TCE and the inadequacy of specificity to contribute to the explanation of make-and-buy, behavioral

---

31   See chapter 4.

uncertainty has to be rejected, too, as an explicatory variable concerning make-and-buy as long as it is argued from the point of view of orthodox TCE. However, this offers the opportunity to extend the TCE framework by making performance ambiguity independent from asset specificity and thereby probably explain make-and-buy, since other than the hitherto examined governance forms may become efficient when performance ambiguity is considered as autonomous independent variable.

> **Proposition 2: Performance ambiguity has the potential to be a determinant of making and buying the same assets when conceptualized differently than in TCE.**

3.3.2.2.   Environmental Uncertainty

Plenty of suppositions exist as to the effect of "innocent" environmental uncertainty on the choice of governance forms of which virtually none is consistently empirically supported (David/Han, 2004; Rindfleisch/Heide, 1997). Causative for these inconsistencies are the many different types of environmental uncertainty, which may have opposite influence on governance modes as well as the different measures applied (Boerner/Macher, 2002). From the point of view of make-and-buy, another reason for contradictory results can be the examination of the "wrong" dependent variables make vs. buy, instead of looking at the make-and-buy alternative.

Demand / Volume Uncertainty

The traditional uncertainty-based argument for make-and-buy can be assigned to secondary environmental uncertainty in TCE's comprehension: Due to volatility of market supply, demand, respectively volume uncertainty is expected to lead to compensation of capacity utilization by completing the in-house production with the purchase of the same product at the market (Porter, 1980; Williamson, 1975). Empirically, the effect of volume uncertainty on make-and-buy is unclear, since according to Parmigiani make-and-buy can be difficult to manage when disputes are likely, and she identifies volume uncertainty to be a main driver of disputes. Consequently, she hypothesizes that when volume uncertainty is high, make-and-buy is unlikely (Parmigiani, 2003: 221). However, she cannot support her hypothesis. In contrast, Heide does not explicitly hypothesize that volume uncertainty increases the likelihood of make-and-buy, but finds it supported in his data (Heide, 2003: 24). Particularly, he uncovers a positive effect of volume uncertainty in the presence of buyer-specific investments

on the likelihood of make-and-buy, while Parmigiani assumes that volume uncertainty and specificity would lead to exclusively make, an effect she again cannot support empirically.

In orthodox TCE reasoning, increasing external uncertainty favors vertical integration, since volatile changing market environments may cause costly contractual adaptation when the transaction is organized as market exchange.

The common argument that volume uncertainty serves as a main driver of make-and-buy in the literature claims that demand can be divided into a certain and an uncertain part (Harrigan, 1983a/1984; Mols, 2000). While a firm provides own capacity to produce for the certain part of the demand and thereby keeping its internal plants at full utilization, it leaves "outsiders to absorb the uncertainties of irregular demand" (Harrigan, 1983a: 32). As a result, the firm produces the larger part of the demand by itself and purchases only the exceeding residuum – and this is widely assumed in the literature as the typical favorable make-and-buy case – because the certain part of the demand has to be larger than the uncertain part, which means that the volume uncertainty is low, since compared to the total demand only the smaller part is uncertain and vice versa. The following figure illustrates this logic.
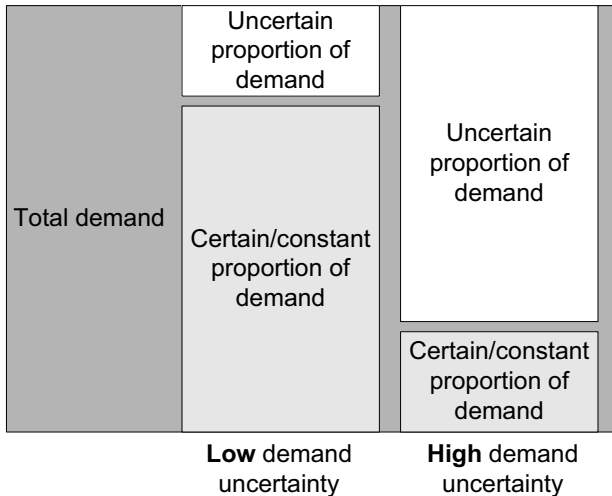

Fig. 8:   High vs. low demand uncertainty

In such a case when the firm is producing the larger quantity of the demand by itself, it can be assumed that the firm has lower per unit costs due to greater expertise, scale or scope econo-

mies or other advantages than outside supplier.[32] The first implication is that only making and buying of same assets could possibly be suitable to solve volume uncertainty, because assets have to be perfect substitutes to enable augmenting one supplier with another when unexpected uncertainties arise. The attempt to reduce volume uncertainty by making and buying similar assets bears the risk of (additional) set-up costs and delay, since production equipment has be adjusted to manufacturing the similar but not identical asset.[33] Second, make-and-buy would only be reasonable as long as paying higher per unit costs in the long run is cheaper than building own production capacity, which represents fixed costs and will probably not be fully utilized in the future. Considering specific assets, TCE recommends hierarchy. If a firm was forced to cope with volume uncertainty by augmenting supply externally it would be difficult for the firm to find a supplier who unexpectedly is able to produce the same specific assets, since the supplier is only covering demand peaks and has therefore not been able to invest as specifically in production facilities and processes as the focal firm. Considering unspecific assets, TCE recommends market. So the puzzle here is why there should be any internalization. Hence, making and buying unspecific assets under conditions of low volume uncertainty is no reasonable strategy (Parmigiani, 2003). The only rather unlikely case in which make-and-buy may occur to hedge against volume uncertainty is that a firm has to temporarily purchase specific assets also externally, since it on the one hand encounters unexpected increases in demand and on the other hand has an available supplier at its disposal, which is able to provide the specific assets.

Given that the uncertain part of the demand is greater than the certain part, the firm would produce only the smaller quantity of the needs in-house and purchase the larger part from outside. Considering specific assets, the question remains why there would be any externalization. Making and buying specific assets, while purchasing the major part from outside the firm, does not necessarily reduce the risk of this uncertainty, since in the case of breakdown of the relationship, the firm would not be able to produce a significant portion of the demand by itself. Considering unspecific assets, the question is why would there be any internaliza-

---

32 This assumption premises that supply markets are not thin. Thin markets are characterized by low market trade volume and/or only a very limited number of alternative suppliers. Under such market conditions even small changes in demand and supply could have extensive consequences such as e.g. rising prices or supply uncertainties. Here, make-and-buy could possibly represent a feasible alternative to full integration, since the internal production unit could secure a minimum availability of input in case of interruptions in the supply market. See also Parmigiani, 2003: 30 et seq. But since in TCE markets are not generally assumed to be thin, this assumption represents a special condition which will not be elaborated further in this thesis.

33 Therefore, volume uncertainty will not be considered further as determinant for making and buying the same type of assets.

tion. Volume uncertainty of unspecific assets could more easily be solved by multiple outside suppliers. Furthermore, maintaining internal and external supply simultaneously entails higher coordination costs, which seem to outweigh the questionable benefits and a complete out-sourcing would be more cost efficient (Parmigiani, 2003). Thus, making and buying assets to solve volume uncertainty seems not reasonable. To sum up, in this case sourcing can rather be explained by orthodox TCE, but it seems no reasonable situation for make-and-buy. The following proposition summarizes the above reasoning:

Proposition 3: Volume uncertainty is no determinant of make-and-buy.[34]

Technological Uncertainty

Solely technological uncertainty – falling under primary environmental uncertainty – gained relatively consistent empirical support, but not in the direction of action often understood as TCE reasoning. As already argued with regard to behavioral uncertainty, also environmental uncertainty does not lead to hierarchy as long as not conjunct with specificity (Boerner/Macher, 2002). Nevertheless, environmental uncertainty has predominantly been investigated as being independent from asset specificity (Boerner/Macher, 2002). Here, it could be shown empirically that uncertainty about technological development results rather in market contracting or hybrid governance forms than in hierarchy (Walker/Weber, 1984; Balakrishnan/Wernerfelt, 1986). At this point, Parmigiani succeeds in proving an empirical support of technological uncertainty as a driver for make-and-buy (Parmigiani, 2003: 221). She argues that technological uncertainty does not lead to hierarchical governance, but to make-and-buy "indicating the benefit of learning from both internal and external suppliers." (Parmigiani, 2003: 3). Again, in the absence of specificity and in the face of the empirical results, the question is why there would be any internalization.

(1) Making and buying the same assets could not resolve technological uncertainty, since uncertain future development of these assets refers to both internal as well as external suppliers. Thus, in cases technological change unexpectedly turns assets obsolete, both inter-nal and external supplier would face the problem of adjusting antiquated technology.[35]

(2) Making and buying the same types of assets could mitigate the hazards of high technolo-gical uncertainty by enabling innovation through a combination of internal technology devel-

---

34   This proposition refers to make-and-buy as an equilibrium strategy. As argued above, make-and-buy could rarely also appear as a transitional niche strategy to temporarily purchase specific assets.

35   This statement is true independently of the level of specificity.

opment with external knowledge acquisition. Internal supply is necessary to enable the firm to assess and absorb the supplier's knowledge (absorptive capacity) (Cohen/Levinthal, 1990; Lane/Lubatkin, 1998; Veugelers/Cassiman, 1999). In doing so, external knowledge acquisition could either take place by cooperative means, i.e., R&D joint ventures or co-development alliances as well as in the form of (production sourcing) contracts (Leiblein, 2004). In case the externally purchased asset is generic while the internally produced one is more specific, TCE can explain this sourcing strategy, because differences in specificity justify different levels of internalization (Williamson, 1985). Otherwise, i.e., when the assets provide an identical or similar level of specificity or when the externally purchased asset is the specific one while the internally produced asset is generic, then TCE cannot explain why such a sourcing mode emerges.

Analogous to behavioral uncertainty, environmental uncertainty develops its explanatory power in TCE exclusively in the presence of asset specificity. The inference concerning TCE's capability to explain make-and-buy is therefore the same here as it is regarding behavioral uncertainty. As long as explicatory power of environmental uncertainty is bound up with asset specificity in the TCE logic, environmental uncertainty and uncertainty in general is deprived of the potential to explain make-and-buy. Since technological uncertainty could be argued as a reason for making and buying similar assets, considering technological uncertainty not only as a moderator in the relationship of asset specificity and governance forms could lead to useful explanations of make-and-buy.

Therefore, I conclude the following proposition:

Proposition 4:   Technological uncertainty has the potential to be a determinant of making and buying the same type of assets when conceptualized differently than in TCE.

3.3.2.3.   *Further Uncertainty Classifications: Volatility versus Ambiguity*

In contrast to the usual categorization of uncertainty depending on its sources in TCE, another classification of (external) uncertainty is provided by McNaughton (2002). Following Klein et al. (1990) McNaughton subdivides uncertainty into the two dimensions volatility and diversity (McNaughton, 2002: 195) which are considered to have distinct effects on governance choices. Whereas volatility reflects the rapidity with which an environment changes and enhances the difficulty to predict future outcomes, diversity refers to a multiplicity of sources of uncertainty in the environment (Klein et al., 1990; McNaughton, 2002). McNaughton

argues that firms won't use multiple export channels under conditions of high volatility, because a firm is expected to better cope with high risk of unpredictability when having its distribution channel(s) integrated. On the contrary, in cases of high diversity firms will tend to use multiple channels in order to meet the various demands of numerous actors in the environment. The author can support his hypotheses in an empirical test.

The existence of plenty different taxonomies of and terms for uncertainty has a long tradition in the management literature (Camerer/Weber, 1992): While, Carson et al. (2006: 1058) "decompose uncertainty into volatility and ambiguity" already Duncan (1972) distinguished between different uncertainty dimensions of complexity and variability. Although the terms differ, the underlying conceptualizations of uncertainty resemble each other. While volatility and variability[36] refer to environmental changes that create a large amount of potential outcomes which enhances the difficulty to predict future (Duncan, 1972; Klein et al., 1990; McNaughton, 2002; Carson et al., 2006), diversity and complexity[37] refer to the multiplicity and interconnectedness of environmental elements (Duncan, 1972; Klein et al., 1990; McNaughton, 2002; Bronner, 1992). These uncertainty concepts are objective in the sense that changes as well as number and interconnectedness of elements are (theoretically) measurable independently from an individual's perception. Ambiguity, however, "refers to the degree of uncertainty inherent in perceptions of the environmental state irrespective of its change over time. Ambiguity is less about an uncertain future as about uncertainty about present and past experience." (Carson et al., 2006: 1059). Consequently, ambiguity represents a subjective or perceptual conceptualization of uncertainty. However, in TCE, complexity is expected to lead to or favor ambiguity, since bounded rationality hinders the complete perception of the number and interconnectedness of the elements and hence may create "uncertainty about present and past experience" and not about future states of nature (Williamson, 1975). Ambiguity and complexity differ fundamentally from volatility in that the latter creates uncertainty about what will occur, but not about what has occurred (Carson et al. 2006). As a result, in this thesis uncertainty is conceptualized as follows: According to TCE uncertainty is subdivided into environmental and behavioral uncertainty, whereas behavioral uncertainty is an equivalent of (performance) ambiguity, while environmental uncertainty can be conceptually divided into volatility and complexity (Koopmans, 1957;

---

36 In the following only referred to as volatility.

37 In the following only referred to as complexity.

Williamson, 1985).[38] The distinction of behavioral uncertainty in ambiguity and volatility is neither usual nor meaningful and has not been common in the management literature to date. Environmental complexity is considered to be a condition for ambiguity and is therefore closely coupled with behavioral uncertainty in the form of performance ambiguity (Williamson, 1975). Assets have to be complex for performance ambiguity to arise, since in case of simple or standard commodities, performance, i.e., quality is easily assessable and performance ambiguity cannot occur (Parmigiani, 2007; Coles/Hesterly, 1998; Bensaou/ Anderson, 1999). Since in the category of environmental uncertainty only technological uncertainty is supposed to have a potential to explain make-and-buy,[39] environmental complexity is in the following reasoning narrowed down to technological complexity. However, technological complexity will not be further elaborated separately but either referred to as performance ambiguity (when the focus is on uncertainty dimensions) or termed as technological uncertainty when related to technological volatility. To sum up, in the course of this work the two main uncertainty types which will be considered further are performance ambiguity and technological volatility.

The following figure visualizes the systematization of uncertainty used in this thesis:

		Uncertainty Dimensions	
		Ambiguity	Volatility
TCE Uncertainty Types	Behavioral	Performance Ambiguity	---
	Environmental	(Technological Complexity)	Technological Volatility

Fig. 9:   Used systematization of uncertainty

While uncertainty has been predominantly operationalized as volatility in the extant (TCE) literature (Carson et al., 2006; Boerner/Macher, 2002), ambiguity has received lesser attention as uncertainty type, but instead has been conceptualized as transaction cost (David/Han, 2004). Thereby, uncertainty measured as volatility is generally understood in TCE as having its source in the environment, i.e., market, technology, or demand. As already acknowledged

---

38 Not all uncertainty types are expediently distinguishable into volatility and complexity. For example, volume uncertainty rather represents volatility than complexity. Whereas e.g. technological and general market uncertainty are imaginable as both volatility and complexity.

39 See chapter 3.3.2.2.

in TCE volatility poses an adaptation problem, since incomplete contracts have to be adjusted when unexpected changes in environment occur (Williamson, 1985; Geyskens et al., 2006). However, ambiguity in TCE normally refers to behavioral uncertainty and, therefore, ambiguity in contrast to volatility raises rather control and monitoring issues (Rindfleisch/Heide, 1997; Geyskens et al., 2006). Since environmental uncertainty in terms of complexity favor ambiguity, complexity as well leads rather to control and monitoring concerns. Due to this logic that under conditions of volatility organizational arrangements have to be chosen and managed in order to allow for optimal flexibility (adaptation) and under conditions of ambiguity organizational arrangements have to be chosen and managed in order to allow for optimal monitoring, these dimensions of uncertainty affect rather the management of make-and-buy than its determinants. The figure below basically shows this reasoning.

	Environmental Uncertainty (i.e., **Technological Volatility**)	Behavioral Uncertainty (i.e., **Performance Ambiguity**)
Source of Transaction Costs (Nature of Governance Problem)	Adaptation	Performance Evaluation
Type of Transaction Costs (Direct Costs)	Negotiation and coordination costs	(Information) search costs (ex ante) Control costs (ex post)

Fig. 10: Sources and types of transaction Costs[40]

Hence, I argue that specific sources of uncertainty, here, behavior and technology, are potential determinants of organizational modes in general and make-and-buy in particular, whereas the distinct dimensions of uncertainty, i.e., ambiguity and volatility affect the management of organizational modes in general and make-and-buy in particular. The following proposition results from this argumentation:

> **Proposition 5: Volatility and ambiguity have the potential to be determinants of the management of make-and-buy when conceptualized differently than in TCE.**

---

40 Figure adapted and modified from Rindfleisch/Heide (1997: 46).

3.3.3.   Frequency

Compared to asset specificity and transaction uncertainty, empirical research on TCE has been paying much less attention to analyzing frequency (Boerner/Macher, 2002; Rindfleisch/Heide, 1997). Williamson claims that frequent transaction are more efficiently organized inside the firm's hierarchy, because "the costs of specialized governance structures will be easier to recover for large transactions of a recurring kind" (1985: 60), since transaction and production costs can be saved by economies of scale and scope, which occur when control costs are divided among lots of transactions (1985: 61).

A temporal perspective is inherent in frequency as it represents "the rate at which something occurs over a particular period" (Soanes/Hawker, 2005). Frequency (or periods in general) can usually be understood retrospectively or prospectively. Translated into the context of transactions and TCE, transaction frequency can mean that transactions either (1) have been taking place repeatedly in the past, or (2) will (or at least are expected to) be taking place repeatedly in the future, or (3) both.

Ad (1): Repeated occurrence of transactions in the past refers to path dependency. In critiques of TCE it has been suggested "that TCE dominated views of organization may be extended by changing the level of analysis, both in terms of time and the transaction." (Leiblein, 2003: 952) Even Williamson recognizes that transaction cost analysis comparisons between governance forms "are made between *de novo* alternatives". (Williamson, 1998: 43). Thereby he acknowledges that firms are committed to the institutional arrangements in which prior transactions have been carried out. Due to the probably high costs of switching organizational forms, the efficiency of new organizational modes is affected, i.e., reduced, and the implementation of new alternatives is hampered. This is important in the exploration of make-and-buy, since I expect in most cases make-and-buy not to be the initial governance mode alternative. Firms are more likely to start with one of the polar modes as the necessity of the simultaneous use of both modes may not be visible at first glance. But as soon as firms encounter the disadvantages connected to using either market or hierarchy, they turn to implement make-and-buy. Thus, the likelihood/management of make-and-buy may depend on the inherited organizational form.

Ad (2): (Expected) repeated occurrence of transactions in the future refers to the so-called shadow of the future (Heide/Miner, 1992). High expected frequency of transactions decreases average coordination costs of make-and-buy, since the extra costs of the concurrent use of two sourcing modes will be easier to recover for (large) transactions of a recurring kind

(Williamson, 1985). However, high expected frequency is able to decrease uncertainties, especially in connection with behavioral ambiguity. Hence, there may be more intricating effects of expected frequency on make-and-buy.

Summing up the above train of thoughts, I conclude the following proposition:

> **Proposition 6:** **Frequency has the potential to be a determinant of make-and-buy when conceptualized differently than in TCE.**

3.3.4. Production Costs

While the effects of frequency itself on make-and-buy have not been researched to date, some evidence exists as to the impact of scale and scope economies on plural form governance. Scale and scope economies can be interpreted as operationalization of production costs (Parmigiani, 2003). Although TCE has often been – not wrongfully – criticized to neglect production costs in favor of emphasizing transaction costs (esp. Madhok, 1996: 581 and 588; Madhok, 2002: 537), Williamson's comparative heuristic analysis clearly includes a simulta-neous minimization of production cost as well as transaction costs (Williamson, 1985: chapter 4). Therefore, the explanatory power of explicit production cost considerations in terms of scale and scope economies concerning make-and-buy is scrutinized in the following.

In TCE production costs are conceptualized to be contingent on asset specificity (Riordan/Williamson, 1985: 369): Production cost diseconomies for a firm are considered to be great when asset specificity is at a low level, because here an outside supplier is able to produce for the demand of a wide range of buyers applying a large scale production techno-logy. Therefore, the "market" can realize more economies of scale which leads to a pro-duction cost disadvantage of the firm when the transactions are unspecific. As asset specif-icity grows, the outside supplier has to adapt his investments in the production technology increasingly to the buyer's needs and the production cost advantage of the market in compari-son to the firm diminishes. Given that asset specificity is very high, the supplier has to provide unique investments for the technology to produce the highly idiosyncratic assets for the buyer and in this situation the production cost differences between market and hierarchy asymptotically approach zero, since investments of both firm and market would be to the same extent non-redeployable and thus no economies of scale benefits are achievable for the market compared to the firm.

Regarding scale economies Heide and Parmigiani could show a negative effect on make-and-buy, based on the assumption that with an increasing external supplier's cost advantage, a plural governance strategy becomes less attractive to a buyer (Heide, 2003; Parmigiani, 2003). This argumentation is consistent with TCE, since production cost disadvantages exist on the part of buyer when the supplier can produce large scales more efficiently, which would lead the firm to rather buy the asset. But note that this would only occur in the presence of unspecific transactions in TCE logic.

The same is true for evidence concerning supplier scope economies, which is somewhat tricky: While Dutta et al. and Parmigiani agree in the fact that the disincentive to source internally increases when the supplier's production is characterized by greater economies of scope, Parmigiani poses that the greater the scope economies of both the internal and external suppliers, the more likely the sourcing firm will concurrently source the asset (Dutta et al., 1995; Parmigiani, 2003). Both hypotheses are supported empirically. So that the effect of supplier scope economies on make-and-buy ostensibly changes dependent on the firm scope economies. Consistently to the correlation of supplier scope economies, firm scope economies are expected to have a positive effect on make-and-buy. This effect was moderately supported by Parmigiani (2003).

I disagree with the extant literature on the effects of scale and scope economies on make-and-buy in tow crucial points: First, according to TCE, production costs are not independent variables in terms of determinants, but are dependent variables in terms of outcomes or efficiency criteria precisely as transaction costs (Williamson, 1985). Therefore, scale and scope economies as operationalization of production costs have to be modeled as outcome, respectively performance variables and not as determinants.

Second, the value of scale and scope economies as outcome variables depends on which mode of make-and-buy is at hand. Similar to the previous argumentation concerning the determinants, also the performance implications of make-and-buy differs depending on whether the same or the same types of assets are simultaneously made and bought.

Considering the differences in making and buying the same assets vs. the same type of assets, scale diseconomies are only possible when induced by making and buying the same assets, since per unit cost degression works only when assets are substitutes and is probably hampered when one production volume is divided to internal and external supplies (as in the case of making and buying the same type of assets). This also fits into the hitherto empirical results of Heide (2003) and Parmigiani (2003), because they did not distinguish between making and

buying the same assets vs. the same type of assets in their studies and have therefore considered only the case of making and buying the same assets. This does fit into the empirical results of Heide (2003) and Parmigiani (2003), even though they modeled scale economies as independent variables, because statistical correlation does not indicate which variable is cause and which one is effect when measured at only one point in time (Schnell et al., 2005).[41]

But scale diseconomies due to making and buying the same assets need not necessarily occur, since both buyer and supplier considered separately can realize scale economies with their production as they may, for instance, produce at high or maximum capacity utilization. However, production cost advantages in terms of production costs are not the main driver of making and buying the same assets which provides rather transaction cost benefits based on the reduction of performance ambiguity. Possibly occurring production cost inefficiencies are expected to weigh lower than the transaction cost benefits achieved by such a strategy. Hence, scale diseconomies are considered to be of less relevance in the case of making and buying the same assets.

In contrast, economies of scale can only be induced when making and buying refers to the same type of assets, since then each firm (buyer and supplier) can realize cost degression effects separately, because the focal assets are no substitutes. This is particularly likely, if in cases of technological uncertainty both firms can learn from each other and thereby realize scale curve effects (learning economies) (Macher/Boerner, 2006).

Since scope economies depend on how efficiently individual firms can utilize manufacturing capacity and facilities in the production of different assets, assets of buyer and supplier have not to be identical to allow for scope economies in a make-and-buy strategy. Hence, argumentation concerning scope economies of make-and-buy needs not to be distinguished in making and buying the same vs. the same type of assets.

To sum up, generally TCE cannot explain make-and-buy regarding scale economies, since scale economies are conceptualized to be contingent on asset specificity in TCE. Although hitherto empirical evidence regarding the effects of supplier scale and scope economies on making and buying the same assets is consistent with predictions of TCE, this does not imply that TCE provides explanations for make-and-buy, since the underlying logic results works

---

41 Strictly speaking, the measurement of variables has to be done including at least two points in time in order to interpret statistical correlation factors in terms of cause and effects correctly. Normally, the interpretation of correlations as to causes and effects is (and also can be) justified by theoretical underpinning (Schnell et al., 2005). Hence, based on different theoretical considerations the empirical results are as well supportive of the oppositely assumed cause-and-effect chain.

with asset specificity. Additionally, the positive effect of firm scope economies on make-and-buy does not match TCE logic, since TCE would traditionally presume the firm to make in this situation.

Finally, the following proposition summarizes the above argumentation:

> **Proposition 7:   Production costs have the potential to be a performance variable in the explanation of making and buying the same type of assets when conceptualized differently than in TCE.**

3.3.5.   Transaction Costs

Transaction costs as "costs of running an economic system" (Arrow, 1969: 48) represent the efficiency criterion in TCE as the theory's recommendation is to "align transactions which differ in its attributes, with governance structures, which differ in their costs and competencies, in a discriminating (mainly, transaction cost economizing) way." (Williamson, 1991b: 79). In contrast to the significance of this variable inside the TCE framework, the measurement and conceptualization of transaction costs as a performance variable has been utterly neglected, not only in the make-and-buy literature, but also in make-or-buy studies in general (Geyskens et al., 2006). In those TCE studies which included performance measures, these measures referred to firm performance, such as profit (growth) or sales, and not to transaction costs themselves (Geyskens et al., 2006). The inference that higher firm performance, which is influenced by a multitude of different factors, depends only on the alignment of transaction characteristics and governance mode is not tenable (Robins, 1987). Notwithstanding, the effects of make-and-buy on transaction costs have not been studied in the literature to date.

When arguing from a TCE perspective, the consideration and integration of transaction costs as efficiency variable is necessary. According to Williamson (1985), transaction costs can be systematized according to their occurrence and relevance ex ante versus ex post the contract:

ex transaction costs			ex post transaction costs		
(information) search[42]	negotiation	contracting	control and monitoring[43]	enforcement (i.e., incentives)	adaptation

Tab. 3:   Ex ante and ex post types of transaction costs[44]

Based on the different phenomena of make-and-buy, also different performance effects in terms of transaction cost minimization are expected. According to the type of uncertainty, which shall be mitigated by the particular make-and-buy governance form, distinct transaction cost benefits can be realized. Regarding the resolution of performance ambiguity, which entails mainly the problem of insufficient performance due to opportunistic behaviour, especially the ex post transaction cost of control and monitoring as well as the contract enforcement should be reduced in order to turn making and buying the same assets to the comparably most transaction cost efficient governance form in comparison to the remaining governance modes. Considering the alleviation of environmental uncertainty (here, in the form of technological volatility) which comes along with flexibility concerns, ex post transaction costs due to maladaptation should be diminished for making and buying the same type of assets to be the relatively most transaction cost efficient governance form.

In contrast to the handling of ex post transaction costs in TCE, I assume that ex ante transaction costs do not vary systematically with the subsequently chosen governance form. The costs for (information) searching, negotiation, and contracting in advance of the transaction do not differ depending on whether the transaction partner is another firm in the market exchange or an employee in a hierarchical governance form, because a careful choice of the future transaction partner is necessary for every transactions when costly conflicts, contract renegotiations, and permanent changes of the exchange partner are to be avoided. Regarding the ex post transaction costs, distinct cost minimizing effects are plausible due to the different uncertainty resolution, respectively management functions of the different make-and-buy phenomena independently of asset specificity.

Finally, the following proposition summarizes the above argumentation:

---

42   Includes e.g. costs of screening and selecting transaction partners.

43   Includes e.g. also coordination and communication costs.

44   Figure adapted and modified from e.g. Ebers/Gotsch (2006: 278). See also Picot (1982: 270).

Proposition 8: Ex post transaction costs have the potential to be a performance variable in the explanation of make-and-buy when conceptualized differently than in TCE.

3.4. Management

"Bradach/Eccles (1989) have shown how firms deliberately can combine different forms into a single system of "plural governance" to play the governance properties against each other. [...] Note that governance in a plural system is achieved in an indirect fashion, by means of bringing the governance properties of one form to bear on another."

Heide, 1994: 82.

Transaction cost theory characterizes institutional arrangements (synonymous: governance forms), in which the goods or services are exchanged, by two dimensions: On the one hand by the contract law which explicitly or implicitly underlies the exchange relationship and on the other hand by the governance mechanisms, which the transaction partners agree upon, in order to be able to meet possibly arising unplanned changes. These governance mechanisms on their part determine the attributes assigned to each governance form, which are (1) administrative support by bureaucracy, (2), incentive intensity and (3) autonomous vs. coordinated adaptability (Williamson, 1991a; Williamson, 2003; Ebers/Gotsch, 2006). The favorability of different governance forms then depends on their relative cost advantages, which, on their part, depend on the underlying transaction and its characteristics. Hence, the main goal of TCE is to "align transactions which differ in its attributes, with governance structures, which differ in their costs and competencies, in a discriminating (mainly, transaction cost economizing) way." (Williamson, 1991b: 79). As an inference it can be stated that governance attributes result from governance mechanisms and are linked to governance forms by a function of cost minimization.

The following figure shows the mechanisms and the distinct governance forms according to Williamson (1991a and 2003):

Governance Mechanisms	Governance Forms		
	Market	**Hybrid**	**Hierarchy**
Administrative Support by Bureaucracy	Nil	Some	Much
Incentives	High-Powered	Less High-Powered	Low-Powered
Adaptation *autonomous* *coordinated*	strong weak	medium medium	weak strong

Tab. 4:   Generic governance modes with corresponding governance attributes[45]

As the above reasoning points out, TCE is intrinsically destined to provide explanations with respect to governance structure choice and not governance structure management. Nevertheless, TCE is not least prominent among the theoretical approaches that have been used to explain the management of governance structures in empirical studies to date (Heide 2003; David/Han, 2004). However, the conceptualization of management in those studies was predominantly confined to control and monitoring as management mechanism (Heide, 1994). A more comprehensive approach to apply TCE in a way that allows providing explanations of the management of organizational institutions is to understand the alternative governance forms as interdependent with governance mechanisms (Heide, 1994; Joshi/Stump, 1999). As argued above, these governance mechanisms on their part result in the aforementioned governance attributes which are administrative support by bureaucracy, incentive intensity, and autonomous vs. coordinated adaptability (Williamson, 1991a, Williamson, 2003). That implies that the governance forms possess these attributes exactly because corresponding governance processes typically are brought to bear within the particular governance forms. Further, governance forms are chosen or implemented, because they inhere and thereby facilitate the use of the corresponding governance mechanisms. According to TCE, the price mechanism in market governance, which is often referred to as invisible hand[46], assures, for example, that inferior goods or services are superseded by superior ones as a result of competition (e.g. Hill, 1990). Hence, the incentives to perform well are high powered. Due to this effect it is assumed in TCE that firms generally tend to outsource functions to exploit the positive effects

---

45 Adapted from Williamson (2003: 28) and modified.

46 This popular metaphor can be traced back to Adam Smith's pivotal work "The wealth of nations" in 1776. Its meaning is as follows: If each economic actor is allowed to freely choose what to buy respectively to sell, resources will be allocated by an invisible hand optimally in terms of benefiting the whole community (Smith, 1776).

of the price mechanism, respectively competition in the market as long as these functions are not idiosyncratic to the firm (Williamson, 1985). In other words, in order to easily and inexpensively use the price mechanism the firm sources its need from an external supplier. Otherwise, the firm would be forced to use high-powering incentives and the price mechanism in form of, for instance, transfer prices as costly and "foreign body" governance mechanisms within hierarchy are still not able to achieve the same effect as the "natural" price mechanism in the market. Hence, it will be assumed in the following that the governance form shapes the frame for the use of the corresponding governance mechanisms. As the example above points out, the governance form at hand facilitates the use of the corresponding governance mechanisms in terms of cost efficiency. But it does not categorically exclude the use of other governance mechanisms, which are not immediately inherent in the focal governance form, as the example above shows as well. In TCE, transaction characteristics are defined in a way where the governance mechanisms, which are adequate for carrying these transactions, are mutually exclusive.

Diametrically opposed to TCE, another stream of literature conceptualizes governance mechanisms as independent and combinable in a variety of ways (Bradach/Eccles, 1989): Governance mechanisms, which in TCE belong to either market or hierarchy and are therefore mutually exclusive, are here assumed to be combinable in order to allow for a new, different governance form with distinct characteristics, namely make-and-buy. This work, instead, tries to mingle this thesis and antithesis into a synthesis, where indeed the governance form defines and thereby limits the scope of reasonably applicable governance mechanisms, but they are by no means as restricted to one governance form as in TCE logic. As a result, in this work I argue that the specific characteristics of real-world governance forms in general and the characteristics of make-and-buy in particular can better be understood by the different, sometimes idiosyncratic **combinations of the distinct governance mechanisms within one governance structure**.

According to TCE, different institutional arrangements are assumed to be cost advantageous for carrying out the distinct transactions when the transaction characteristics of different transactions diverge. Instead, transactions with equal or akin transaction characteristics, which are carried out through different institutional arrangements are not compatible with TCE in its traditional form and handling.[47] Here, the combination of governance mechanisms, respectively modes from the viewpoint of TCE must be interpreted as a not yet considered "new"

---

47   See chapter 3.

governance form with cost characteristics which differ from those of market, hierarchy, and hybrids.[48] Hence, as an inference it must be stated that TCE in its traditional handling cannot explain the management of make-and-buy. Make-and-buy is in this thesis understood and conceptualized as **distinct governance form** with its **distinct mechanisms** and **(cost) characteristics** and each TCE-based governance mechanism will be elaborated as to explanatory relevance for make-and-buy.

Thereby, consonant with the two identified cases of make-and-buy, i.e., making and buying the same assets and making and buying the same type of assets, the management of this governance form depends on the make-and-buy phenomenon at hand.

3.4.1.   Administrative Support by Bureaucracy

According to Williamson (1991a), administrative support by bureaucracy refers to the enabling/ability of behavioral control and monitoring in order to confine opportunistic activities by bureaucratic organization which is thought to be highly pronounced in hierarchies due to fiat and lesser information impactedness[49], whereas market exchange is characterized by a lack of such bureaucratic administrative support (Ebers/Gotsch, 2006). Control and monitoring mechanisms have received the relatively most attention among the TCE governance attributes (Heide, 1994; Ouchi, 1980). Control, respectively monitoring as one type of governance mechanisms among others is applied to ascertain the degree to which contractual compliance is on hand. For these purposes it is necessary to measure either input or output (Wathne/ Heide, 2000). Input or behavior control "is exercised when supervisors specify the process or behaviors that are believed to lead to desired end-results." while output control is carried out when "formal directives from the organization are specified in the form of end performance measures." (Challagalla/Shervani, 1997: 161). Although, according to orthodox TCE, hierarchical organizations are characterized by an emphasis on behavioral control, topical literature also acknowledges that output control does take place in hierarchies as well, mostly in terms of target agreements and tied up to financial incentives (e.g. Challagalla/Shervani, 1997; Heide, 1994). But since in hierarchies rewards and punishments are not tied to good or bad performance as immediately as in the market, output control is thought to have much more penetrating power in markets (Ebers/Gotsch, 2006). In hybrid governance modes, control and

---

48   This inference is only true when it could be proved that no other explanations apply like e.g. unobserved differences in the transaction characteristics. Potential contradictoriness of make-and-buy with TCE assumptions has been discussed in chapter 3.1.

49   Williamson uses this term synonymously for information asymmetry (Williamson, 1975).

monitoring are based on interest alignment and self-control in the context of a socialization process (Ouchi, 1980; Heide, 1994).

Ambiguity in TCE normally refers to behavioral uncertainty and, therefore, ambiguity in contrast to volatility raises rather control and monitoring issues (Rindfleisch/Heide, 1997; Geyskens et al., 2006).[50] Concerning the make-and-buy argumentation, hence, an alleviation of performance ambiguity (through making and buying the same assets) requires specialized administrative support by bureaucracy, i.e., control and monitoring. Therefore, administrative support by bureaucracy has the potential to explain the management of make-and-buy, which is reflected in the next proposition:

> **Proposition 9: Administrative support by bureaucracy has the potential to explain the management of making and buying the same assets when conceptualized differently than in TCE.**

3.4.2. Incentives / Incentive Intensity

Considering incentives as second governance mechanism, market exchange is characterized by high-powered incentives due to the price mechanism. Firms, however, are thought to provide only low-powered incentives, since rewards are not directly tied to work input. Since the incentive to perform well is dependent on the fact whether the focal economic actor is the owner of property and residual rights and therefore has a strong incentive to perform well. To implement high-powered incentives into the hierarchy, output control in terms of target agreements are not effective without a corresponding performance-related extra payment or other kind of bonus. Hybrids are conceptualized as being located between market and hierarchy regarding incentive intensity.

High-powering incentives are especially relevant for the mitigation of performance ambiguity, because strong incentives are thought to lead to higher performance and thereby mitigate the risk of opportunistic behavior, which is virulent in the case of high performance ambiguity (= behavioral uncertainty) (Heide, 1994). As a consequence, the management of performance ambiguity (by making and buying the same assets) requires besides specific control and monitoring mechanisms, special employment of empowering incentive mechanisms. Since incentive empowerment works only when assets are comparable, this

---

50   See chapter 3.3.2.3.

governance mechanisms is particularly relevant when making and buying refers to same assets. Hence, the next proposition is:

> **Proposition 10:** **Incentives have the potential to explain the management of making and buying the same assets when conceptualized differently than in TCE.**

3.4.3. Adaptation

Concerning the ability to adapt flexibly to changing circumstances, hierarchies are expected to adapt efficiently in a coordinated manner. This means that decisions about investments and realignments in order to react to changing circumstances are made sequentially and coordinately between the parties that bear a long-term bilateral dependency relation, which applies to the members of a firm but also to the parties of alliance (Williamson, 1975/1991a). While coordinated adaptation in hierarchies is of a unilateral kind in that the necessary realignments are decided and ruled top down, coordinated adaptation in hybrid governance modes takes place as mutual adjustment in which the parties negotiate adjustments as environmental changes occur (Noordewier et al., 1990). In contrast, autonomous adaptation of the market allows the economic actors to individually react to changes, such as in demand or supply, which is advantageous in arm's length respectively short-term relationships (Hayek, 1945). Thereby, coordinated adaptation is thought to be less immediate than autonomous and hence the market is thought to react more flexibly/quickly to changing circumstances.

As already acknowledged in TCE, volatility poses an adaptation problem, since incomplete contracts have to be adjusted when unexpected changes in environment occur (Williamson, 1985; Geyskens et al., 2006).[51] As a consequence, the management of volatility (by making and buying the same type of assets) requires special employment of adaptation mechanisms. Therefore, adaptation mechanisms have the potential to explain the management of make-and-buy which is reflected in the next proposition:

> **Proposition 11:** **Adaptation mechanisms have the potential to explain the management of making and buying the same type of assets when conceptualized differently than in TCE.**

---

51 See chapters 3.3.2.2 and 3.3.2.3.

3.5. Is Transaction Cost Theory a useful perspective for make-and-buy?

In terms of asset specificity in its traditional handling, it is not. As argued above, one level of asset specificity can only lead to one distinct institutional arrangement, which is either market when asset specificity is low or hierarchy when specificity is high and the two governance modes do exclude each other mutually. Also, a careful scrutiny, whether asset specificity can unfold an explanatory power either through a consideration of production cost effects or by a combination of specificity with the other TCE variables, leads to the result that asset specificity cannot explain make-and-buy, even when its original TCE application is handled permissively.

The crux here is the unit of analysis of TCE: All explanatory variables aim at the consideration of one single transaction, while make-and-buy simply isn't one single transaction. No matter how good theoretical variables are, they cannot explain phenomena they cannot capture.

Uncertainty (excluding volume uncertainty), however, has the potential to be a quite promising determinant of make-an-buy, but TCE sees uncertainty just in a moderating role between specificity and governance modes and therefore neglects its autonomous explanation potential. Given that behavioral uncertainty as the crucial uncertainty type in TCE, which directly results from the opportunism assumption, is inseparably connected to asset specificity, behavioral uncertainty is for that reason impeded in explaining make-and-buy from the point of view of TCE. The same is true for environmental uncertainty: As long as the effect of uncertainty depends on the level of specificity, external uncertainty cannot explain make-and-buy out of itself.

The direct effects of transaction frequency on make-and-buy have not been examined in the literature to date, but instead, evidence exists as to the impact of scale and scope economies on plural form governance which are inherent in production cost considerations of TCE. As argued above, production and transaction costs are no determinants, but efficiency variables in governance choice in general and make-and-buy in particular. Furthermore, the following propositions resulting from the discussion of this chapter have not been yet clearly expressed: There are conditions under which make-and-buy is an efficient governance mode. Particularly:

Proposition 12: **Under conditions of high performance ambiguity, making and buying the same asset has the potential to be a more efficient governance form than make, buy or ally.**

Proposition 13: **Under conditions of high technological volatility, making and buying the same type of asset has the potential to be a more efficient governance form than make, buy or ally.**

The following table summarizes the proposition that were developed in this chapter:

Prop. 1		Asset specificity is no determinant of make-and-buy.
Prop. 2		Performance ambiguity has the potential to be a determinant of making and buying the same assets when conceptualized differently than in TCE.
Prop. 3	**Determinants**	Volume uncertainty is no determinant of make-and-buy.
Prop. 4		Technological uncertainty has the potential to be a determinant of making and buying the same type of assets when conceptualized differently than in TCE.
Prop. 5		Volatility and ambiguity have the potential to be determinants of the management of make-and-buy when conceptualized differently than in TCE.
Prop. 6		Frequency has the potential to be a determinant of make-and-buy when conceptualized differently than in TCE.
Prop. 7	**Performance**	Production costs have the potential to be a performance variable in the explanation of making and buying the same type of assets when conceptualized differently than in TCE.
Prop. 8		Ex post transaction costs have the potential to be a performance variable in the explanation of make-and-buy when conceptualized differently than in TCE.
Prop. 9		Administrative support by bureaucracy has the potential to explain the management of making and buying the same assets when conceptualized differently than in TCE.
Prop. 10	**Management**	Incentives have the potential to explain the management of making and buying the same assets when conceptualized differently than in TCE.
Prop. 11		Adaptation mechanisms have the potential to explain the management of making and buying the same type of assets when conceptualized differently than in TCE.
Prop. 12	**Alignment**	Under conditions of high performance ambiguity, making and buying the same asset is a more efficient governance form than make, buy or ally.
Prop. 13		Under conditions of high technological volatility, making and buying the same type of asset is a more efficient governance form than make, buy or ally.

Tab. 5: Summary of propositions

In order to contrast again the logic of TCE and the logic that can explain make-and-buy, the figure below shows a brief summary of the arguments put forward in the previous section by juxtaposing the research question, unit of analysis, independent variables, and the efficiency criterion of TCE with either potential or effectively supported explanations of make-and-buy.

Criteria:			TCE	Make-and-Buy
Research Question			Why a certain transaction is organized more efficiently by a certain institutional arrangement?	Why a certain asset is more efficiently sourced through different institutional arrangements?
Unit of Analysis			Single Transaction	Asset/Resource (Intertwined Transaction)
Independent Variables	**Asset Specificity**		Discriminates on the "single transaction level" between make **or** buy	Cannot explain that firms source assets with one or comparable levels of asset specificity in different governance forms
	Uncertainty	**Behavioral**	Is only virulent in the presence of specificity	Solution of performance ambiguity problems by benchmarking high incentive market exchange and bureaucratic hierarchy
		Environmental	Moderates (amplifies) the effect of asset specificity	Coping with technological volatility through mutual learning independently from asset specificity
	Transaction Frequency		Gives no sufficient explanation detached from other TCE variables	Scale economies provide rather an explanation for make **or** buy
Efficiency criterion			Minimizing Transaction Costs	Uncertainty reduction, Minimizing Transaction and Production Costs

Tab. 6:   Juxtaposition of TCE and make-and-buy

To conclude this theoretical disquisition, it can be stated that the missing theoretical underpinning to explain make-and-buy which has been discovered in the existing literature in chapter 2.3, can be confirmed generally and especially regarding TCE. When we now take for granted that TCE's orthodox framework is not appropriate to explain make-and-buy, two possible ways exist to proceed: First, one could seek advice applying other theories like for example the resource-based view, real options perspective, or other (strategic management) theories. Here, a frequent approach is to combine theories in order to enhance the explanatory potential. The second option is to try to extend the traditional TCE framework in order to enable transaction cost economists to incorporate the "anomaly" of make-and-buy as a dependent variable and explainable phenomenon besides make, buy, and ally. The latter seems more auspicious than the former, since no other theory is more predestinated to explain the

choice of governance forms than TCE and an unfixed disability of TCE to explain make-and-buy would leave a gap in this so far quite successful approach. Furthermore, "TCE is one of the leading perspectives in management and organizational studies (David and Han, 2004), has received an increasing amount of attention from a broad range of audiences (Rindfleisch/Heide, 1997), and has emerged as a major paradigm in the academic literature (Hill, 1990)." (Tsang, 2006: 1000). Therefore, the next section provides an attempt in this direction.

4. Extending the TCE Framework

"The objective of this process is to revise theory so that it accounts for the phenomena that the prior theory explained; and in addition, now accurately predicts the phenomena that, to the old theory, appeared to be anomalous."

Christensen et al., 2001: 4.

Based on the previous state of the art of prior research on make-and-buy, this chapter will provide the development of a theory of make-and-buy. The aim of the make-and-buy framework is to explain the determinants, the management, and the performance implications of make-and-buy. In order to accomplish this goal, I follow Christensen et al. (2001) who describe the process by which theory is built and provide some advice of how this process can be improved. The authors propose three steps of "building better theory" (Christensen et al., 2001: 4): First, the phenomenon of interest has to be described carefully in words and numbers. This has been done in chapter 2. Second, with the phenomenon observed and described, researchers have to find categorization schemes. Here, the authors suggest circumstance-based categorization in contrast to attribute-based categorization schemes, because "categories of circumstances [that] enable a theory to state what causes what, and why, and to assert how that causal chain might yield different outcomes in different situations." (Christensen et al., 2001: 11). The hitherto standard framework (= categorization)[52] for exploring questions of make vs. buy is TCE (e.g. Leiblein, 2003), in which the governance choice of make vs. buy is categorized according to the asset specificity of the underlying transaction.[53] It has been argued in chapter 3 that the TCE categorization scheme is not appropriate to explain make-and-buy. Third, theories can be built that explain the behavior of the phenomena, i.e., to state what causes what, and why, must be based on appropriate categorizations. Since this is not given in the existing framework (= TCE) a new and appropriate categorization scheme has to be found in order to develop a theory of make-and-buy.

Hence, the development of a theory of make-and-buy by extending the TCE framework is organized as follows: First, an alternative categorization scheme is proposed as foundation for theory development. Before deriving hypotheses concerning the determinants, the manage-

---

52 Christensen et al. (2001) use the terms framework and categorization synonymously.

53 See the detailed analysis of TCE's explanations of make-and-buy in chapter 3.

ment, and the performance implications of make-and-buy, the assumptions underlying the theory will be clarified.

Alternative Categorization of Economic Institutions

As the above analysis of potential TCE explanations of make-and-buy revealed, asset specificity provides no useful explanation for make-and-buy. Accordingly, asset specificity will no longer be modeled as "big locomotive", i.e., the dominant explanatory variable, but instead, uncertainty in its different appearances serves as dominant independent variable in the explanation of make-and-buy. As the investigation of the appropriateness of TCE logic for make-and-buy revealed, uncertainty (including opportunism-based as well as external) has the potential to be a quite promising determinant of make-an-buy. However, TCE treats uncertainty just as a moderator between specificity and governance modes and therefore neglects its autonomous explanation potential. Independently from asset specificity, TCE provides no explanations as to governance choices under conditions of uncertainty. In contrast to the theory, a recent meta-analysis of empirical TCE studies reveals that the effect of uncertainty as independent variable on governance decisions is not weaker than the effect of the "big locomotive" asset specificity (Geyskens et al., 2006: 530 et seq.). Specifically, some extant evidence in the automotive industry suggests that "transactions-specific investments are unlikely to explain variation in die sourcing decisions […]. [The authors] turn instead to uncertainty in contracting for dies as the source of transactions costs that influence die sourcing decisions." (Anderson et al., 2000: 730). This stresses the necessity of the extension of TCE not only when it shall provide explanations for make-and-buy, but also as an extension and refinement of TCE predictions with respect to the other governance forms, i.e., make, buy, and hybrids. Therefore, in the subsequent make-and-buy framework, uncertainty functions as the dominant explanatory variable and the traditional conceptualization of the relationship between asset specificity and governance choices which is moderated by uncertainty, is turned upside down. Lending words from Williamson (1985), I state that "make-and-buy governance thus holds across uncertain transactions of all kinds, whatever the degree of asset specificity." (Williamson, 1985: 79, modified).

The following figure illustrates the alternative categorization of economic institutions as proposed and employed here.
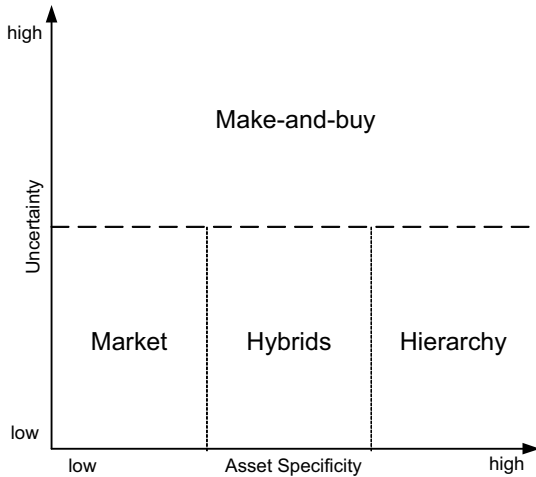
Fig. 11: Alternative categorization of economic institutions

Hence, I model uncertainty to be independent from asset specificity: Whereas under conditions of low to mediocre levels of uncertainty, the traditional TCE holds true, TCE is extended by explicit governance choice statements under conditions of high uncertainty,[54] which are missing in the theory to date. This is consistent with traditional TCE, since Williamson does not require high levels of uncertainty, but assumes that a certain level of uncertainty is at hand when transactions take place: "The third dimension, uncertainty, is assumed to be present in a sufficient degree to pose an adaptive, sequential decision problem." (Williamson, 1985: 79). Beyond that, the alternative categorization stresses and also clarifies the distinction between hybrid modes and make-and-buy, as make-and-buy represents the efficient governance mode under conditions of high uncertainty, while hybrids are prevalent when uncertainty is limited (Williamson, 1985; Master et al., 2004): "Transactions with mixed investment attributes pose especially interesting organizational problems. Unless an appropriate market-assisted governance structure can be devised, such transactions may "flee" to one of the polar extremes as the degree of uncertainty increases. […] Reductions in uncertainty, of course, warrant shifting transactions in the opposite direction." (Williamson, 1985: 80). Make-and-buy are a combination of at least two of the three classical governance forms of market, hybrids, and hierarchy, while make-and-buy (which is the subject in this thesis) represents a combination of hierarchy (make) with at least one buy-

---

54 Note that this applies only for the two uncertainty types which were not explicitly excluded as determinants of make-and-buy in the previous chapter, i.e. technological uncertainty and performance ambiguity.

governance form (market or hybrids). Thereby, it is important to note that plural forms (= make-and-buy) persist across all levels of specificity.

This rather general depiction is, at this point, not yet differentiated regarding its two forms of appearance, i.e., making and buying the same assets and making and buying the same type of assets, as well as regarding the different types of uncertainty. This will be provided in the subsequent chapters 4.1.1 and 4.2.1 where concrete hypotheses will be derived based on the propositions that were developed in the previous chapter.

Behavioral Assumptions

As pointed out in chapter 3.1, the behavioral assumptions of TCE, i.e. bounded rationality, opportunism, and risk neutrality principally remain valid in the subsequent framework. Bounded rationality is assumed to represent the human rationality appropriately and lies therefore at the bottom of all hypotheses which will be derived subsequently. Similarly, opportunism is a central assumption in this thesis which builds the foundation of the following hypotheses. Thereby opportunism is conceptualized according to Williamson (1985) in that it is not assumed that all economic actors will behave opportunistically but that the possibility of opportunistic behavior raises the need to design governance structures which enable a relatively inexpensive handling of potential uncertain behavioral patterns, i.e. opportunism (Williamson, 1985; Hill, 1990). In order to provide assumption-based theory testing with respect to this controversial assumption (e.g. Ghoshal/Moran, 1996), opportunism is incorporated in empirical data analysis.

Frequency

Although frequency seems to be interesting variable to explain make-and-buy and has, so far, also been rather neglected in the literature, I will not integrate this variable into my make-and-buy framework due to two reasons: First, frequency falls behind the other variables regarding its significance in and for the TCE framework (Boerner/Macher, 2002). Second, an integration of frequency into the framework would unnecessarily complicate argumentation while at the same time not improving the model significantly enough to justify the loss of clarity and structuredness of the overall theory. Hence, I have to perpetuate the neglect of the frequency variable in my work.

Management

Furthermore, an extended TCE framework will not only be applied to explain the occurrence of make-and-buy, but also to deduce how make-and-buy will or shall be managed. Based on the elaboration of chapter 3.4, this section provides the introduction of the make-and-buy-

management framework derived from TCE based governance attributes. The governance modes are systematized according to Heide (1994), who distinguishes between market and non-market governance. Non-market governance is further subdivided into unilateral (hierarchical) and bilateral (hybrid) governance (Heide, 1994). Hence, this systematization corresponds to the typical TCE differentiation of governance in market, hierarchy and hybrids. In the following, this governance classification will be augmented by a governance mode, which I term mutual: This means that different governance processes are combined within one mutual governance form[55] and that this mutual governance mode has distinct own attributes and cost characteristics.

The following table shows a conjunction of the systematization of distinct governance modes applied in this thesis and the corresponding governance attributes of the hitherto well-known governance modes make, buy, and hybrids.

Governance Attributes	Governance Modes				
	Market	Non-Market			
		Bilateral (Hybrid)	Unilateral (Hierarchy)	Mutual (Make-and-Buy)	
				Same assets	Similar assets
Administrative Support by Bureaucracy	Nil	Some	Much	Chapter 4.1.2.1	Chapter 4.2.2.1
Incentives	High-Powered	Less High-Powered	Low-Powered	Chapter 4.1.2.2	Chapter 4.2.2.2
Adaptation *autonomous* *coordinated*	strong weak	medium medium	weak strong	Chapter 4.1.2.3	Chapter 4.2.2.3

Tab. 7: Governance modes and governance attributes with mutual governance forms[56]

The details of the governance attributes and corresponding mechanisms of the mutual governance modes, i.e., making and buying the same assets and making and buying the same type of assets will be successively worked out in the chapters 4.1.2 and 4.2.2. Thereby, the combinations of governance mechanisms, which account for make-and-buy are always a

---

55 The term mutual more exactly describes the concurrent use of two distinct governance modes whereas plural governance could entail a combination of more than two distinct governance modes. Hence, mutual governance is a subordinate form of plural governance.

56 Adapted from Williamson (2003: 28) and augmented.

combination of a hierarchical governance mechanism with a non-hierarchical mechanism, since the make-and-buy phenomenon is elaborated from the buyer's perspective.

Finally, the performance implication of the make-and-buy framework will be explicitly elaborated differentiated for each make-and-buy case. The argumentation pointed out that each case has distinct causes and determinants and it can be assumed that either different manifestation of make-and-buy also has different management requirements and hence different performance implications.

Accordingly, the development of the theoretical make-and-buy-framework including the explanation of determinants, management, and performance implications will be carried out for the following two cases separately:

(1) Making and buying the same assets

(2) Making and buying the same type of assets.

4.1. Making and buying the same assets

4.1.1.   Determinants – Transactional Attributes

4.1.1.1.   Performance Ambiguity

Since performance ambiguity occurs when the causes of good or bad performance are not clearly identifiable due to the interplay of bounded rationality and opportunism, it conceptually refers to complexity (Williamson, 1975).

Hence, assets have to be complex, since in case of simple or standard commodities, performance (e.g., quality) is easily assessable and performance ambiguity cannot occur (Parmigiani, 2007; Coles/Hesterly, 1998; Bensaou/Anderson, 1999). Opportunism on the side of the exchange partners[57] provokes performance ambiguity, since performance ambiguity would not pose any (transactional or contractual) problems when all economic actors honestly report about the true nature of their performance (Williamson, 1985; Heide, 2003). Further,

---

[57] A context of division of labor is assumed here, since the exchange of assets either occurs as an inter-personal exchange when supplier and buyer are both inside the firm, or as inter-organizational exchange when the supplier is located outside the firm.

performance ambiguity problems are conceptually based on bounded rationality[58], since otherwise all economic actors would posses all information about the true nature of the other economic actor's performance and no performance ambiguity could arise.[59]

Thereby, performance ambiguity is normally associated with market failure and therefore is expected to lead to a favorability of hierarchical organization, since a supplier can more easily act opportunistically without being detected when the information is asymmetrically distributed in the supplier's interest (Wathne/Heide, 2000; Williamson, 1975).

However, as proponents of property rights and agency theory already suggested in the early 1970ies, performance ambiguity respectively information asymmetry problems in form of performance measurement and moral hazard do by no means turn out to be irrelevant or solved within hierarchies (Alchian/Demsetz, 1972; Bea/Göbel, 2002: 134) – a fact which is also acknowledged by Williamson (Williamson, 1985: chapter 6 and 12.4.). According to agency theory, information asymmetry between principals and agents inside the firm poses a pivotal economic problem[60] and has to be handled by the appropriate employment of control and monitoring mechanisms (Wathne/Heide, 2000). Similarly, Ouchi (1980) argued that hierarchy can fall through in the face of ambiguity because the monitoring and control of employee behavior becomes ineffective when the measures against which behavior or output are benchmarked are ambiguous. "Bureaucracies can fail when the ambiguity of performance evaluation becomes significantly greater than that which brings about market failure. […] In such a system, each superior must have a set of standards to which he can compare behavior or output in order to provide control. When tasks become highly unique, completely integrated, or ambiguous for other reasons, then even bureaucratic mechanisms fail." (Ouchi, 1980: 134-135). Generally, performance ambiguity poses economic problems whenever property rights are not unified in a single person but are distributed between principal and agent (Alchian/Demsetz, 1972), which is the fundamental unit of analysis in TCE. While agents can be located either within or outside the principal's institutional arrangement, the

---

58 Bounded rationality, in turn, is crucial for information asymmetry which is studied representatively for bounded rationality and its derivatives e.g. by Heide, 2003. Williamson uses the term information impactedness as a synonym for information asymmetry (Williamson, 1975).

59 This is a common assumption in economic theories like new institutional economic (especially agency theory) but also in e.g. the resource-based view (e.g. Leiblein, 2003).

60 Whole agency theory deals with the management of opportunistic hazards in economic transactions of principals and agents (Bea/Göbel, 2002: 134).

exchange between principal and agent – based on a contract – is in TCE considered as trans-action.[61]

So far, different means have been put forward to solve performance ambiguity: While new institutional economics propose extensive control and monitoring (in the form of a system or a person) (Alchian/Demsetz, 1972), the problem of "Who will monitor the monitor?" (Alchian/Demsetz, 1972: 782) remains insufficiently addressed whenever the proprietor cannot control and monitor every task or person by himself (Bea/Göbel, 2002). Ouchi (1980), however, suggests clans as appropriate organizational mode when performance ambiguity is high. However, since clans rely upon a relatively complete socialization process to effectively eliminate goal incongruence between individuals (Ouchi, 1979), they may inhere high cost and/or long time to realize socialization and goal congruence to the required degree. As Ouchi notes, "Clearly, a clan is more demanding than either a market or a bureaucracy in terms of the social agreements which are prerequisite to its successful operation." (1979: 838). In contrast, following, for instance Carson et al. (2006) or Heide (2003) I challenge the assumption that the mere existence of relational contracting safeguards such as norms or reputations leads to the elimination of opportunism per se, without explicit consideration of the actual mechanisms through which relational safeguards function and deter opportunism.[62]

In this thesis, I will therefore propose a distinct means by which performance ambiguity can be solved, respectively mitigated, namely make-and-buy:

As I argued above, in the presence of high performance ambiguity, on the one hand, market transactions bear the risk of opportunism problems, since suppliers can more easily stay undetected when delivering low(er) quality and thereby acting opportunistically (Ouchi, 1980; Heide, 2003; Parmigiani, 2003). Hierarchy, on the other hand, suffers from low incentive problems and leads thereby to performance ambiguity not because of missing know-how about the production processes but because of moral hazard of internal staff, i.e., managers or production labor (Alchian/Demsetz, 1972). In other words, **under conditions of high performance ambiguity it comes to both market and hierarchy failure.**

---

61 Recall that "a transaction occurs when a good or service is transferred across a technologically separable interface" (Williamson, 1985: 1), while the pivotal issue is not the physical transfer of goods or services but the transfer of property rights (Ebers/Gotsch, 2006; Chung, 1998).

62 See also Masters et al., 2004 who even ratchet up this argument and state that relational contracting increases the risk of opportunism because a firm creates a small numbers bargaining situation by developing closer ties to exchange partners without the safety of complete integration (Masters et al., 2004: 52-53).

As a result, neither governance form solves the problem of performance ambiguity by itself, but a combination of governance forms which serve as benchmarks for each other, can achieve a reduction of performance ambiguity (Heide, 2003; Dutta et al, 1995). Thereby each sourcing mode (both make and buy) serves to mitigate the weakness of the other sourcing mode and is therefore necessary to reduce the inefficiency of the overall governance mode, i.e., make-and-buy (Dutta et al., 1995).

Making an input and buying identical inputs enables the firm to alleviate performance measurement problems, since the making function enables the firm to better assess the performance of the outside supplier and thereby mitigates the risk of inefficiencies due to bad performance (Parmigiani, 2003). Here, internal production leads to or at least facilitates understanding and knowledge about the production processes and its success factors (Kogut/Zander, 1992; Grant, 1996). Buying is necessary to enhance incentives of the internal production by benchmarking the performance, e.g., product quality, with the performance of the internal production. Recall that this argument is based on the assumption that competition as well as the price mechanisms at the market forces firms to constantly increase or at least maintain a competitive advantage in terms of quality or price in comparison to their competitors (Hill, 1990).

As the performance ambiguity mitigating effect of make-and-buy works only if each governance mode serves as a credible alternative for the other one, the assets in question have to be identical, since the same types of assets cannot be compared and substituted equitably. Based on proposition 2 "performance ambiguity has the potential to be a determinant of making and buying the same assets when conceptualized differently than in TCE", I frame the following hypothesis:

> **Hypothesis 1a: The greater the performance ambiguity, the more likely the firm will make-and-buy the same assets.**

As already argued, performance ambiguity cannot be solved by making and buying the same type of assets, since similar assets are not sufficiently substitutable to create a credible threat of replacing one governance mode with the other. Hence, based on proposition 2, the following hypothesis reflects this argument:[63]

---

63   See additional argumentation according this point in chapter 4.2.

**Hypothesis 1b: No significant relationship will exist between performance ambi-
guity and making and buying the same type of assets.**

4.1.1.2.   *Asset Specificity*

In contrast to environmental uncertainty which leads to contractual respectively opportunistic
hazards only in the presence of asset specificity, behavioral uncertainty (here examined as
performance ambiguity) leads directly to contractual hazards without the necessity of specific
investments (Williamson, 1985: 67). Although behavioral uncertainty is treated ambiguously
in TCE – as I have already argued in chapter 3.3.2.1 – this thesis builds on the assumption
that performance ambiguity raises contractual hazards independently from asset specificity:
Performance ambiguity occurs when the causes of good or bad performance are not clearly
identifiable due to the interplay of bounded rationality and opportunism (Williamson, 1985:
67; Williamson, 1975: 40).[64] Given that bounded rationality and opportunism are basic
assumptions in TCE, performance ambiguity is to a certain degree inherent in every transac-
tion, **independently from asset specificity**. In case of high performance ambiguity, "serious
contractual difficulties" (Williamson, 1985: 67) emerge immediately whatever the degree of
specific investments (Anderson, 1985; Gulati, 1995; Gulati/Singh, 1998). While normally,
asset specificity affects the risk of opportunism it does not affect the risk of opportunism due
to performance ambiguity. The logic is as follows for inter-organizational exchanges: Assets
that are specific to the buyer are better known and understood by the buyer than by any other
firm which includes also all potential suppliers. Therefore, performance ambiguity concerning
buyer-specific assets will be lower for the buyer than for all potential suppliers, which as a
result will not lead to a situation where the supplier can retain output/performance without
being detected by the buyer. In case assets are specific to the supplier, performance ambiguity
may be high for the buyer, but as the buyer has not invested specifically the risk of loss due to
opportunism does not increase because of asset specificity. Regarding inner-organizational
exchanges, low incentive problems arise due to attenuated property rights and not due to asset
specificity. The production of firm-specific assets does not lead the labor to cheat or shirk
more or less.

Hence, based on proposition 1 "asset specificity is no determinant of make-and-buy", the
following hypothesis is derived:

---

64   For detailed disquisition see chapter 4.1.1.1 above.

Hypothesis 2a: No significant relationship will exist between asset specificity and making and-buying the same assets.

4.1.1.3.   Volume Uncertainty

As it has been already argued in chapter 3.3.2.2, volume uncertainty is no reasonable determinant for making and buying the same assets: High volume uncertainty means that the firm produces only the smaller part in-house and leaves the "outsiders to absorb the uncertainties of irregular demand" (Harrigan, 1983a: 32). Considering highly specific assets, such a sourcing strategy would bear the risk of being locked-into a relationship with and being dependent on a potentially opportunistic supplier. Considering lowly specific assets, the significantly higher coordination costs of a simultaneous use of make and buy would not outweigh the benefit of reducing the risk of a volatile demand, especially because volume uncertainty of unspecific assets can likewise be solved by multiple outside suppliers. Thus, founded on proposition 3 "volume uncertainty is no determinant of make-and-buy", I bring forward the following hypothesis:

Hypothesis 3a: No significant relationship will exist between volume uncertainty and making and buying the same assets.

4.1.1.4.   Technological Uncertainty

When considering determinants for make-and-buy, technological uncertainty normally would have to be differentiated into technological volatility and technological complexity. But as elaborated earlier, technological complexity is a prerequisite for performance ambiguity and will hence not be considered separately further.[65] Technological volatility occurs when the future development of currently used technologies is not properly assessable ex ante (Walker/ Weber, 1984; Geyskens et al., 2006). Based on bounded rationality, the impossibility to determine all potential contingencies of future technological requires not safeguarding specific investments but rather adaptation to changing circumstances in a flexible manner (Harrigan, 1983a).

To mitigate the risks of uncertain technological development, the firm has to gain knowledge about and access to different technologies than the ones which are already used in-house. Simultaneous internal as well as external sourcing of perfect substitutes, i.e. identical assets,

---

65   See chapter 3.3.2.3 and 4.1.1.1.

however, cannot solve the risk of the in-house technology becoming obsolete due to techno-logical innovations. Hence, only making and buying of similar but not identical assets opens up the possibility to deal with the challenges of technological volatility. Therefore, technolo-gical volatility is expected to be correlated with making and buying the same type of assets, while a positive relationship is assumed between technological complexity and making and buying the same assets.

A detailed disquisition of technological uncertainty as determinant of make-and-buy can be found in chapter 4.2.1.1. The following hypothesis reflects this reasoning and particularizes proposition 4 "technological uncertainty has the potential to be a determinant of making and buying the same type of assets when conceptualized differently than in TCE":

Hypothesis 4a: No significant relationship will exist between technological vola-tility and making and buying the same assets.

4.1.2.   Management – Governance Attributes

4.1.2.1.   Administrative Support by Bureaucracy

It has been argued in detail that uncertainty in the form of ambiguity raises performance evaluation problems that cannot sufficiently be solved by either market or hierarchy. "In practice, measurement problems could exist that require different monitoring mechanisms to be employed simultaneously. […] If a meaningful standard for some reason is unavailable, output measurement may need to be supplemented with behavior controls and/or socialization processes." (Heide, 1994: 77). The condition of high performance ambiguity represents such a case where performance standards are not available, which leads to the necessity of a combi-nation of different control, respectively monitoring governance mechanisms. In such a case, output control of internal staff is not effectively applicable directly.[66] On the one hand, without available quality standards performance-linked incentives work only restrictedly, because output can only be measured in terms of financial targets, which are possibly achiev-able without reaching the originally aimed at quality targets/standards. On the other hand, lacking performance measures, behavior control is likely to suffer from the same shortcom-ings, since the specification of processes that shall lead to a result which itself cannot exactly

---

[66] Note that the combinations of governance mechanisms which account for make-and-buy are always a combination of a hierarchical governance mechanism with a non-hierarchical mechanism, since the make-and-buy phenomenon is elaborated from the buyer's perspective.

be specified seems difficult. Instead, output control under these conditions can only take place in interaction/conjunction with behavior control.

Since performance ambiguity emerges as a performance evaluation/ measurement problem, I follow Carson et al. (2006) in their assessment that "relational contracting suffers from many of the same liabilities with respect to ambiguity and monitoring problems that Ouchi attributed to hierarchy." (Carson, 2006: 1058). Hybrid governance modes are based on social sanctioning mechanisms that are only effective when justified by a correct evaluation whether the transaction partner has behaved opportunistically or not, which is not true under conditions of high performance ambiguity. Hence, given high performance ambiguity hierarchical control mechanisms have to be combined with market-like control and monitoring. Thereby, market governance as part of a make-and-buy strategy does not refer to arm's length relationships but rather to middle-to long-term buyer-supplier relationships.

Therefore, I put the following hypothesis:

> **Hypothesis 5a:** **Under conditions of high performance ambiguity a positive relationship will exist between making and buying the same assets and a combination of intensive behavior and output control mechanisms.**

4.1.2.2.   *Incentives / Intensive Intensity*

In order to enable an effective containment of opportunism from both relationships, i.e., internal as well as external, output control inside the hierarchy has to augment behavior control of the supplier. Since output control in hierarchical organization has to be tide to outcome target agreements, in order to relate work input and output to each other effectively, output control in hierarchies refers to incentive-powering mechanisms, such as, for instance, performance-linked payments, bonuses, profit sharing or immaterial (non-financial) incentives, similar to ideas contest for process improvement. The hypothesis below expresses these arguments:

> **Hypothesis 5b:** **Under conditions of high performance ambiguity a positive relationship will exist between making and buying the same assets and high-powering incentive mechanisms inside the firm.**

4.1.2.3.   Adaptation

Since adaptability is not the major issue when making and buying the same assets due to performance ambiguity, there is no need for extraordinary use of autonomous and/or coordinated adaptation mechanism. Therefore, I will not shape an explicit hypothesis here, although it may be plausible that due to a combination of hierarchical coordinated adaptability and market-like autonomous adaptability, both could be of moderate value.

4.1.3.   Performance Implications

Make-and-buy in general, and in cases of high performance ambiguity in particular, is only a useful strategy when the costs of coping with uncertainty exceed the cost of coordinating two sourcing modes simultaneously. Furthermore, make-and-buy is only superior compared to other governance forms when the costs which arise due to preventing the threatening opportunism under conditions of high performance ambiguity are lower for make-and-buy than for other governance forms. And in fact, this is what I assert here: While, at first glance, it may appear that the general costs of maintaining an institutional arrangement are higher for make-and-buy in comparison to either make or buy, this proves false under conditions of high performance ambiguity: Both market and hierarchy fail in the presence of high performance ambiguity, because the required control and monitoring mechanisms to control for potential opportunism would be prohibitively high for each governance form separately. Concerning market, complete contracts are impossible to draft and at the same time still do not confine possible opportunism sufficiently (Williamson, 1975/1985). Concerning hierarchy, extensive control and monitoring as well as incentive powering mechanisms are ineffective when output or behavior cannot be measured against a standard and furthermore imperil profitability of internal production due to high bureaucracy costs (Ouchi, 1980). And this is exactly the point with which a combination of make and buy ties in: The possibility to benchmark the performance of each supplier with the other one provides the firm with a standard against which performance can be measured. Based on the superior control and monitoring mechanisms of internal production as well as external procurement, making and buying the same assets leads to higher performance under high performance ambiguity conditions than other governance forms. Furthermore, the credible threat of substituting internal production with the procurement of an external supplier or vice versa powers incentives of both suppliers. The following hypothesis reproduces this logic:

Hypothesis 8a: **Making and buying the same assets under high performance ambiguity leads to higher supplier performance than other governance forms under these conditions.**

As it has been argued, the reason why markets as well as hierarchies fail under conditions of high performance ambiguity is that the governance mechanisms which have to be employed in order to reduce opportunism are prohibitively high for each governance form separately. In the presence of high performance ambiguity, on the one hand, market transactions bear the risk of opportunism problems, since delivery of low(er) quality or other opportunistic actions of suppliers are obscured much more easily (Ouchi, 1980; Heide, 2003; Parmigiani, 2003). Hierarchy, on the other hand, suffers from low incentive problems and leads thereby to performance ambiguity because of moral hazard problems inside the organization (Alchian/Demsetz, 1972). As a consequence, also the transaction costs of each governance form individually would be prohibitively high under high performance ambiguity. By combining the sourcing modes of both make and buy, making and buying the same assets serves to mitigate the weakness of each single mode and is therefore able to reduce the transaction costs of the overall governance mode, i.e., make-and-buy in comparison to each mode separately (Dutta et al., 1995). Based on this stream of argumentation the following hypothesis is:

Hypothesis 8b: **Making and buying the same assets under high performance ambiguity entails lower buyer-specific transaction costs than other governance forms under these conditions.**

A good resolution of performance ambiguity is therefore not only tantamount to high a performance of the buyer-supplier relationship in terms of product quality, price, reliableness of delivery etc. (generally referred to as supplier performance) and lower buyer-specific transaction costs, but it would also manifest itself in lower ex-post opportunism of the focal supplier. As argued already, the presence of high performance ambiguity bears the risk of opportunism, since suppliers can more easily stay undetected when delivering low(er) quality and thereby acting opportunistically (Ouchi, 1980; Heide, 2003; Parmigiani, 2003). As a consequence, a resolution of performance ambiguity should minimize opportunism when making and buying the same assets under conditions of performance ambiguity in comparison to other governance forms. The following hypothesis summarizes this reasoning:

Hypothesis 8c: **Making and buying the same assets under high performance ambiguity entails lower supplier (ex post) opportunism than other governance forms under these conditions.**

A clear conceptual separation between production and transaction costs is troublesome and shall therefore not be undertaken here (Milgrom/Roberts, 1992). However, in comparison with making and buying the same type of assets, making and buying the same assets due to performance ambiguity entails rather transaction (cost) related benefits like supplier performance,[67] lower buyer-specific transaction cost, and lower supplier opportunism than production (cost) related benefits (like e.g. economies of scale and scope)[68] as the above hypotheses point out. This distinction shall serve the accentuation of the distinct phenomena of make-and-buy with its distinct performance implications.

4.2. Making and buying the same type of assets

4.2.1. Determinants – Transactional Attributes

4.2.1.1. Technological Uncertainty

Since technological volatility occurs when the future development of currently used technologies is not properly assessable ex ante, the future value of currently used technological assets may vary dramatically (Walker/Weber, 1984; Geyskens et al., 2006). In transaction costs economics uncertainty in general and technological volatility in particular are understood as bearing a risk and thereby inhering a negative notion. But hypothetically, future developments can also bear opportunities and competitive advantages and hence stand for positive impacts.

In contrast to TCE predictions, it has been supported empirically that technological uncertainty (mostly measured as volatility though) favors external procurement respectively outsourcing, because quickly changing technologies render (specialized) assets obsolete, which – when deployed inside the firm –implicate high depreciations (Boerner/Macher, 2002; Balakrishnan/Wernerfelt, 1986). When the supplier is saddled with the uncertainties of technological change, the firm, on the one hand has no need to constantly modernize own produc-

---

67   Existing empirical research finds support for the idea that organizing transactions in accordance with transaction cost principles improves organizational performance (Argyres/Bigelow, 2007; Bigelow, 2003; Silverman et al., 1997).

68   See chapter 4.2.3.

tion facilities and, on the other hand, due to high competitiveness of the market, can expect state-of-art technology from its. But in cases the focal technology represents (a part of) the core business of the firm and hence important knowledge or skills, problems may arise in terms of knowledge outflow and as a consequence the risk of dependency on the supplier, which in turn may open up opportunities for opportunistic exploitation.

Here, buying[69] assets from a skilled supplier in order to learn from the supplier's skills and at the same time use this knowledge in the making of own assets based on similar technology enables the firm to keep up with technological development while omitting the risk of potential obsolescence of internal production technologies. At the same time, the internal production is necessary to enable the firm to assess and absorb the supplier's knowledge (absorptive capacity) (e.g. Cohen/Levinthal, 1990; Lane/Lubatkin, 1998; Veugelers/ Cassiman, 1999). "The ability to exploit external knowledge is thus a critical component of innovative capabilities. We argue that the ability to evaluate and utilize outside knowledge is largely a function of the level of prior related knowledge. Thus, prior related knowledge confers an ability to recognize the value of new information, assimilate it, and apply it to commercial ends. These abilities collectively constitute what we call a firm's "absorptive capacity." […] through direct involvement in manufacturing, a firm is better able to recognize and exploit new information relevant to a particular product market. Production experience provides the firm with the background necessary to both recognize the value of and implement methods to reorganize or automate particular manufacturing processes." Cohen/Levinthal, 1990: 128-129)

Thereby, the assets have to be similar in type to enable learning, but shall not be completely identical, because making and buying the same assets leaves only little room to learn from the supplier. On the one hand the asset shall not be identical, since in the case of uncertain future technological development it would be important to spread technological know-how across different areas which could turn out to be promising in the future. A diverse knowledge background provides a more robust basis for learning and thereby also facilitates the innovative process (Cohen/Levinthal, 1990). But on the other hand the technology should be similar to a degree that enables the firm to absorb the knowledge (e.g. Dussauge et al., 2000; Cohen/Levinthal, 1990; Lane/Lubatkin, 1998; Lane et al., 2001). Firms are better able to acquire new knowledge and capabilities when they already possess a know-how base that

---

69 Buying does not mean necessarily that buyer and supplier have an arm's length relationship. Concerning making and buying due to technological volatility the buy function may rather be of a hybrid type. For a detailed definition of make-and-buy see chapter 2.2. For an elaborated explanation of the governance attributes of making and buying due to technological volatility see chapter 4.2.2.

resembles the new knowledge that they are looking for. "Firms operating in the same business typically share a common competence base because they use similar technologies, satisfy similar customer needs, serve similar customers, and offer related products. Building on this idea, Lane/Lubatkin (1998) argue that firms which share similar concerns and face similar problems, and therefore […] can more easily learn from one another." (Dussauge et al., 2000: 101).[70]

Employing a make-and-buy strategy can help to resolve technological volatiltiy in two ways: First, by keeping up with current technological developments and requirements of the "market", the firm can prepare itself for upcoming innovations and will not be overwhelmed by them. Second, in cases a technological change occurs, the firm can more quickly adapt to the new technology by either procuring the new assets transitionally[71] from the supplier (who already possess the new technological skills) or by jointly implementing or developing the required new technological skills or processes.

Hypothesis 4b summarizes this stream of reasoning, derived from proposition 4 "technological uncertainty has the potential to be a determinant of making and buying the same type of assets when conceptualized differently than in TCE":

Hypothesis 4b: The greater the technological volatility, the more likely the firm will make-and-buy the same type of assets.

4.2.1.2.   *Asset Specificity*

Technological volatility occurs when the future development of currently used technologies is not properly assessable ex ante (Walker/Weber, 1984; Geyskens et al., 2006). Specific investments are understood as investments in special purpose technologies (Williamson, 1985). TCE logic thereby argues that "asset specificity arises in an intertemporal context. […] parties to a transaction commonly have a choice between special purpose and general purpose investments. Assuming that contracts go to completion as intended, the former will often permit cost savings to be realized. But such investments are also risky, in that specialized assets cannot be redeployed without sacrifice of productive value if contracts should be

---

70 Of course, delineating similar assets from identical assets is surely an empirical challenge. See chapter 6.2.2.1 for a detailed discussion of this issue.

71 Generally, make-and-buy can also occur as a temporary strategy in that a firm wants to learn new skills and therefore starts buying the relevant assets (in large parts) from a supplier and turns to producing solely in-house once the necessary knowledge was built. But since make-and-buy is conceptualized as equilibrium strategy in this thesis, this case will not further be elaborated.

interrupted or prematurely terminated. General purpose investments do not pose the same difficulties. "Problems" that arise during contract execution can be solved in a general asset regime by each party going his way." (Williamson, 1985: 54). I agree with Williamson in that general purpose investments do not pose the same difficulties, but I claim that they do pose difficulties of a different kind. Under conditions of high technological dynamism, difficulties arise less in behavioral terms due to opportunism and contractual hazards. Instead, unpredictable changes in the technologies pose difficulties with adaptation to changing circumstances in a flexible manner (Harrigan, 1983a).

While specific assets are hardly redeployable when the execution of the transaction to which the assets are specific is disrupted, the productive value of generally all assets – independently of their specificity – is negatively affected by unforeseen changes in the underlying technology. Since the extent of the investment in terms of financial, human or physical spending does not vary systematically with the degree of specificity, technological volatility affects specific and unspecific investments likewise: Adaptation problems of the production with specific technologies do not arise due to insufficient adaptability of the governance form at hand but only due to the possibility of opportunistic exploitation when adaptations to occurred changes have to be negotiated. But since Williamson considers technological uncertainty only in the presence of specificity, uncertainty does not pose governance problems by itself but only enhances the risk of opportunism when specific investments have been made. As a consequence, in this thesis, it has been argued that technological uncertainty is only useful to explain make-and-buy when uncoupled from specificity.

Thus, considering technological volatility and thus uncertainty as independent from specificity and adaptability problems as from safeguarding then implications for organizing governance forms efficiently diverge from orthodox TCE reasoning (Williamson, 1985): According to traditional TCE, special purpose investments are thought to be affected more heavily by technological change than general purpose investments, since value of assets in first-best use may decline dramatically until in the extreme case it is tantamount to the brake-up value. According to TCE, contractual hazards arise in cases of high technological uncertainty, because the transaction partner gets the opportunity to exploit the firm opportunistically, since incomplete contracts have to be adjusted to new circumstances (technology) and negotiation may be time-consuming and costly. The firm is locked-in to this situation, because it has invested in assets which are specific to this very transaction and the termination of the transaction would entail capital loss. This holds true for an external procurement of specific assets,

which therefore is not recommendable from the viewpoint of TCE (Balakrishnan/Wernerfelt, 1986). But what happens in cases of internal production with a technology that may quickly become obsolete due to high technological dynamisms?

From the viewpoint of TCE, no transaction cost relevant problems like opportunism or contractual hazard arise, since internalization is thought to be the remedy of potential opportunistic exploitation and the firm adapts to changed technological requirements in a coordinated manner. But "it follows that vertical integration implies investment with low salvage value and hence it increases the size of capital loss, if a major innovation occurs. […] The risk of technological obsolescence would consequently moderate the incentives to integrate, *ex ante*. A highly volatile industry characterized by frequent technological changes, therefore, will be unattractive for high levels of integration." (Balakrishnan/Wernerfelt, 1986: 352-353).

As an inference of this argumentation, TCE focuses on the problem of costly safeguarding of specific investments when changes occur under conditions of high (technological) uncertainty, instead of contemplating on flexibility or promptness of adaptation of different governance forms. And that's why Williamson claims that "market governance (classical contracting) thus holds across standardized transactions of all kinds, whatever the degree of uncertainty." (Williamson, 1985: 79). In contrast to that, I assume here that technological uncertainty in the form of volatilty does indeed pose governance problems in terms of appropriate adaptability to changing environments which are independent of the specificity of the assets at hand, but rather depending on volume of financial, human or physical spending and which can be solved by making and buying the same type of assets.[72] Derived from proposition 1 "asset specificity is no determinant of make-and-buy", the subsequent hypothesis is:

Hypothesis 1b: No significant relationship will exist between asset specificity and making and-buying the same type of assets.

4.2.1.3.   *Performance Ambiguity*

As part of environmental uncertainty, technological uncertainty can reasonably be subdivided into technological volatility and complexity.[73] Given the assumption of bounded rationality, technological volatility is equivalent to technological unpredictability. This uncertainty type refers to changes in the environment (here: technology) and since economic actors are

---

72 See chapter 4.2.1.1.

73 See chapter 3.3.2.3.

boundedly rational, they are not able to predict all possible changes that can occur, respectively the probabilities of the occurrence of possible changes. In contrast, technological complexity is a condition for performance ambiguity, since technological complexity, defined as multiplicity and interconnectedness of components and technologies, "increases the difficulty in evaluating quality through inspection prior to use" (Parmigiani, 2007: 290; see also e.g. Coles/Hesterly, 1998; Bensaou/Anderson, 1999). Therefore, all arguments put forward regarding performance ambiguity are valid in equal measure in cases of high technological complexity and will not be elaborated further at this point.[74]

4.2.1.4.   Volume Uncertainty

According to the discussion in chapter 3.3.2.2, volume uncertainty is not considered a reasonable driver of making and buying the same type of assets: Volume uncertainty is high when the buyer produces a small part of asset in-house, because it leaves the production of the greater irregular/uncertain part to the supplier. If at all, only making and-buying of same assets could possibly be suitable to solve volume uncertainty, because assets have to be perfect substitutes to enable augmenting one supplier with another when unexpected uncertainties arise. The attempt to reduce volume uncertainty by making and buying similar assets bears the risk of (additional) set-up costs and delay, since production equipment has be adjusted to manufacture the similar but not identical assets.

Hence, based on proposition 3 "volume uncertainty is no determinant of make-and-buy", the following hypothesis phrases this reasoning:

Hypothesis 3b: No significant relationship will exist between volume uncertainty and making and buying the same type of assets.

4.2.2.   Management – Governance Attributes

4.2.2.1.   Administrative Support by Bureaucracy

In contrast to performance ambiguity, technological volatility raises rather flexibility and adaptability concerns regarding the adjustment to unforeseen future developments. As a consequence, not the monitoring of a potentially opportunistic supplier is the major issue

---

74 See chapter 4.1 for the stream of argumentation concerning making and buying the same assets due to performance ambiguity.

under conditions of high technological volatility, but an adequate combination of hierarchical and market adaptation mechanism to provide flexibility. Nevertheless, some administrative support is necessary to enable, respectively enhance collaboration and learning between partners. While the focus of control mechanisms under conditions of performance ambiguity is on motivational aspects, administrative support by bureaucracy under conditions of technological volatility concentrates rather on coordination aspects.

Since technological volatility emerges as a problem of unpredictable future events, I follow Carson et al. (2006) in their assessment that "the effectiveness of formal contracts will decrease as volatility increases", since "ex post adjustments are problematic because contracts are inflexible and must be undone and renegotiated to accommodate change" (Carson, 2006: 1061). Hybrid governance modes, in contrast, are based on social sanctioning mechanisms, which are not disabled under conditions of environmental volatility. "Indeed, behavior during ex post adjustments provides some of the clearest evidence on the cooperative or opportunistic intentions of partners. Hence, assessments of reputations and decisions concerning the extension of trust that must be made accurately for social sanctioning and relational contracting to be effective (discussed below) should only become more accurate as volatility increases." (Carson, 2006: 1061). Following this logic, hierarchical control mechanisms have to be combined with hybrid control mechanism given high technological volatility.

Based on proposition 5 "volatility and ambiguity have the potential to be determinants of the management of make-and-buy when conceptualized differently than in TCE", hypothesis 5c proposes a positive relationship between making and buying the same type of assets and an intensive coordination between buyer and supplier under condition of high technological volatility:

> **Hypothesis 5c:** **Under conditions of high technological volatility a positive relationship will exist between making and buying the same type of assets and an intensive coordination between buyer and supplier.**

4.2.2.2.   *Incentives / Incentive Intensity*

Similar to monitoring, incentive empowering mechanisms relate to motivational aspects of governance. As making and buying the same type of assets is argued to be the adequate governance mode to enable a firm to adapt flexibly to changing technological circumstances, it does not have to be managed to empower incentives of internal or external suppliers. Making and buying similar but not identical assets is incapable of empowering incentives as

described in the case of making and buying the same assets, because benchmarking performance of distinct suppliers is not possible with distinguishable assets. Hence, no credible threat of substituting one supplier with the other can be built. Therefore, no extraordinary use of high-powering incentive mechanisms is expected in the case of making and buying the same type of assets. Therefore, I will not shape an explicit hypothesis here.

4.2.2.3.   Adaptation

It has been argued that uncertainty in the form of volatility raises problems of maladaptation, which cannot be solved as sufficiently by either market or hierarchy as by making and buying the same type of assets. In order to maximize flexibility, the firm has to be open to multiple options on how to react to changing circumstances. Thereby, hierarchical adaptation provides on the one hand the advantage that adaptation takes place in a coordinated manner without the need to renegotiate with a transaction partner. On the other hand, coordinated adaptation is expected to be less expeditious in its reaction time than autonomous adaptation in markets (Balakrishnan/Wernerfelt, 1986). However, "given the short-term nature of interactions under market governance, the need for making ongoing adjustments is somewhat limited by default. To the extent that changes are contemplated by either party, they tend to give rise to transaction cancellation ("exit") or some form of immediate compensation." (Heide, 1994: 77).

In order to be able to react to shifting technology in diverse ways depending on how the firm wants to adapt to this change, the simultaneous maintenance of distinct adaptation mechanisms based on the simultaneity of distinct generic governance modes is necessary.

Based on the argumentation that formal contracts in market exchanges are "inflexible and must be undone and renegotiated to accommodate change" (Carson et al., 2006: 1061), the market adaptation mechanism is inappropriate in volatile environments (Carson et al., 2006). In contrast to formal contracting, bilateral adaptation mechanisms in relational contracting are expected to provide a more adequate flexibility for a firm to react quickly to changing circumstances, because adjustments in hybrid governance modes are based on processes of mutual and joint renegotiation and implementation of changes as environmental variations unfold (Heide, 1994; Noordewier et al., 1990).

> **Hypothesis 5d: Under conditions of high technological volatility a positive relationship will exist between making and buying the same type of assets and a combination of coordinated bilateral and coordinated hierarchical adaptation mechanisms.**

4.2.3. Performance Implications

Similar to making and buying the same assets, making and buying the same type of assets due to high technological volatility is only a useful strategy when the costs of coping with uncertainty exceed the cost of coordinating two sourcing modes simultaneously. Furthermore, make-and-buy is only superior compared to other governance forms when the costs, which arise due to preventing the inflexibility and obsolescence under conditions of high technological volatility, are lower for make-and-buy than for other governance forms. Therefore, I assert here, too, that although at first glance, it may appear that the general costs of maintaining an institutional arrangement are higher for make-and-buy in comparison to either make or buy, this proves false under conditions of high technological volatility.

Neither market nor hierarchy can solve the problem of maladaptation, which is raised by uncertainty in the form of volatility, as sufficiently as making and buying the same type of assets. In order to maximize flexibility, the firm has to be open to multiple options to react to changing circumstances. Thereby, hierarchical adaptation provides, on the one hand, the advantage that adaptation takes place in a coordinated manner without the need to renegotiate with a transaction partner. On the other hand, coordinated adaptation is expected to be less expeditious in its reaction time than autonomous adaptation in markets (Balakrishnan/ Wernerfelt, 1986). In order to be able to react to shifting technology in diverse ways depending on how the firm wants to adapt to this change, the simultaneous maintenance of distinct adaptation mechanisms, based on the simultaneity of distinct generic governance modes, is more efficient in terms of flexibility.

The following hypothesis reproduces this logic:

> **Hypothesis 8d: Making and buying the same type of assets under high technological volatility leads to higher buyer flexibility than other governance forms under these conditions.**

Furthermore, it has been argued in detail that making and buying the same type of assets enables learning.[75] Under conditions of high technological volatility, the crucial asset, which has to be sourced, is know-how, respectively knowledge rather than the tangible component. Hence, the sourcing strategy refers to knowledge creation or acquisition (buy) and knowledge diversification in-house (make). Thereby, by making and buying the same type of assets

---

75 See chapter 4.2.1.1.

under conditions of high technological volatility, the firm can benefit from organizational knowledge gaining and learning, which are reflected in production cost advantages. Production cost advantages can express themselves in scale, respectively scope economies (Parmigiani, 2003; Macher/Boerner, 2006). By exploiting learning curve effects, based on the acquisition of (the supplier's) knowledge about process improvements, the firm can produce with lower per unit costs and thereby achieve economies of scale (Parmigiani, 2003). Based on this stream of argumentation the following hypothesis is:

> **Hypothesis 8e: Making and buying the same type of assets under high technological volatility leads to higher buyer scale economies than other governance forms under these conditions.**

Economies of scope, instead, are present when cost savings or performance benefits are realized, because activities can share productive inputs at little or no additional cost. Here, internal spillovers of knowledge are identified as a source of returns that results from greater diversity of knowledge (Henderson/Cockburn, 1996); Macher/Boerner, 2006). By making and buying the same type of assets, firms acquire knowledge from a skilled supplier and thereby diversify and extend their own knowledge base, potentially resulting in production cost benefits through scope economies.

The following hypothesis reflects this logic:

> **Hypothesis 8f: Making and buying the same type of assets under high technological volatility leads to higher buyer scope economies than other governance forms under these conditions.**

In comparison with making and buying due to performance ambiguity, making and buying the same type assets due to technological volatility entails rather production (cost) related benefits like buyer flexibility and economies of scale and scope than transaction (cost) related benefits (like e.g. lower buyer-specific transaction cost, and lower supplier opportunism) as the above hypotheses point out. As argued already, this distinction shall serve the accentuation of the distinct phenomena of make-and-buy with its distinct performance implications and not provide a clear conceptual separation between production and transaction costs, which is regarded as troublesome (Milgrom/Roberts, 1992).

4.3. Summary of Hypotheses

The following table shows a synopsis of the previously developed hypotheses with their systematization according to determinants, management, and performance statements.

H 1a		The greater the performance ambiguity, the more likely the firm will make-and-buy the same assets.
H 1b		No significant relationship will exist between performance ambiguity and making and buying the same type of assets.
H 2a		No significant relationship will exist between asset specificity and making-and-buying the same assets.
H 2b	Determinants	No significant relationship will exist between asset specificity and making and-buying the same type of assets.
H 3a		No significant relationship will exist between volume uncertainty and making and buying the same assets.
H 3b		No significant relationship will exist between volume uncertainty and making and buying the same type of assets.
H 4a		No significant relationship will exist between technological volatility and making and buying the same assets.
H 4b		The greater the technological volatility, the more likely the firm will make-and-buy the same type of assets.
H 5a		Under conditions of high performance ambiguity a positive relationship will exist between making and buying the same assets and a combination of intensive behavior and output control mechanisms.
H 5b	Management	Under conditions of high performance ambiguity a positive relationship will exist between making and buying the same assets and high-powering incentive mechanisms inside the firm.
H 5c		Under conditions of high technological volatility a positive relationship will exist between making and buying the same type of assets and an intensive coordination between buyer and supplier.
H 5d		Under conditions of high technological volatility a positive relationship will exist between making and buying the same type of assets and a combination of coordinated bilateral and coordinated hierarchical adaptation mechanisms.

H 8a		Making and buying the same assets under high performance ambiguity leads to higher supplier performance than other governance forms under these conditions.
H 8b		Making and buying the same assets under high performance ambiguity entails lower buyer-specific transaction costs than other governance forms under these conditions.
H 8c	Performance &Alignment	Making and buying the same assets under high performance ambiguity entails lower supplier (ex post) opportunism than other governance forms under these conditions.
H 8d		Making and buying the same type of assets under high technological volatility leads to higher buyer flexibility than other governance forms under these conditions.
H 8e		Making and buying the same type of assets under high technological volatility leads to higher buyer scale economies than other governance forms under these conditions.
H 8f		Making and buying the same type of assets under high technological volatility leads to higher buyer scope economies than other governance forms under these conditions.

Tab. 8: Summary of hypotheses

4.4. Basic Research Model

Resulting from the argumentation in the previous sections of this chapter, a theory of make-and-buy, based on an extended TCE framework, can be presented. Thereby, this model entails two streams of argumentation, which tell different stories:

First, making and buying the same assets lies at the core of TCE opportunism problems and is assumed to be the most efficient governance form when performance ambiguity is high and, hence, both markets and hierarchies fail. Here, especially control and incentive mechanisms are needed to manage make-and-buy in order to benefit from the advantages of both ideal type governance modes, while mitigating the disadvantages (Heide, 2003). Thereby, these benefits are rather transaction (cost) related.

Second, making and buying the same type of assets is assumed to be the most efficient governance form when technological volatility is high and the risk of obsolescence of technology (investments) in a dynamic environment favors broad diversification of the knowledge base of

the firm through acquisition or cooperation without losing the skills in-house (Cassiman/ Veugelers, 2006). To solve this high environmental volatility, flexible adaptation and coordination mechanisms are required for managing make-and-buy. Hence, the benefits of making and buying the same type of assets are rather production (cost) related.

The figure below illustrates the basic logic of the two streams of argumentation reflecting the above elaborated hypotheses, which are subsequently to be tested empirically:
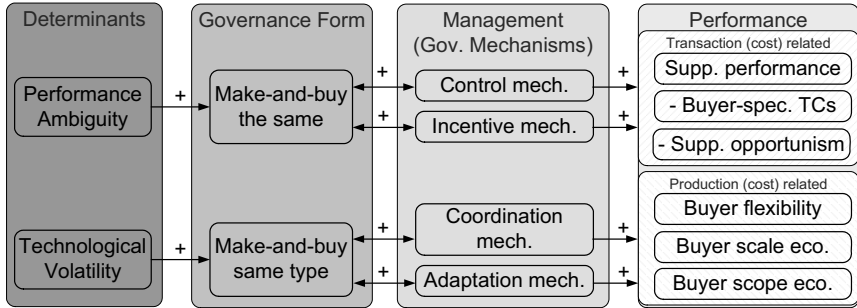
Fig. 12: Two streams of make-and-buy-argumentation

5. Empirical Survey

The research process can be structured along several stages which have to be completed in order to ensure that the research project meets the qualitative requirements that enable scientific progress (Schnell et al., 2005): Starting with the research question (chapter 1.1), theoretical hypotheses about cause-and-effect-chains have to be developed (chapter 3 and 4). Then, based on the research model (summarized in chapter 4.4), the selection and development of an appropriate *research design* (chapter 5.1) have to take place. Subsequently, the sample of units of analysis in the empirical setting (chapter 5.2) has to be chosen in interaction with the data collection method and the development of the operationalization of the constructs (chapter 5.3 and 6.2) to finally analyze the collected data with the according data analysis methods (chapter 5.5).

The following chapter describes how the theoretically derived hypotheses are brought to empirical testing according to the research process above. Thereby, the subsequent paragraphs deal with each issue consecutively.

5.1. Research Design

The subject of investigation serves as a starting point for the selection respectively the development of an appropriate research design (Schnell et al., 2005; Yin, 2003). In this thesis, the subject of investigation is the effect of different types of uncertainty as determinants on make-and-buy as governance form, which in turn is thought to be interrelated with specific management mechanisms. Furthermore, the appropriate alignment of determinants, management and make-and-buy is expected to lead to higher performance. Although make-and-buy implicates a combination of intra- with interorganizational aspects, the focus of this thesis is on make-and-buy as an intraorganizational phenomenon, since the question is "why does a firm choose to simultaneously make and buy an input and how does this firm manage this procurement mode efficiently?". These procurement choices with their antecedents and effects are fine-grained organizational phenomena which cannot be directly observed in secondary data[76] or within an experimental design (Parmigiani, 2003). The multitude and

---

76   Such as archival data, annual reports, or other records which can be found in databases.

complexity of variables can neither be sufficiently reproduced under laboratory conditions[77] nor as an experiment in the field[78]. In questionnaires, however, items that closely reflect their theoretical variables can be created in the form of questions respectively statements about real facts. Thereby, usually mailed questionnaires, are the most common method of investigating procurement choices (Shelanski/Klein, 1995).

As a result, as most appropriate research design, an ex-post-facto-design in the form of a survey-design has been chosen in this work.[79] In order to be able to analyze correlations that underlie the hypotheses quantitatively, a large scale of data about procurement decisions has to be collected. Since, in this thesis, I aim to explain make-and-buy decisions in industrial purchasing, the target population includes all purchasing decisions in the manufacturing industry (in Germany). As next step, an adequate sampling of units of analysis is necessary, because it is not reasonable in terms of time and costs to collect data from the entire target population. Generally, a sample can be generated by either a random sample in a cross sectional design (coarse-grained methodology), involving a large amount of firms, or a delibe-rate sample as a case study within one or few single firms (fine-grained methodology) (Harrigan, 1983b; Schnell et al., 2005).

"Because the hypotheses tested in a contingency approach to strategy are complex, […] researchers who have relied on either single site case studies or large database methodologies are missing important aspects of the construct they studied. Contingency approaches to strategy formulation require hybrid designs, incorporating attributes of both fine- and course-grained research methodologies." (Harrigan, 1983b: 400). Beside these general shortcomings of relying on either cross-sectional or case study design, a number of further reasons rooted in my special research context require a mix of the mentioned research designs, i.e. a case study within one or few single firms including a large scale of different procurement decisions:

The problem with the exploration of simultaneously making and buying an input is that with a cross sectional design the inputs have to be defined and restricted to a feasible set, since normally it is not possible to investigate all procurement decisions of all firms in the

---

77 Germane objects of interest like e.g. governance forms and the employment of mechanisms to manage supplier relationships can only hardly be replicated in a laboratory situation, since respondents have to put themselves in a hypothetical situation where they have to imagine how a concrete environmental condition would probably influence their governance decision.

78 A field experiment seems impossible, because firms will not be willing to change "variables" like gover-nance form only to enable a scientific insight.

79 For a systematization of different research designs with their pros and cons see Schnell et al., 2005.

sample.[80] Then, including all firms of the target population in a cross sectional survey, no more than maybe three to ten procurement decisions in each firm can be investigated with respect to time and costs for the firm and its respondents: "As with selection of the industrial context, the selection of inputs must represent a feasible set. This involves a reasonable number of inputs, between three and ten, to obtain variance in sourcing modes and constricts, but without putting an undue burden on respondents." (Parmigiani, 2003: 95). Contrariwise, a restriction of units of analysis is not unproblematic, since the sub sample of inputs investigated inside one firm has to reflect the total sample of procured inputs in this firm. But it is hardly possible to represent the entirety of about several hundred procurement decisions with a set of ten investigated procurement decisions. Otherwise, the sub sample may be biased by the perception of the researcher who has to define criteria to which the units of analysis have to conform, such as, for instance, strategic relevance.[81] This bias may even be worsened when the survey involves firms in different industries, because the selection criteria are likely to vary across different industries.

Hence, I decided to concentrate on one single industry and on one single firm in order to be able to collect data on all procurement decisions inside this firm. Furthermore, focusing on one single industry enables a better control for intervening factors, since factors like competitive intensity, concentration or the like may be very different across different industries and may therefore distort the results. As explained in chapter 5.2 and 5.3.1, my exploratory research revealed that the automotive industry represents a very well suited empirical setting for investigating industrial purchasing decisions. Fortunately, we were able to acquire one of the world-wide leading and the biggest German OEM, Volkswagen AG, as a scientific cooperation partner for my study.[82]

This survey design provides several further advantages (Harrigan, 1983b): On the one hand, the large scale survey enables the collection of a great amount of quantitative data, which allows thorough hypotheses testing with multivariate analysis methods in contrast to qualitative data. But on the other hand, the focus on and close collaboration with one single firm in the development and execution of the survey also employs elements of case study research. The focus on one firm, as well as the close teamwork in the development of the survey

---

[80] Theoretically it is possible to investigate all procurement decisions of all firms in the sample, but normally, the firms will not be willing to respond to such an extensive list of questions.

[81] In the case, the respondent has to select the input, the sample may be biased by the perception of the respondent who may recall the e.g. latest transaction best.

[82] For a detailed description of the empirical setting see chapter 5.2.

instrument, enabled an exceedingly precise selection and arrangement of the constructs according to the situation of the purchasing managers at Volkswagen AG and the adjustment of the items to a terminology that is common within their practice. As Volkswagen AG wanted to ensure nondisclosure and anonymity of the responding procurement managers, who are critical human resources for an OEM, the administration of the mailing of the questionnaire and the reminders was executed by one head of the purchasing department at Volkswagen AG, which thereby ensured a preferably high response rate.[83]

In order to ease not only the mailing, but also to augment the quality of received data especially in terms of missing values and transcription errors, the survey was conducted web-based instead of paper and pencil. In this case, a web-based approach provides many advantages without implying the pitfalls online surveys normally have (Schnell et al, 2005):

Lacking representativeness is an issue with online surveys, because not everyone has access to the internet and the sample may be biased as a consequence. This problem is not relevant in my survey, since the respondents are determined by their function as procurement manager at Volkswagen AG. Hence, in their management function, they all do have access to the internet. Another problem, which is normally connected with online surveys, is that of interruptions and breakups of the response. Due to the fact that the mailing and administration of the survey is guided by the head of the procurement department, the problem of low response rates in comparison to paper and pencil surveys is likely to be counterbalanced. Besides that, Volkswagen AG committed itself to participate in the survey as a cooperation partner and is interested in the results of the study, what is likely to induce a quiet high participation. The problem of a multiple participation of a single respondent is resolved technically by the use of cookies. Moreover, the incentive to multiply respond to the questionnaire and thereby distort the results is expected to be low at Volkswagen AG, since on the one hand the self-conception as a cooperation partner impedes cheating and on the other hand the work load of the procurement managers inhibits multiple participations. The lacking anonymity of the respondents due to technically linked contact information with the access hyperlinks of each respondent which normally represents a problem with online research is solved by the fact that the mailing and administration of the survey is guided on the part of Volkswagen AG.

The description of the research context and its selection is given in the next chapter.

---

83   See chapter 6.1.

5.2. Empirical Setting

This chapter describes my research context, the company Volkswagen AG and the automotive industry, and discusses the suitability of this context to my core research questions concerning the determinants and management of make-and-buy. As elucidated in the previous paragraph, I conducted the empirical analysis as a survey/case study (mixed design) (Harrigan, 1983b) within the automotive industry.

In selecting a suitable empirical setting in which to study make-and-buy, one must consider both the industrial context and the selection of firm(s) within that industry. High (statistical) variance in technological volatility as well as performance ambiguity would be favorable as industry criteria for studying make-and-buy.

The selection of the industry was hence based on a literature study and on a pre-study in which procurement decisions were examined in 4 different industries, namely (1) mineral oil, (2) automotive, (3) pharmaceutical, and (4) publishing and printing industry.[84]

The pre-study revealed that the automotive industry is an appropriate and particularly interesting empirical context for investigating make-and-buy, because an automobile consists of many hundreds of separate components ranging from simple sheet metal components to rather complex electronic driver assistance systems (Monteverde/Teece, 1982b). Hence, each of these components provides very diverse characteristics concerning key variables, especially performance ambiguity and technological volatility, but also asset specificity and other important variables. "In order to best understand concurrent sourcing, one needs to explore inputs that are only made, only bought, and also those inputs that are both made and bought. This allows the researcher to distinguish between these three types of decisions." (Parmigiani, 2003: 94). At Volkswagen AG this requirement is met, since each of the distinct components is sourced differently and the various procurement modes can be found in this setting.[85] Moreover, the components as units of analysis do not have to be defined, especially, since the data is collected only inside Volkswagen AG where data collection includes a sample of 89 components across all five commodity groups[86] which were selected by the managers of each

---

84 This pre-study took place within a master course at the University of Paderborn in winter semester 2005/2006. For more details see chapter 5.3.1.

85 In exploratory interviews which I conducted previous to the research design and empirical analysis, I ensured that all different types of sourcing modes like make, buy, hybrids, and of course make-and-buy are relevant in the automotive industry. See chapter 5.3.1. for more details.

86 These commodity groups which are often used commonly in the automotive industry consist of exterior, interior, electronics, powertrain, and metal.

commodity group. In contrast to prior studies[87] on procurement decisions in the automotive industry, I have been provided with a complete list of over 400 components,[88] which are sourced in the headquarter. As will be elaborated in chapter 6.1, I was able to ensure that the sample size of 89 components builds a representative sample of all components sourced within Volkswagen AG.[89] Concerning generalizability of the data about procurement decisions at Volkswagen AG for the automotive industry, I expect that the population sample of procurement decisions at such a big OEM does represent the target population much better than a small subset of procurement decisions in a number of different original equipment manufacturers (OEMs). Especially because procured components are likely to resemble each other strongly across different OEMs. Furthermore, the automotive industry is quite concentrated in terms of small total number of OEMs in Germany: According to the NACE classification, only 67 firms belong to the group of manufacturers of automobiles and automobile engines (Statistisches Bundesamt, 2002).[90] Generalizability for other industries is of course unsure.

Furthermore, the industry criteria of the automotive industry are also well suited for the purpose at hand. The level of technological volatility is quite high, since the industry is classified as medium to high technology industry (Götzfried, 2004) But, as already adumbrated, the variance of technological complexity as well as volatility varies heavily across the different inputs as they range from simple bolts to highly complex electronic systems. Furthermore, despite relatively high industry concentration, the competitive intensity is appropriately high, since due to technological pressure, firms are forced to produce and procure efficiently, which avoids that potential make-and-buy decisions are made due to slack resource and not due to efficiency reasons (Parmigiani, 2003). This embodies itself in a stronger relocation of more activities of the value chain, especially the development, on suppliers, which emphasizes the dynamism and relevance of procurement decisions in the automotive industry (Wilken/Kracht, 2003).

---

87   See e. g. Monteverde/Teece (1982b), Gulati et al. (2005).

88   With only few exceptions, one procurement manager is responsible for the procurement of one component. This means that the burden of responding is feasible for each respondent, since he or she has to respond regarding one single input.

89   See chapter 6.1.

90   Manufacturers of automobiles and automobile engines are classified with the number 34.1 according to the in Germany common classification of branches of trade WZ 2003 which is based NACE, the Nomenclature générale des activités économiques dans les Communautés Européennes. The NACE is the system for the classification of branches of trade which was developed by the European Union on the basis of ISIC Rev. 3 which is the International Standard Industrial Classification of all Economic Activities mainly used by the US.

Generally, the degree of vertical integration of original equipment manufacturers (OEMs) has decreased dramatically since 1970 and is expected to decrease further in the next years: While OEMs in Germany have been vertically integrated to a degree of about 55 % in 1970, this value has diminished to 26.7 % in 2003 and is expected to diminish further to not more than 20 % in 2010 (Hild, 2005). This means that decisions about making and/or buying develop(ed) dynamically in the automotive industry – while the trend moves towards increased outsourcing – and the question of the proper balance of vertical integration and outsourcing is of strategic relevance for success in the automotive business (Wilken/Kracht, 2003). However, the degree of vertical integration at Volkswagen AG is still relatively high with a value of about 35 % as in comparison to other big OEMs which leaves enough room for the occurrence and investigation of not only outsourcing and external procurement but also strategies that imply internal production.

As favorable firm criteria, in contrast to Parmigiani (2003), I propose that make-and-buy occurs rather in large firms than in small ones. The logic is that large firms may, on the one hand, reach a critical mass of sourced inputs sooner, so that combined and hence more complex sourcing approaches like make-and-buy are more reasonable than in small firms, which procure only a limited amount of inputs. On the other hand, large firms can more likely afford such complex sourcing strategies than small firms,[91] which may like to choose make-and-buy for the purpose of efficient sourcing, but may not afford it due to other barriers like shortage of administrative manpower.

Against this background, also the focal firm Volkswagen AG turns out to be an appropriate and particularly interesting empirical context for investigating make-and-buy: The company Volkswagen AG was founded in 1937 as "Gesellschaft zur Vorbereitung des Deutschen Volkswagens mbH" and re-named as "Volkswagenwerk GmbH" in 1938. In early 1938 the construction of the production plant of Volkswagen (Volkswagenwerk) started in today's Wolfsburg (Germany) in order to manufacture the vehicle designed by Ferdinand Porsche.[92]

The headquarter of Volkswagen AG remained in Wolfsburg and today the Volkswagen Group is one of the most prominent car manufacturers world-wide and the largest one in Europe. Volkswagen AG operates 44 production plants in eleven countries of Europe and in seven countries of America, Asia, and Africa. Worldwide, almost 345,000 employees of Volkswagen Group produce more than 21,500 vehicles every day which are offered in over

---

91 See exploratory research in chapter 5.3.1.

92 See Volkswagen Chronik www.volkswagen.de.

150 countries. In the year 2005, the Volkswagen Group increased the distribution of vehicles to a value of 5,211 million (2004: 5,095 million) which makes the company the fourth biggest OEM[93] in the world with a total world market share of 7.8 %. Given the market of passenger cars, Volkswagen AG achieves a market share of 10.85 % and is on position three in the world ranking. In Western Europe, the largest passenger car market of the world, almost any fifth new passenger car (18.9 %) comes from Volkswagen AG. The turnover of the company in the year 2005 increased to 95.3 billion € (2004: 89.0 billion). The result after taxes amounted to 1.12 billion € in fiscal year 2005 (2004: 0.697 billion).[94]

The Volkswagen Group comprises three groups of automobile brands, namely Volkswagen, Audi, and Volkswagen Nutzfahrzeuge (commercial auto) as well as Volkswagen financial services AG as a non-automotive business division. The Volkswagen brand group consists of Volkswagen, Skoda, Bentley, and Bugatti, while Audi, Seat, and Lamborghini are parts of the Audi brand group. Volkswagen financial services AG covers business services such as financing for dealers and customers, leasing, insurance, airline business, as well as car renting (Europcar).[95]

Not least, the automotive industry in general is by far the biggest and therefore influential German industry (Hild, 2005): The automotive industry has the biggest industrial output in Germany and with a turnover of 279.2 billion. € (2004) it shares 19.8 % of sales in the whole branch of manufacturing industry (Verarbeitendes Gewerbe). In the period of 1995 to 2005, the automotive industry grew above-average with a total real growth rate of 80 % in comparison to only 23 % total real growth rate of manufacturing industry. On the average, this is an annual turnover growth rate of 4.2 % for the automotive industry while the turnover rate of the whole manufacturing industry has increased annually only with 1.5 % in the same time. Hence, due to the importance and dynamic development of purchasing decisions as well as the predominance of the automotive industry in the manufacturing industry, the automotive industry suits preeminently as empirical setting for investigating make-and-buy in an industrial purchasing context.[96] Against this background, the investigation of procurement choices

---

93 In terms of world motor vehicle production, position one, two, and three in the world ranking are held by General Motors, Toyota, and Ford. For more details see statistics from the International Organization of Motor Vehicle Manufacturer's website: http://www.oica.net/.

94 See Navigator 2006: Zahlen – Daten - Fakten www.volkswagen.de.

95 See Gecshäftsbericht 2005.

96 See also introduction (chapter 1.1) where I have already defined the industrial purchasing context as favourable empirical setting.

in the automotive is also of extraordinary relevance from the viewpoint of practice and practitioners (Wilken/Kracht, 2003).

5.3. Development of the Measurement Model

In order to develop appropriate scales to measure all relevant variables, I followed a two-sided approach. On the one hand, I intensively studied previous literature and collected scales that have successfully been used in prior empirical tests and are therefore thought to be approved. On the other hand, I conducted exploratory research in the forefront of the ultimate study to ensure that all variables are also relevant in practice (and not only in theory) and that I did not miss any important issues. Furthermore, the questionnaire was also presented to and thoroughly discussed with research colleagues at a doctoral seminar at the Freie Universität Berlin in December 2006. At least, the questionnaire was pretested with procurement managers at the participating company and other companies of the industry to finally remove ambiguities and to guarantee the face validity of the measures.

This chapter briefly describes the exploratory research conducted and the scale construction leading to the final operationalization of the variables.

5.3.1. Exploratory Research

In winter semester 2005/2006, we started exploratory research in the form of a small-size pre-study on sourcing strategies, including different industries and different types of firms characterized by differences in terms of size and performance. This pre-study took place within a master course at the University of Paderborn (Mellewigt et al., 2007). Although the sample counted merely 34 cases, this study revealed first insights on relevant constructs, such as determinants and performance of sourcing strategies, as well as provided first feedback on the wording of questions and items. Here, instead of reporting detailed results of this pre-study, I will focus only on the main insights for my research context.[97] The main results, which affected the design of the major survey, were (1) that the automotive industry was a very well suited empirical setting for the purpose at hand, (2) that large companies are more likely to make-and-buy than smaller ones, since they rather can afford the surplus load of staff necessary for coordinating a mixed sourcing mode, and (3) that the factors which I theoretically modelled as determinants of make-and-buy, are indeed relevant in this context. Further-

---

97   For a detailed description of this pre-study and the results see Mellewigt et al. (2007).

more, I received first feedback on wording of questions and items and even with the small sample size, the reliabilities of some of the central measures (especially the uncertainty measures) could be checked and proved to be suited for the major study.

At about the same time, I conducted on-site interviews with a manager working in an OEM, two procurement managers on the side of an automotive supplier, as well as an industry expert at an auditing company. The initial interviews were exploratory and with an open end but focused on the determinants and the type of different sourcing arrangements and supplier-buyer relationships, and its relative performance. Most importantly, these interviews provided me with a deeper understanding of the idiosyncrasy of the automotive industry, the sourcing processes, and the production process as well as relevant characteristics of the buyer-supplier relationships.

Based on these interviews and the collected items from prior studies on sourcing modes especially make-and-buy, the questionnaire was designed in close collaboration with a management assistant of a leading purchase manager in the focal company Volkswagen AG. Through an extensive iterative process the questions and items were developed and at the same time it was ensured that all of the key constructs were clarified both linguistically as well as regarding content. As elaborated above, the focus on one firm as well as the close teamwork in the development of the survey has enhanced the quality of the questionnaire significantly. Finally, the survey instrument was thoroughly pretested as described above.

5.3.2. Scale Construction

Besides exploratory research, which serves to validate how the variables apply to make-and-buy in the automotive industry, the operationalization of the theoretical variables is based on reviewing existing literature. To explore how my theoretical variables were measured in extant research, I gathered items mainly in articles published in top management journals.[98] I used these items immediately, which reflected the content of what I aimed at measuring and which at the same time provided a good reliability of a value of at least 0.7 (Nunnally, 1978). Also, I had to modify some of the items to fit my research context. In some cases, I had to create new items, so that all the items fit both the variable conceptualization and the particular empirical setting. Often, relying on existing literature emerged as being insufficient, because measures either did not reflect all the underlying dimensions of variables, the measures were

---

98   The sources of all measures are reported in the subsequent paragraphs.

not sufficiently reliable or simply because my theoretical variables have not been measured in the literature before. Hence, designing individual items or even scales was necessary. When designing individual items/scales, I referred to theoretical dimensions of constructs and aimed to make items simple, intelligible, and clear (Netemeyer et al., 2003).[99]

Since the survey took place in a German enterprise of course all items were either translated to or created in German. Most of the items are closed ended, seven-point Likert (agree/disagree or applies/does not apply) scales. Since the majority of these concepts are difficult to measure and multi-faceted, respectively multi-dimensional, I tried to use multi-item scales to address this multi-dimensionality and I reverse scaled some items to assure the validity of responses (Netemeyer et al., 2003). As for sequencing, related constructs were grouped together, resulting in five sections of the questionnaire:[100]

A: Statements about the procurement and characteristics of the component

B: Statements about uncertainties in procurement

C: Statements about the relationship to the supplier

D: Statements about the management and performance of the supplier relationship

E: Statements about the characteristics of the buying firm and the supplier.

For the sake of better comprehensibility, I provide the description of the operationalization of constructs along with the corresponding reliability and validity analyses in chapter 6.2 in the empirical analysis part of this dissertation.

5.4. Survey Administration

After the development as well as the pretest of the questionnaire was finished, the survey started in August 2007. As the questionnaire was designed as online-survey, the URL and password were e-mailed from the account of corporate executive director of the purchasing department of new products launches of Volkswagen AG to all seven leading purchasing managers of this department and to corporate executive directors of five other purchasing departments at Volkswagen AG with the request to forward it to at least ten of their purchase managers. This resulted in a minimum target gross sample size of 120 respondents. In order to

---

99 The details of the individual item construction are given with the description of the operationalization of the concerned constructs in the following paragraphs. These scales/items received exceptional attention in the pre-test to ensure validity.

100 The complete questionnaire can be found in the appendix.

enhance response rate, the respondents were contacted multiply via e-mail and concluding via telephone. The survey was closed in October 2007 with a result of 139 logins and 89 completely answered questionnaires representing a response rate of 64 %.[101]

5.5. Data Analysis Methods

After the collection of the data was completed, I analyzed the data set in multiple stages. The entire data analysis comprises 4 steps: (1) I first assessed the applicability and quality of the data set in terms of sample size and representativeness, non-response rate bias, and common method bias. (2) After the applicability of the data set is ensured, the next stage of data analysis is concerned with the verification of the reliability and validity of the measures used. (3) Subsequently, the most important descriptive statistics are provided, before eventually (4) the hypotheses were tested using multivariate data analysis methods.

Each stage of data analysis is explained in more detail in a dedicated paragraph in the subsequent empirical results chapter.

---

101 For determining response rate I referred to the 139 logins instead of the 120 target respondents as this yields the more pessimistic value in case of doubt.

6. Empirical Analysis

6.1. Applicability of the Dataset

As first step in data analysis, I want to assess the applicability and quality of the data set in terms of sample size, representativeness and non-response rate bias, and common method variance.

As mentioned already, the size of the sample is 89 which is considered to be sufficient for most multivariate analysis methods (Backhaus et al, 2006). Nevertheless, against the background of the depth and fine-grainedness of the theoretical hypotheses as well as the number of theoretical variables, the power of the sample is probably limited. As over 50 % of my hypotheses (10 out of 18) include interaction effects, potential restrictions in testing will especially concern these hypotheses. If occurring, I will discuss these restrictions and solution approaches for each hypotheses test separately. Furthermore, in order to allow as much variables as possible to be included in the regression models I increased the acceptable level of statistical significance from 0.05 to 0.1. I believe that this approach is justifiable and reasonable for the size of my sample.[102]

The non-response rate bias occurs when a sample and hence the results generated from this sample are biased because respondents differ systematically from those who have not responded (Armstrong/Overton, 1977). In order to minimize a potential non-response rate bias, during survey administration, the response rate was maximized by several reminders and follow-up actions which yielded a very good response rate of 64 % (Hammann/Erichson, 2000). Nevertheless, a potential bias cannot be excluded unless the response rate is 100 %. To be able to control for non-response bias, it is necessary for the researcher to possess information that enables a comparison of respondents with non-respondents or at least with late-respondents (Armstrong/Overton, 1977). As the warranty of anonymity of respondents was crucial for Volkswagen AG, I was not allowed to gather any information about the respondents in order to assess potential non-response biases. As a consequence, it is not possible to assess the potential non-response rate bias for this study. In order to be able to at least estimate the representativeness of my sample in comparison with the total population of compo-

---

102 Other researchers did also use these significance levels despite a much greater sample size (e.g. Parmigiani, 2003).

nents at Volkswagen AG, I compared the frequency of the commodities in the population with that in my sample. Chi-square test shown in the table below revealed that both samples, i.e., the total population and my sample, are significantly related (Bortz, 1993). This supports representativeness of my sample with respect to Volkswagen AG. However, this does not indicate whether my sample is also representative for the target sample, as this was determined by the corporate executive director of the purchasing department of new products launches of Volkswagen AG and may itself be unrelated with the total population.

	Population VW	Sample	Total
Exterieur	49	22	71
Interieur	38	18	56
Metal	170	15	185
Powertrain	75	10	85
Electrics	55	24	79
Total	387	89	476
Chi-square Test	**Pearson Chi-Square**		37.139
	df		4
	Asymp. Sig. (2-sided)		0.000

Tab. 9:   Chi-square test of association of the sample with total population

Common method variance can occur when independent and dependent variables are gathered by the same data collection instrument. Thereby, common method variance means that the regression condition that the residuals in a regression equation are not longer independent form the variance of the explanatory variables, which may bias regression results (Söhnchen, 2007). As potential common method variance is not eliminable post hoc, the data sources of dependent and independent variables are ideally separated in research design and during data collection. Unfortunately, this was not possible in my research design. This was due to a number of reasons: First, the data in my questionnaire is on the component level and not on the firm or business unit level, which makes it impossible to obtain this data from databases or archives. Second, Volkswagen AG does not provide any kind of supplier evaluation system (e.g. SAP MM) which would allow gathering data on supplier performance from such a system. Third, my theoretical model contains 3 transaction (cost) related performance measures (i.e., supplier performance, buyer transaction costs, and supplier opportunism) and 3 production (cost) related performance measures (i.e., buyer flexibility, scale economies, and buyer scope economies), most of which are to be assessed by the focal procurement manager

for each component.[103] Hence, as I rely on information of my key respondents concerning both independent and dependent variables, my data may be prone to common method variance.

In order to make sure that common method variance is not a problem in my study, I follow Krishnan et al. (2006), who provide a list of remedies against common method bias and single respondent bias. Omitting the remedy of different data sources, I performed the following procedural and statistical approaches: Protecting respondent's anonymity decreases socially desirable responses and is given in my case as questionnaire mailing was administered by Volkswagen AG. Item ambiguity was eliminated by careful pretests with Volkswagen AG and in my questionnaire, the independent variable and performance items were placed far apart from each other. Regarding statistical remedies, I performed a Harman's single factor test to assess whether a single or general factor accounts for most of the variance in the data (see also Podsakoff et al., 2003). Evidence for common method bias exists when a general construct accounts for the majority of the covariance among all constructs. An unrotated principal components factor analysis on all the variables measured revealed 8 factors, which account for about 90 % of the variance in the sample. Also, the first (largest) factor did not account for a majority of the variance (24.75 %). This suggests that common method bias is not a serious problem in my study.

6.2. Operationalization, Reliability, and Validity of Measures

After the applicability of the data set is ensured, the next stage of data analysis is concerned with the verification of the reliability and validity of the used measures. Reliability reflects the accuracy of a measurement instrument, while validity may be defined as the extent to which a measuring instrument measures what it is intended to measure (Netemeyer et al., 2003). Thereby, reliability is a necessary, but not sufficient condition for validity.

Reliability

Usually in (empirical) social sciences and also predominantly in my work, the theoretical constructs of interest are assumed to be latent, which means that they are not directly observable like, for instance, uncertainty, asset specificity or trust (Zinnbauer/Eberl, 2004; Kromrey, 2006). Hence observable indicators (= items) of the focal theoretical constructs have to be formulated to a measure model for the focal construct. Thereby, normally two

---

103 The same is true for the independent variables. If this had not been the case, data on the independent variables could have been obtained from different sources to prevent common method variance.

different kinds of measurement models can be distinguished, i.e., reflective versus formative measurement. While reflective measurement models are based on the assumption that the observable indicators are determined by the latent variable, this assumption is obverted within the formative measurement model (Eggert/Fassot, 2003; Zinnbauer/Eberl, 2004). This means that the indicators of a reflective measurement change coherently when the latent variable changes, while this needs not to be the true within a formative measurement model as each indicator has to be correlated to the latent variable, but not to the remaining indicators. As a consequence, reliability of reflective measurement models is based on high correlations between the indicators and can be assessed by methods like exploratory factor analysis and Cronbach's alpha (Eggert/Fassot, 2003; Zinnbauer/Eberl, 2004). In contrast, reliability of formative measurement is not amenable to these "traditional" methods of reliability testing and can typically only be assessed in terms of external validity by experts (Zinnbauer/Eberl, 2004). As in my work, I mostly used reflective measurement models and I will conduct reliability testing for these in my explanations below.

To first check whether the theoretical constructs represent a single factor structure in the data, I employed exploratory factor analysis (Netemeyer et al., 2003). Factors are extracted based upon the correlations between the items. Thereby, I used principal axis factoring that assumes that common factors behind the indicators explain a substantial amount of variance. Furthermore I used varimax rotation where the factors are rotated to be orthogonal (Backhaus et al., 2006). If necessary, I dropped items with little factor loadings in order to maximize reliability of measurement, which I additionally assessed with Cronbach's alpha. Cronbach's alpha is the standard measure of reliability (Cronbach, 1951). With values ranging from 0 to 1, reliability for each item should be preferably over 0.70 and at least 0.50 for exploratory work (Nunnally, 1978: 245).

Validity

While exploratory factor analysis and Cronbachs's alpha can provide information about the reliability of measurement, the validity of construct measurement shall be supported with confirmatory factor analysis (Netemeyer et al., 2003). Following APA/AERA/NCME (1985)[104], validity can be classified into the generic concepts of criterion-related evidence of validity, content-related evidence of validity, and construct-related evidence of validity. While criterion validity refers to the predictive validity of the indicators, content validity reflects the

---

104 The abbreviations stand for The American Psychological Association, The American Education Research Association, and The National Council on Measurement in Education who established a joint committee of their representatives in order to define the Standards for Educational and Psychological Testing.

consistency and relevance of the measurement instrument in terms of theoretical meaningful-ness. A test of criterion validity necessitates the existence of an external criterion to validate the experimental measure against which (in social sciences) is mostly not given (Mellewigt, 2003). Content validity cannot be tested empirically, but only by ways of reason and logic, which has been done in the process of survey development by theoretical arguments, scale construction, and pre-testing. Contrary, construct validity attempts to demonstrate that a measuring instrument in fact measures some theoretical construct, which, in most cases, can be empirically determined. By computing the convergent and discriminant validities, confir-matory factor analysis can provide a test of the degree to which items measure the same (= convergent) or different (= discriminant) variables (Netemeyer et al., 2003).

Hence, I conducted confirmatory factor analysis (CFA), which is a subset of structural equa-tion modeling. This analysis is based on the assumption that reflective indicators of a latent variable load onto this single variable and these loadings and their corresponding variables will be estimated; others will be set to zero. Unfortunately, due to the small sample size, I encountered several problems while conducting CFA: First, the amount of parameters (indi-cators and variables), which can be validly estimated by CFA is limited by sample size. The rule of thumb says that each parameter estimation requires a minimum of 10 cases in the sample, which results in a maximum of 9 parameters with a sample size of 89 (Netemeyer et al., 2003). So I had to divide all variables into four logical subgroups, i.e., determinants, management, performance variables of making and buying the same assets, and performance variables of making and buying the same type of assets. Thereby, I used the typical maximum likelihood estimation to determine the best fitting parameters. However, the small sample size caused the necessity to "cut down" the variables to very few items in order to make the goodness of fit-estimates admissible. But, by cutting down the variables to the extent CFA required to yield well fitted models, lots of information transported by different dimensions of factors gets lost. Moreover, some variables in the questionnaire are measured by only one or two items (e.g., scale and scope economies). But, in order to avoid identification problems, 8-10 items per construct are regarded as ideal and at least three items of each variable are compulsory (Netemeyer et al., 2003). The sum of problems mentioned led me to the decision to not use CFA results for further multivariate analysis with the data in my sample. Instead, I confined myself to perform EFA along with classical reliability analyses using Cronbach's alpha.

In the following sections I report the initial operationalization of the constructs and the results of the described reliability testing, starting with the dependent variables. The details for each group of variables are reported in either table at the end of each paragraph. Variables belonging to one group (i.e. dependent, independent, or control) appear together in one table as the variables were jointly analyzed in factor analysis.

6.2.1. Operationalization of Theoretical Assumptions

Bounded rationality is not explicitly included in empirical analysis, but remains a behavioral assumption lying at the bottom of the theoretical model. As explained earlier, bounded rationality affects both sides of the transaction, i.e., the transactor and the transaction partner. As bounded rationality is a widely accepted behavioral assumption in management sciences, it will not be assessed as variable in my work. In contrast, opportunism, which is also a behavioral assumption in TCE, is incorporated in empirical analysis as it represents a part of transaction related "performance" measures in my hypotheses.

Risk neutrality respectively risk aversion can assumed to be constant in my context, since I investigate sourcing decisions in only one firm and decisions about sourcing of the focal components is made by a (centralized) sourcing committee and not by each procurement manager. Hence, I will not include risk preferences in the empirical analysis.

6.2.2. Operationalization and Reliability of the Dependent Variables

The major dependent variables, which have to be measured based on the given research model, can be subdivided into sourcing mode (i.e., buy, make, make-and-buy), different management mechanisms of make-and-buy (i.e., mechanisms of administrative support by bureaucracy, incentive mechanisms, and adaptation mechanisms), and sourcing mode performance, which is differentiated according to the focal make-and-buy type into supplier performance, buyer transaction costs, and supplier opportunism for make-and-buy the same assets and buyer flexibility and scale and scope economies for make-and-buy the same type of assets. The details concerning operationalization and reliability of the dependent variables are reported in a table at the end of this section.

6.2.2.1.   Governance Form (Sourcing Mode)

This variable reflects the sourcing firm's procurement choice for the focal input. Since in almost all cases, as a procurement manager each respondent is responsible for one component, a self-selection bias, such that respondents only mention the most recent, most important, or otherwise most memorable input, is avoided.[105]

The three governance mode choices of interest included complete internal production, complete external procurement, or a combination of both, the latter of which represents make-and-buy. By "external procurement", I mean that the firm purchases the component from an external supplier in whom the firm has a stake that is less 50 % (alternative A). This reflects the possibility that external procurement means either procurement from a completely external supplier or a supplier in which firm may have a stake but which is not integrated in the buyer organization. Inversely, "internal production" means that the input is sourced from within the same firm. Thereby, the input may be produced within the same plant or in a subsidiary, whereby the criterion that constitutes internal production is that the firm shares 50 % or more in the plant or subsidiary that produces the focal component (alternative B). "Make-and-buy" (alternative C), instead, indicates that the firm produces some part of its need internally (alternative B) and at the same time purchases some part of the demand from an external supplier (alternative A).

For each governance mode alternative, I inquired a couple of detailing information, which can be used as control variables: For external procurement, I inquired the number of outside suppliers, the duration of the procurement relationship to the leading supplier, the emergence, and the likely future development of this sourcing mode. To distinguish between making and buying the same assets (alternative C) and making and buying the same type of assets, I inquired whether there is a component with similar or related technical specifications, but which is sourced internally. Of course, I did the same for internal production with a reversed question. If inputs were not identical, I attempted to separate sourcing modes by technological complexity ("which of the components is more technologically complex as well as firm specificity: the internally produced vs. the externally purchased").

---

105 This means that in almost all cases each procurement manager is responsible for one component. In the seldom remaining cases, the respondents were asked to answer the question for the most important component they source. Since these cases are only very few, I don't expect self-selection bias to be a problem in the data.

For internal production, I inquired the number of inside suppliers, the duration of the procurement relationship to the leading supplier, the emergence and the likely future development of this sourcing mode.

For making and buying the same assets, I inquired the number of both inside and outside suppliers, the duration of the procurement relationship to the leading supplier, the emergence and the likely future development of this sourcing mode, and the percentage of the overall volume (unit) requirements that is internally produced. Furthermore, to check whether the components are really exactly identical and to thereby separate this sourcing mode from making and buying the same type of assets, I directly inquired whether sourced components are exactly identical or not. But note that this information will not be available for the case of making and buying the same type of assets, since this detailed information could only be requested for alternative C.

Nevertheless, the data in this thesis provides very detailed information on the governance forms and in addition distinguishes between different types of make-and-buy which is novelty against the background of the extant make-and-buy-literature.

As governance choice is directly requested by a single nominally scaled item the described reliability analyses are not applicable to this variable.

6.2.2.2.   Management of make-and-buy

Mechanisms of Administrative Support by Bureaucracy

While the focus of control mechanisms under conditions of performance ambiguity is on motivational aspects, administrative support by bureaucracy under conditions of technological volatility concentrates rather on coordination aspects. Hence, mechanisms of administrative support by bureaucracy cover control and monitoring mechanisms as well as coordination. Control and monitoring mechanisms were conceptualized entailing two dimensions, which are behavioral and outcome control (Ouchi, 1980).[106] Furthermore, I use two different measures of control and monitoring; one focusing on the concrete operative mechanisms and the other formulated as construct. The control and monitoring construct scale incorporates 4 items on outcome control and 4 items on behavior control. The items measuring outcome and behavior control are gathered from articles by Jaworski (1988) as well as Mortanges/Vossen

---

106 See also chapters 4.1.24.1.2 and 4.2.2.

(1999).[107] The control and monitoring mechanisms scale is based on Mellewigt (2003) and also covers both the behavior and outcome dimension of control. However, this scale is formative as the operative mechanisms such as quality management systems or committees can occur independently from each other. For the mechanisms, I request to which extent the 6 outcome and 6 behavior control mechanisms are implemented.

Coordination is measured by three items taken from Pearce/Gregerson (1991) requesting the intensity and frequency of required coordination and co-working between buyer and supplier.

In the exploratory factor analysis of the control and monitoring construct the 2 modeled dimensions of behavioral and outcome control could be extracted. Concerning outcome control item 3 had to be dropped due to weak loadings of the factor while item 4 correlated more closely with the dimension of behavioral control. Thus, only items 1 and 2 remained to build the factor of outcome control which provides good reliability. As a consequence, behavioral control was modeled by 5 items including item 4 from outcome control which also results in very good reliability statistics. As the control and monitoring mechanisms measure is formative no reliability analyses will be computed. Concerning the measurement of coordination I had to drop the first item due to unsatisfactory reliability statistics. Even the remaining two items yield only a mediocre Cronbach's alpha.

Incentive Mechanisms

Measuring incentive mechanisms involves the problem that typical incentives like output-related payments or immaterial rewards are normally not at the component-level but at the employee-level, which results in the fact that these variables will appear as constant when the data is analyzed at the component-level. Therefore, I developed an item that directly requests what I assume is the incentive-enhancing causation of make-and-buy, namely the possibility to compare, i.e., to benchmark internal and external suppliers regarding their performance. Since I did not want to rely on a single item to cover such an important variable, especially as it is a self-developed one, I decided to incorporate also another item that requests the existence of potential alternative suppliers as this reflects competition similar to markets and is expected to lead to high incentive intensity (e.g., Hill, 1990). All items were self-developed, since items in the existing literature did not fit properly into my context.

---

[107] In contrast to lacking scales for measuring incentive and especially adaptation mechanisms, there can be located a multitude of measures for control and monitoring mechanisms in extant literature. This makes clear that hitherto empirical tests of the TCE framework concerning the management propositions focused on only one governance mechanism i.e. control. An empirical test of the complete TCE core tenets including all management variables seems therefore to be absent in management studies (Heide, 1994).

As both items measuring incentive mechanisms, i.e. product benchmark and number of alternative suppliers, determine incentive intensity and not vice versa, this measure is formative. Hence, not reliability analyses are provided for this measure.

Adaptation Mechanisms

As already mentioned, I did not find any measures for adaptation mechanisms. In order to develop own measures I bethought the core statements of TCE concerning the different capabilities of distinct governance forms to adapt to changing circumstances. These differences in adaptation capabilities are closely related to the differing adaptability respectively flexibility of the underlying contracts (Williamson, 1985; Macneil, 1980; Vogt, 1997). Thereby, in TCE, 3 distinct types of contracts are distinguished and accordingly allotted to the 3 governance forms: Classical contracts are short-term, arm's-length agreements between autonomous partners, which ex-ante specify the complete content of the exchange, and therefore entail no need and offer no room for ex-post adjustments, since the transaction can easily be finished instead of renegotiated due to little specific investments (e.g., simple contracts of sale). Hence, classical contracts build the basis of market transactions (Ebers/Gotsch, 2006).

Relational contracts, in contrast, are incomplete since the content of the agreement cannot be specified ex-ante (e.g., employment contract) due to length and specificity of the exchange and is therefore subject to ex-post adaptation and renegotiation (Williamson, 1985; Ebers/Gotsch, 2006).

The third form of contract is the neo-classical contract, which underlies long-term inter-organizational agreements typically found in hybrid governance forms. These contracts are also not fully specified ex-ante due to length and at least intermediate specificity, but adjustment mechanisms are incorporated often in the form of clauses to enable adaptation between the autonomous partners.

Based on this reasoning,[108] I measure autonomous adaptation mechanisms as either no or a small equity stake (< 50 %) of the buyer in the supplier's firm and a short duration of contract. Contrastingly, coordinated hierarchical adaptation mechanisms are expected to manifest themselves in an increasing equity share of the buyer in the supplier's firm and a long duration of contract. Coordinated bilateral adaptation mechanisms can be – following this logic – measured through contract clauses regarding adaptation of price, volume, as well as technical

---

[108] A detailed description of the classification of contracts will not be provided here, since for the explanation of the adaptation mechanisms measures it is sufficient at this point to understand how contracts work as adaptation mechanisms. For a detailed outline of the distinct contract forms in TCE see Williamson, 1991a.

specifications of the component. To measure the equity, stake I first requested whether one owns equity shares in the external supplier's firm and if yes how many. Second, I requested how many shares the buyer owns in the internal supplier's firm. For total value of shares I took the mean of these shares. The duration of the contract was directly requested in years without giving a predefined scale. I scaled the duration of the contract into a range from 0 to 1 to be combinable with the measure of equity shares. The contract clauses were taken from Mellewigt/Eckhard (2006).

Similar to the measure of incentive mechanisms, also adaptation mechanisms represent formative measurement as adaptation is determined by the equity stake, the duration of contract, as well as the contract clauses and not vice versa.

6.2.2.3. (Sourcing Mode) Performance

According to the distinction of make-and-buy in two different phenomena with different causes and effects, the performance implications of the different make-and-buy modes differ as well. As already elaborated, making and buying the same assets leads to rather transaction cost related advantages for the buyer, while making and buying the same type of assets provides the buyer with rather production cost related benefits. Concretely, transaction cost related effects are higher supplier performance and lower transaction costs for the buyer. Production cost benefits manifest themselves as higher buyer flexibility and higher scale and scope economies for the buyer. The following paragraphs describe the operationalization of these performance variables.

Performance of making and buying the same assets
Supplier performance is measured with a 5-item scale, questioning price and quality of the component, punctuality and reliability of the delivery, as well as the overall performance of the supplier. On the one hand, these aspects are frequently used in the literature to represent supplier performance (e.g. Parmigiani, 2003; Poppo/Zenger, 1998) and on the other hand, they are also approved to be the main aspects of supplier performance by practitioners in my consultations with the participating firm. EFA of this variable shows one consistent factor with a very high reliability.

A measurement of *transaction costs* does normally not take place in empirical research on TCE (Boerner/Macher, 2002). This may be due to the fact that the operationalization of transaction costs is challenging, because a cause-fair attribution of transaction cost, such as search and negotiation costs to a certain transaction, is difficult. Although transaction costs

may be conceptually distinguishable from other types of costs (e.g., production costs), empirically, however, they are hard to collect separately. The interdependence between these sizes becomes clear by the incorporation of production costs as determinant of transaction costs, namely as transaction specific investments. Moreover, in accounting, transaction costs are mainly represented by overhead costs and the problem of the exact attribution of overhead costs to the cost unit - here the transaction - is well-known (Krzeminska, 2002). Nevertheless, to empirically test TCE core tenets, a measurement of transaction costs is compulsory. Hence, in this thesis, I measure transaction costs with 7 items which are based on Mellewigt (2003) and an intensive consultation with the participating firm. Inside this firm, a specific, pre-defined sourcing process takes place for every sourcing decision regardless of whether an internal and/or external supplier is chosen afterwards. This sourcing process includes the following 7 steps which at the same time represent the items: (1) search of an adequate supplier, (2) assessment and choice of adequate supplier, (3) negotiation with supplier, (4) conclusion of a contract, (5) coordination of tasks, (6) control of results, and (7) adaptation to changed/changing environmental conditions. The question was how many expenses each step in the sourcing process involved. Since these sourcing process steps take place in internal as well as external and make-and-buy procurement modes, a comparison of transaction costs between these different sourcing modes is excellently possible without measuring the exact costs. Furthermore, since these transaction costs accrue also in internal sourcing, they reflect well coordination, respectively bureaucracy costs of hierarchical governance modes, which are the pendant of transaction costs in external procurement. The scale of buyer-specific transaction costs I use in my work is formative as the effort in combination with every step of the sourcing process determines the total amount of transaction costs but every step is independent from the other steps. Consider, for instance, that screening and selection of the supplier can require high efforts and costs while control and coordination with the chosen supplier may induce only little costs afterwards. Hence, the items need not to correlate highly with each other and therefore reliability tests for reflective scales are not applicable for this scale. However, as this scale was on the one hand already used in prior work (Mellewigt, 2003) and on the other hand customized in close collaboration with Volkswagen I expect the scale to be adequately reliable.

Supplier opportunism is measured with a 7-item scale, questioning the behavior of the supplier concerning amongst others acceptance of responsibility, adequate communication, making hollow promises. This scale is taken from the article of Jap/Anderson (2003) where it

was proven to be very reliable. Also in my analyses the supplier opportunism scale EFA shows one consistent factor with a very high reliability.

Performance of making and buying the same type of assets

I measured *buyer flexibility* by two dimensions: On the one hand, I measured the supplier's ability to adapt flexibly to the buyer's need as this dimension can be found in most scales on flexibility in the literature. Here, I used 4 items from an approved scale of Wathne/Heide (2004). On the other hand, I augmented this scale by 4 items based on a scale of Tallon/ Kraemer (2003), which directly inquires the ability of the buyer to adapt to changing market situations by adjusting production volume or prices, and by launching new products and implementing new technologies. I selected these 4 items from the 8-item scale of Tallon/ Kraemer (2003) as they appeared most relevant for practitioners due to the consultation with the participating firm. Concerning the two dimensions the first dimension directly inquires buyer flexibility is a formative measurement in contrast to the reflective measurement of the supplier adaptability dimension. In order to check whether both dimensions constitute a consistent factor, I conducted a separate EFA with both dimensions as factors which extracted one consistent factor of both dimensions. For the measurement of supplier adaptability I kept only the first three items of four as the last one showed a relatively weak factor loading. Buyer flexibility, instead, contains all four items. Eventually, the buyer flexibility construct is measured by seven items reflecting two dimensions.

As outlined in chapter 4.2.3, economies of scale and scope reflect production cost advantages, which I assume take place to a large degree when making and buying the same type of assets. I measure *economies of scale* on the side of the buyer based on Parmigiani (2003). Thereby, buyer scale economies are measured by two items requesting the ability of the buyer to reduce per unit costs and to profit from volume discounts.

Buyer scope economies measurement is also based on Parmigiani (2003) and comprises two items requesting the ability of the buyer to more efficiently utilize production plants as well as the ability to decrease per unit costs of different products.[109]

For both scale and scope economies the two items provided insufficient consistency as either one item of each scale was not clearly loading on one factor. Hence, I dropped the first item

---

109 For both buyer scale and scope economies, I did not incorporate the learning aspect directly in the item question as I want to be able to distinguish whether potential scale and scope economies truly result from learning and knowledge transfer or not. Hence, I included organizational learning as well as buyer and supplier expertise as control variables in my analyses.

of the scope economies scale and also the first item of scale economies measurement and remained with a single item measurement for these variables.

The following table gives an overview of the measurement of the dependent variables. Exploratory factor analysis with all reflective scales yielded a meritorious Kaiser-Meyer-Olkin Measure of Sampling of 0.827 (Backhaus et al., 2006). Bartlett's Test of Sphericity also provides good values of a highly significant approximate chi-square of 1,655.169. Cumulative variance explained by the 6 factors (supplier performance, supplier opportunism, supplier adaptability, behavior control and outcome control constructs, and coordination) is 66.14 %.

Variable	Item/Proxy	Cronbach's alpha
Supplier Performance	Preis des Bauteils	0.922
	Qualität (z.B. geringe Ausschussquote) des Bauteils	
	Pünktlichkeit der Lieferung	
	Zuverlässigkeit der Lieferung	
	Beurteilung der Gesamtleistung	
Buyer Transaction Costs	Beim Sourcingprozess für dieses Bauteil sind/waren folgende Aufgaben mit hohem Aufwand verbunden… …Suche nach einem geeigneten Lieferanten	Formative scale
	…Bewertung und Auswahl eines geeigneten Lieferanten	
	…Verhandlung mit dem Lieferanten	
	…Vertragsabschluß mit dem Lieferanten	
	…Kontrolle der Ergebnisse	
	…Koordination der durchzuführenden Aufgaben	
	…Nachträgliche Anpassungen an Wettbewerbsveränderungen	
Supplier Opportunism	Der Lieferant… ... macht leere Versprechungen.	0.917
	... verhält sich uns gegenüber distanziert.	
	... stellt seine Bemühungen wesentlich besser dar, als sie tatsächlich sind.	
	... erwartet von uns, dass wir mehr als nur den gerechtfertigten Anteil der Kosten zur Korrektur eines Problems übernehmen.	
	... lehnt es ab, Verantwortung zu übernehmen.	
	... gibt unvollständige/verzerrte Informationen heraus.	
	... benachrichtigt uns nicht angemessen.	
Buyer Flexibility	Unser Lieferant zeigt sich gegenüber unseren Änderungswünschen aufgeschlossen.	0.786
	Unserem Lieferanten fällt es leicht Anpassungen vorzunehmen, um mit veränderten Gegebenheiten besser umgehen zu können.	
	Unser Lieferant ist bereit unsere gegenseitigen Vereinbarungen zu modifizieren, sofern unerwartete Ereignisse dies notwendig machen.	
	Aufgrund der Beschaffungsstratgie bei diesem Bauteil kann VW besonders flexibel… ... das Beschaffungs- bzw. Produktionsvolumen an Nachfrageschwankungen anpassen.	Formative scale
	... eigene Preise anpassen, wenn sich die Preise am Markt ändern.	
	... bei Einführung neuer Produkte oder Dienstleistungen der Wettbewerber mit eigenen Neueinführungen nachziehen.	
	... neue Technologien produktiv einsetzen.	
Buyer Scale Economies	(D) (Auch wenn sich unsere Nachfrage nach diesem Bauteil verdoppeln würde, würden sich die durchschnittlichen Stückkosten (A-Preis) kaum verändern. (R))	Single item
	Unser Einkaufsvolumen an diesem Bauteil ist so hoch, dass wir von enormen Mengenrabatten profitieren können.	

Variable	Item/Proxy	Cronbach's alpha
Buyer Scope Economies	(D) (Durch die interne Herstellung dieses Bauteils können wir die Stückkosten (A-Preis) mehrerer Produkte verringern.)	Single item
	Durch die interne Herstellung dieses Bauteils können wir Produktionsanlagen besser auslasten.	
Outcome Control and Monitoring Construct	Falls unser Lieferant die vorgegebenen Leistungsziele nicht erreicht, ist er angehalten dies zu erklären.	0.848
	Wir kontrollieren, wie gut unser Lieferant die vorgegebenen Leistungsziele erreicht.	
	(D) (Die Vergütung unseres Lieferanten basiert auf einer Gegenüberstellung seiner tatsächlichen Leistung mit den vereinbarten Zielen.)	
Behavior Control and Monitoring Construct	Im Hinblick auf den Erreichungsgrad der vereinbarten Leistungsziele geben wir unserem Lieferanten ein Feedback.	0.877
	Wir kontrollieren, wie gut unser Lieferant vorgegebenen Routinen folgt.	
	Wir bestehen darauf, dass unser Lieferant seine Routinen anpasst, wenn die gewünschten Ergebnisse nicht erreicht werden.	
	Wir geben unserem Lieferanten Hinweise, durch welche Verhaltensweisen er bestimmte Leistungsziele erreichen kann.	
	Wir bewerten die Prozeduren, die unser Lieferant anwendet, um unseren Auftrag zu erfüllen.	
Outcome Control and Monitoring Mechanisms	Projektbudgetpläne	Formative Scale
	Ergebnis-, Kosten- oder Wirtschaftlichkeitsrechnungen	
	Kennzahlen(systeme)	
	Cost-Break-Down Methoden (z. B. Materialquoten, Zuschlags- oder Stundensätze)	
	Berichte (z. B. Status-, Finanz-, Kosten- oder Umsatzberichte)	
Behavior Control and Monitoring Mechanisms	Informations- oder Qualitätsmanagement-Systeme (z. B. Auditprogramme, System- oder Prozessreviews)	
	Gemeinsame Planungsrunden, regelmäßige Meetings, Konferenzen o.ä.	
	Vorgabe von Handlungs- oder Verfahrensrichtlinien (Prozeduren, Regeln)	
	Besetzung von Fachausschüssen (z. B. Lenkungsgremien, Qualitätsausschüsse) oder Schlüsselpositionen (z. B. Verbindungsmanager)	
Coordination	(D) (Unser Lieferant arbeitet für seine Leistungserstellung eng mit uns zusammen.)	0.640
	Unser Lieferant muss viel mit uns koordinieren, um seine Leistung erbringen zu können.	
	Unsere Leistungserstellung erfordert eine ständige Abstimmung mit dem Lieferanten.	
Incentive Mechanisms	Die intern hergestellten Bauteile werden bzgl. Kosten und technischer Eigen-schaften mit am Markt erhältlichen Bauteilen verglichen (Product Benchmark).	Formative Scale
	Anzahl alternativer Lieferanten die gleichwertige Leistungen zur Verfügung stellen könnten	
Coordinated Hierarchical Adaptation Mechanisms	Eigenkapitalanteile von VW an internen und externen Lieferanten, metrisch skaliert zwischen 0 und 1	Formative Scale
	Vertragslaufzeit; metrisch skaliert zwischen 0 und 1	
Coordinated Bilateral Adaptation Mechanisms	Der Vertrag enthält Regelungen… …über Preisanpassungen (z.B. im Falle von Rohstoffpreiserhöhungen) oder Mengen-anpassungen.	Formative Scale
	... zur Abnahme einer bestimmten Mindestmenge der Leistung.	
	... zu ggf. notwendigen Modifikationen der technischen Spezifikationen der Leistung.	

(R) reverse coded item. (D) marks deleted items which additionally appear in parentheses.

Tab. 10: Measurement of dependent variables

6.2.3.   Operationalization and Reliability of the Independent Variables

The major independent variables refer to determinants of make-and-buy. Potential determinants include asset specificity, performance ambiguity, volume uncertainty, and technological uncertainty. The details concerning operationalization and reliability of the independent variables are reported in a table at the end of this section.

6.2.3.1.   Asset Specificity

Since asset specificity is the dominant variable in TCE, many sources of measurement respectively operationalization of this variable can be found in the management literature (Boerner/Macher, 2002). But, to my understanding, these existing measures do not sufficiently reflect the different dimensions of the specificity variable: The operationalization of asset specificity has to allow for its different dimensions which are site specificity, physical asset specificity, human asset specificity, and dedicated assets in the first instance (Williamson, 1985; Richter/Furubotn, 1999), and may include also organizational asset specificity (e.g., business process specificity, procedural specificity), temporal asset specificity, intellectual specificity, and relational asset specificity (e.g. Masten et al., 1989; Madhok/Tallman, 1998). And this is what was realized in the measurement of asset specificity used in this thesis: Based on prior measures by Rokkan et al. (2003), Heide/John (1990), Joshi/Stump (1999), Buvik/Haugland (2005), Buvik/ Andersen (2002), Buvik/Reve (2001), Heide/John (1992), Zaheer et al. (1998), Poppo/ Zenger (1998), Joskow (1987), Subramani/ Venkatraman (2003), Masten et al. (1989), Madhok/Tallman (1998), the scale for buyer specific investments include 3 items for each type of specificity, i.e. physical asset specificity, human asset specificity, dedicated assets, and organizational asset specificity as well as one item for site specificity, temporal specificity, intellectual and relational asset specificity. As clearance with the responding firm revealed that organizational asset specificity is more relevant in sourcing decisions in the automotive context than site specificity, the scales emphasize organizational asset specificity with 3 items and site specificity is taken into consideration with only one item. The specificity scale then spans a sum of 16 items which reflects the importance of this variable in both the boundaries of the firm context and TCE.

Exploratory factor analysis of the buyer asset specificity scale shows a clear differentiation of the four dimensions physical asset specificity, human asset specificity, dedicated assets, and organizational asset specificity. Site specificity, temporal specificity, intellectual and rela-

tional asset specificity, which were measured by single items, show a high correlation with the dedicated assets dimension. As EFA extracted 4 dimensions the latter have to be allotted to the dedicated assets dimension which can be easily aligned with theory: On the one hand, the classification of different asset specificity types is not unanimous in the literature (e.g. Williamson (1985) vs. Williamson (1991a)) and on the other hand, the empirical distinction of asset specificity types made here is already very fine-grained and powerful. Moreover, Cronbach's alpha for the scales of physical asset specificity ($\alpha = 0.846$), dedicated assets ($\alpha = 0.892$), organizational asset specificity ($\alpha = 0.844$), as well as of the entire buyer specificity is very good ($\alpha = 0.899$). Only the human asset specificity scale provides a value which is mediocre ($\alpha = 0.594$). Therefore, for the buyer asset specificity factor, I excluded the two weakest human asset specificity items and aggregated the remaining items to an entire buyer asset specificity scale ($\alpha = 0.885$).

The detailed values are reported in table at the end of the chapter.

6.2.3.2.   Performance Ambiguity

To find reliable measures of performance ambiguity in the literature was almost impossible as reliability values rarely exceeded 0.7 for measure of this variable (e.g. Heide, 2003; Parmigiani, 2003). Furthermore, many of the measures did not reflect the performance ambiguity of interorganizational relationships as I wanted to focus on, but the ambiguity of employer-employee relationships (e.g. John/Weitz, 1989). Hence, scale construction for performance ambiguity proved to be a challenge. Items 1, 2, and 5 were developed originally in consultation with the responding firm. Items 3 and 4 of the scale were taken from Parmigiani (2003) because although the reliability of her scale is only limited, the items represent dimensions respectively operationalizations of performance ambiguity, which are normally not incorporated in scales in the literature, e. g., determining the cause of a problem that may occur with the component (Parmigiani, 2003; Parmigiani 2007). In the question-naire, items 2 and 4 were reversed coded. Item 6 is taken from John/Weitz (1989) and adapted to an inter-organizational context because the scale of John/Weitz (1989) shows, compared to other performance ambiguity scales, an extraordinary high Cronbach's alpha of 0.79. The chosen item provides a good item-to-total correlation of 0.46 and was furthermore positively evaluated in the consultation with the participating firm.

Concerning performance ambiguity, EFA yielded three dimensions consisting of items 1, 3, and 4, item 2, and items 5 and 6. I did not intend to measure multiple dimensions of perfor-

mance ambiguity, but after a careful scrutiny of the item questions I discovered that the first dimension consisting of items 1, 3, and 4 measures the means by which the buyer wants to ensure the quality of the component. The second dimension measures the ease of quality assessment of the focal component, while the third dimension measures how easily the efforts of the supplier can be assessed. Indeed, these different dimensions can represent different aspects of performance ambiguity. Hence, the effects in the data can properly be explained by theory.

However, as Cronbach's alpha turned out to be much worse when handling all dimensions as one factor, I had to decide which dimension represents performance ambiguity most validly. Although the first dimension provides good reliability statistics, I want to ensure that my measure of this central variable in my model does validly measure what I intended to measure. Hence, I decided to not follow reliability consideration but content validity considerations and restrict the performance ambiguity construct to the second dimension which consists only of one item, because multinomial regression revealed that only this single item of the scale behaves robustly and consistently with theory while both other dimension did not. Hence, I favored the item that validly measures performance ambiguity as validity always includes reliability.

6.2.3.3.   Volume Uncertainty

Volume uncertainty was measured with 3 items, emphasizing different dimensions of uncertainty, i.e., (un)predictability and volatility. All items were taken from Parmigiani (2003) while the first and second items were reversed coded. The reliability of the scales in her study was sound with a Cronbach's alpha of 0.71 for unpredictability and 0.75 for change (tantamount to volatility).

Although EFA of volume uncertainty shows a single factor, the loading of the third non-reversed coded item is low. Hence, I dropped this item and remained with two items measuring volume uncertainty, which generates good reliability statistics.

6.2.3.4.   Technological Uncertainty

The measurement of technological uncertainty turned out to be even more challenging than performance ambiguity, what may seem implausible at first. But as technological uncertainty has up to now been measured as technological volatility in nearly all cases, an adequate

separate consideration of its distinct dimensions of volatility as well as ambiguity/complexity could not be spotted in the existing literature (Boerner/Macher, 2002). Since this distinction is important to separate the case of making and buying the same vs. making and buying the same type of assets, this distinction had to be made necessarily. While good measures (alpha of about 0.87) for technological volatility could easily be found in the contributions of Celly et al. (1999) as well as Robertson/Gatignon (1998), and in similar form in Bensaou/Anderson (1999) and Schilling/Steensma (2002), measures for technological complexity are virtually non-existent. The scale of Celly et al. (1999) reflects these two dimensions of technological uncertainty best, why I wanted to use all four items out of their scale. Of my 9-item scale, the first 4 items represent technological volatility, while the remaining 5 items measure technological complexity. The first item is taken from Celly et al. (1999)[110], while the second item is also taken from this study but the technical innovations are split into technical innovations concerning the functionality of the component and concerning production processes. This operationalization can be found in the contribution of Bensaou/Anderson (1999). Items 4 and 5 are taken from Robertson/Gatignon (1998), but can also be similarly found in Schilling/ Steensma (2002).

For the operationalization of technological complexity, I generated some items by myself due to the lack of existing measures. Item 6 is taken from Celly et al. (1999), while the seventh item is a variation of item 6 focusing on complexity of production processes. After consultation with the participating firm, I had to drop one item that was concerning the amount of engineering content and was originally included in the scale of Celly et al. (1999). Hence, I decided to focus on another dimension of ambiguity besides complexity, namely newness to the firm. The logic is that if a component respectively the corresponding production process is new to the firm, meaning that they are highly innovative, there exists a higher uncertainty of how these components respectively production processes impact performance. And this is exactly what technological complexity means in contrast to about future technological change.[111] Therefore, items 8 and 9 inquire the innovativeness of the component as well as the corresponding production processes. It is important to note that item 2 and 3 and 8 and 9 differ from each other from a theoretical standpoint, because the expectation of future innovations (items 2 and 3) measures technological volatility respectively change while the inno-

---

110 The items taken from Celly et al. (1999) are original in terms of content. But since the items are formulated as oppositional word pairs (e.g. complex products vs. simple products) I transformed them into complete statements in the form of "this component is technologically complex".

111 For a detailed delineation of volatility (change) and ambiguity (complexity) see chapter 3.3.2.3.

vativeness or newness (items 8 and 9) represents a past change which now manifests itself in an uncertainty not about future events, but about present states of the focal component or process and its potential interplay with outcome variables, such as performance. If this conceptual distinction is equivalently realized by the respondents can only to be proven by the survey. The result, whether the theoretical distinction in (technological) ambiguity and volatility is also recognized by and relevant for practitioners, will then further our understanding of the perception and influence of uncertainty on governance choices.

Contrary to the measurement of performance ambiguity, the measurement model of technological uncertainty was explicitly designed to discriminate between two dimensions, namely technological volatility and technological complexity. Unfortunately, this could not be reproduced in the data as all items represent one consistent factor of technological uncertainty with very good reliability. Thus, it seems that although a theoretical distinction in (technological) ambiguity and volatility may be helpful to further our understanding of the influence of uncertainty on governance choices, this distinction was not recognized by the respondents. Due to the lacking of technological complexity scales, it is very likely that the self developed item questions did not properly reflect this distinction. Although EFA did not extract two different dimensions, I decided to try to nevertheless distinguish these dimensions in later multivariate analyses as this distinction is an important part of my theoretical argumentation. As later results will show, this approach was justified as the two dimensions differently affected the sourcing mode decision. Beside these validity considerations, each of two separated dimensions still represents a reliable measure.

The following table gives an overview of the measurement of determinants and management variables. Exploratory factor analysis with all reflective scales yielded a fairly good Kaiser-Meyer-Olkin Measure of Sampling of 0.774 (Backhaus et al., 2006). Bartlett's Test of Sphericity also provides good values of a highly significant approximate chi-square of 1,348.436. Cumulative variance explained by all 5 factors (physical asset specificity, organizational asset specificity, dedicated asset specificity, demand uncertainty, technological uncertainty) is 62.77 %.

Variable	Item/Proxy	Cronbach's alpha
Buyer Asset Specificity	Für die Zusammenarbeit mit dem Lieferanten hat VW folgende Investitionen getätigt…	0.885
	…allgemeine Apparaturen, Betriebsmittel o.ä., die auch außerhalb unserer Geschäftsbeziehung problemlos einsetzbar wären (z. B. standardisierte IT-Hard- und Software)	
	…Transportmittel und Lagereinrichtungen (Fahrzeugflotte, LKWs, Gabelstapler, Hubwagen, Hochregallager, etc.)	
	…Bereitstellung von zusätzlichen Kapazitäten (z. B. Produktion, Lagerhaltung, Mitarbeiter, etc.)	
	… Anpassung und Abstimmung unserer bestehenden Anlagen und Maschinen	
	(D) (… hochspezialisierte (Produktions-)Anlagen, Maschinen und Werkzeuge, die außerhalb unserer Geschäftsbeziehung kaum Verwendung finden könnten)	
	(D) (… spezifische Werkzeuge und Geräte, die ausschließlich der Qualitäts- kontrolle unseres Lieferanten dienen)	
	…Restrukturierung unseres Produktionsprozesses (z. B. um die Bauteile unseres Lieferanten besser verarbeiten zu können)	
	…Entwicklung von auf unseren Lieferanten hin zugeschnittenen Routinen und Prozessen	
	…Erweiterung oder Anpassung etablierter Routinen (Bestellung, Logistik, Inven- tarisierung, etc.)	
	…Übersendung von Personal	
	…Erlernen und Verstehen der technischen Standards, Arbeitsweisen und Beson- derheiten unseres Lieferanten	
	…Ausbau unserer personellen Fähigkeiten (Schulungen im Hinblick auf die Erfordernisse des Lieferanten, o.ä.)	
	…Einrichtungen an oder in der Nähe des Betriebsgeländes unseres Lieferanten, um Transport- und Inventarisierungskosten zu minimieren (z. B. Zwischenläger, Container, Verlagerung von Produktionsstufen, o.ä.)	
	…Prozesse und Routinen, die sicher stellen, dass die von uns bezogene Leistung fristgerecht (z. B. just-in-time) zur Verfügung steht	
	…Patente, Lizenzen, technisches Wissen, Datenbanken o.ä., die außerhalb dieser Lieferantenbeziehung nur einen begrenzten Nutzen aufweisen würden	
	…Aufbau und Aufrechterhaltung einer guten Beziehung zu unserem Lieferanten	
Performance Ambiguity	(D) (Unser Unternehmen erhält Qualitätszeugnisse von dem Lieferanten. (R))	Single item
	Unser Unternehmen kann die Qualität des Bauteils durch eine einfache Sicht- prüfung bestimmen. (R)	
	(D) (Unser Unternehmen setzt verschiedene Formen der Qualitätsprüfung und verschiedene Qualitätsmaße ein, um die Güte des Bauteils zu bestimmen.)	
	(D) (Wenn Probleme mit einem Bauteil auftreten, kann unser Unternehmen die Ursache üblicherweise gut bestimmen. (R))	
	(D) (Es ist schwierig das Bauteil unseres Lieferanten mit dem eines anderen zu vergleichen.)	
	(D) (Es ist schwierig zu beurteilen, wie viele Bemühungen unser Lieferant in die Erfüllung seiner Aufgabe investiert.)	
Volume Uncertainty	Unsere Prognosen über den erforderlichen Bedarf an dem Bauteil sind sehr zuverlässig. (R)	0.777
	Unsere Bedarfsmenge für das Bauteil ist konstant. (R)	
	(D) (Schwankungen in der Produktion bei unserem Unternehmen führen zu häufigen Änderungen des Lieferzeitpunktes für das Bauteil.)	

Variable	Item/Proxy	Cronbach's alpha	
Technological Volatility	Die in dem Bauteil eingesetzten Technologien entwickeln sich sehr schnell.	0.774	0.895
	In den nächsten Jahren sind große technologische Innovationen bei der Funktionalität des Bauteils wahrscheinlich.		
	In den nächsten Jahren sind große technologische Innovationen bei den Produktionsprozessen für das Bauteil wahrscheinlich.		
	Die Lebenszyklen des Bauteils sind kurz.		
Technological Complexity	Der technologische Entwicklungsdruck bei dem Bauteil ist stark.	0.890	
	Es handelt sich um ein technologisch komplexes Bauteil.		
	Die Produktionsprozesse für das Bauteil sind technologisch komplex.		
	Es handelt sich um ein hoch innovatives Bauteil.		
	Die Produktionsprozesse für das Bauteil sind hoch innovativ.		

(R) reverse coded item. (D) marks deleted items which additionally appear in parentheses.

Tab. 11: Measurement of independent variables

6.2.4.   Operationalization and Reliability of Control Variables

To enhance informational value of control variables and theoretical insights, I tried to favor theoretical meaningful control variables, like frequency or trust, over non-theoretical variables as, for instance, commodity or contract volume. Beside the control variables explained in this section, I also included the management variables for which I could show a positive relationship with the focal make-and-buy type in the analyses of the performance implication of either make-and-buy type.

Frequency

Transaction frequency is the third determinant in classical TCE. As I did not integrate frequency in my theoretical model, I gather data on transaction frequency in order to control whether this variable determines the choice to make-and-buy. Frequency is measured by a single item, which requests how often the buyer receives deliveries from the supplier per year. Measuring frequency with only one item is justifiable, since it is a fairly simple construct and therefore it has mostly been measured by a single item in the literature (e.g. Murray/Kotabe, 1999; Murray et al., 1995; Heide/Miner 1992; Buvik, 2000). Frequency is measured by a single item. Hence, reliability statistics cannot be comuted here.

Commodity

I used the affiliation of the component to one of the commodity groups to control whether this affects the sourcing mode. Here, it was requested whether the component belongs to the exterior, interior, electronics, powertrain, or metal commodity. Commodity is measured as nominal variable for which reliability statistics cannot be comuted.

Organizational learning

To control the possibility that the production cost related performance measures of make-and-buy the same type of assets, i.e. buyer flexibility and economies of scale and scope come along with organizational learning, I included this variable as control variable in my analyses. The measurement of organizational learning is based on Kale et al. (2000) (see also Mellewigt, 2003). Thereby, their 3-item scale was reduced to two items due to the length of the questionnaire. Their items 1 and 2 were summarized into a single item. The two items measuring organizational learning yielded one consistent factor with a very good Cronbach's alpha

Buyer and supplier expertise

Logically connected with the control for the possibility that buyer flexibility and economies of scale and scope come along with organizational learning, I also checked whether supplier has the necessary expertise the buyer can learn from. Furthermore, I also controlled whether there is a gap between supplier and buyer expertise to understand whether there is a need for the buyer to learn from the supplier. Moreover, I used supplier expertise to control whether supplier performance is rather determined by the expertise of the supplier than by make-and-buy the same assets. The measurement of buyer expertise included 3 items and was based on a scale of Parmigiani (2003). The supplier expertise scale was composed by one item from Parmigiani (2003) and two items from Bensaou/Anderson (1999). For the measurement of supplier expertise the second item was dropped due to relaibility considerations, whereas all three items of the buyer exptertise scale yielded a good reliability value. However, items measuring organizational learning and supplier expertise loaded on one factor.

Module-/Platform strategy

In the automotive industry, production can be organized in a way where components are part of a module or platform strategy. Thereby, the same components are assembled in various different car types which are based on the same platform or are assembled from the same modules. Hence, argued on the component level, the demand for this component is relatively higher than for components that are not part of such a strategy which leads to the possibility to achieve greater scale economies for this component than for others. Therefore, two items which focus on the fact whether the component is part of either strategy control for the effect of either strategy on scale economies. Also, both items measuring a module-/platform strategy constitute one factor and provide good reliability statistics.

Reputation

To estimate the determinants of buyer transaction costs, I controlled how the effect of a good supplier reputation is on transaction costs compared to the governance choice as I expect that a good reputation decreases transaction costs. Reputation was measured by 3 items based on a scale of Carson et al. (2006). The first item of the reputation scale was dropped to yield one factor and good Cronbach's alpha.

Contract volume

Beside reputation, I also controlled for the effect of the annual procurement volume in the contract with the supplier on buyer transaction costs expecting that a large transaction volume also increases costs in connection with this transaction. Contract volume was directly requested and was scaled in five categories of annual procurement volume ranging from below 1 million, 1-5 million, 6-50 million, 50-100, and over a 100 million €. Contract volume is measured as singel item for which reliability statistics cannot be comuted.

Trust

With supplier opportunism it suggests itself to control for the effect of trust as the other side of the coin on supplier opportunism. This also serves as plausibilization of the measurement of opportunism. Trust was measured by 3 items based on a scale by Luo (2002). The three item scale measuring trust provides a very good reliability and also represents one consistent factor.

The following table gives an overview of the measurement of the control variables. Exploratory factor analysis with all reflective scales yielded a fairly good Kaiser-Meyer-Olkin Measure of Sampling of 0.706 (Backhaus et al., 2006). Bartlett's Test of Sphericity also provides good values of a highly significant approximate chi-square of 585,993. Cumulative variance explained by all 5 factors (organizational learning and supplier expertise, buyer expertise, module-/platform strategy, reputation, and trust) is 59.27 %.

Variable	Item/Proxy	Cronbach's alpha
Organizational learning	Die Zusammenarbeit mit unserem Lieferanten hat uns dabei geholfen, unser vorhandenes Wissen zu verbessern.	0.925
	Wir haben durch die Beziehung zu unserem Lieferanten neues Wissen aufge-baut und/oder neue Fähigkeiten erlernt.	
Supplier expertise	Unser Lieferant verfügt über patentgeschütztes Wissen, das ihm einen Vorteil gegenüber seinen Wettbewerbern verschafft.	0.731
	Unser Lieferant verfügt bei der Herstellung des Bauteils über besondere(s) bzw. einzigartige(s) einzigartige(s) technische(s) Verständnis bzw. Konstruktions-Know-how	
Buyer expertise	Unsere Mitarbeiter können das Bauteil auch kostengünstig selbst herstellen.	0.729
	Die Herstellung dieses Bauteils erfordert ein besonderes Know-how, das in unserem Unternehmen vorhanden ist.	
	Die Fähigkeiten zur Produktion dieses Bauteils sind eng verwandt mit Fähig-keiten, die wir zur Herstellung anderer, ähnlicher Bauteile einsetzen.	
Module-Platform strategy	Das Bauteil ist Teil einer Plattformstrategie.	0.741
	Das Bauteil ist Teil einer Modulstrategie.	
Reputation	Falls sich unser Zulieferer nicht ausreichend kooperativ zeigen würde, so hätte dies negative Auswirkungen auf seine Reputation in der Automobilindustrie.	0.718
	Bei der Auswahl des Lieferanten war uns seine Reputation wichtig.	
Trust	In unserer Beziehung können wir darauf vertrauen, dass die getroffenen Verein-barungen eingehalten werden.	0.923
	In unserer Beziehung haben wir großes gegenseitiges Vertrauen in die Aktivi-täten des Partners.	
	Unser Lieferant steht zu seinem Wort, auch wenn ihm dadurch Nachteile entstehen können.	

(R) reverse coded item. (D) marks deleted items which additionally appear in parentheses.

Tab. 12: Measurement of control variables

6.3. Descriptive Statistics

In the following I will present some general descriptive results on make-and-buy in order to provide an impression of for instance the frequency of different sourcing modes, the number of internal respectively external suppliers, duration of the procurement relationship to the leading supplier, and the emergence and the likely future development of this sourcing mode. These results may help to better interpret the subsequent multivariate analyses of the interre-lationships between the variables. As mentioned earlier some of this information will not be available for the case of making and buying the same type of assets, since this detailed infor-mation could only be requested for making-and-buying the same assets.[112]

As the figure below shows there is no internal production among the investigated 89 sourcing decisions, which instead consist of 54 buy cases and 35 make-and-buy cases. In other words, 60 % of the sourcing decisions are external purchasing while 40 % are make-and-buy.

---

112 Hence, if available statements are based on the total sample of 35 make-an-buy cases while otherwise they refer only to the 11 make-and-buy the same assets-cases.

Furthermore, the 35 make-and-buy decisions can be subdivided into 24 make-and-buy the same type of assets decisions and 11 make-and-buy the same assets decisions.
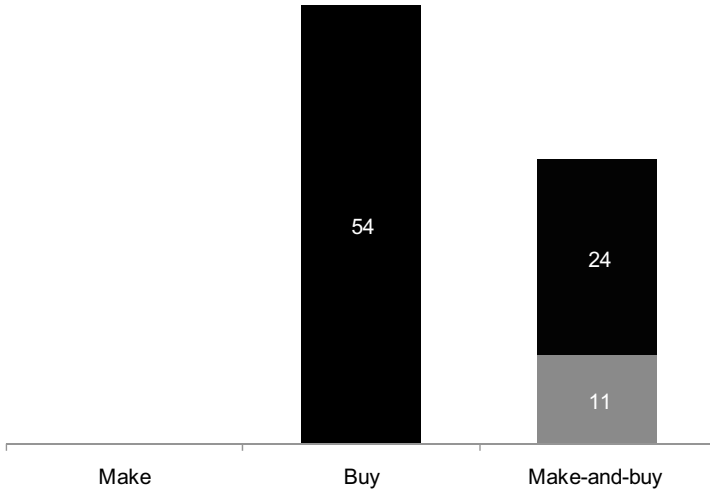
Fig. 13: Frequency of sourcing modes

Concerning the question whether make-and-buy is an equilibrium sourcing mode instead of being a transitional governance form in the change from make to buy or vice versa, I can be stated that make-and-buy is indeed an equilibrium governance form as for the 11 make-and-buy the same assets cases in 8 cases the component has always been sourced this way and in 10 cases it will be further concurrently made and bought.

Analysis of the number of suppliers shows that in almost all make-and-buy the same assets-cases there exists only one internal supplier. In about the half of all make-and-buy cases the firm has only one or two suppliers, while the maximum are 40 external suppliers in one make-and-buy relationship. The following figures give an overview of the number of suppliers in the make-and-buy cases.
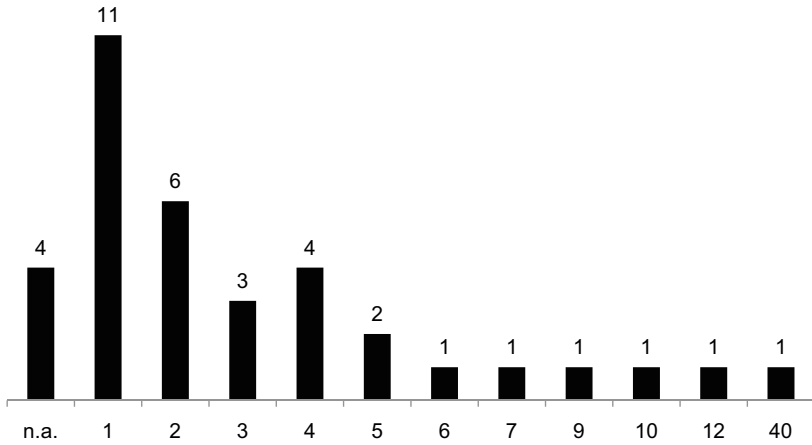
Fig. 14: Number of external suppliers (all make-and-buy cases)
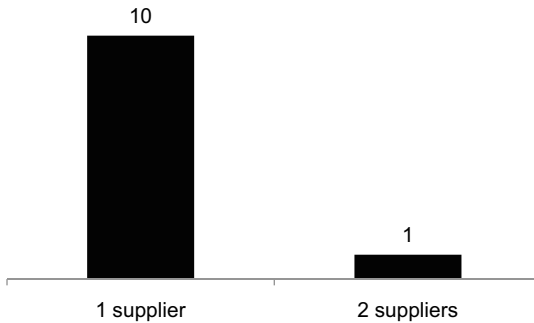
Fig. 15: Number of internal suppliers (make-and-buy the same assets-cases)

Analyzing the duration of the buyer-supplier relationships reveals that over 60 % of the relationships last 10 to 40 years indicating a dominance of developed long-term relationships. Bearing in mind that Volkswagen AG was founded 70 years ago, some relationships have lasted for about the half of the entire firm age. The figure below shows the frequency of the relationship durations.
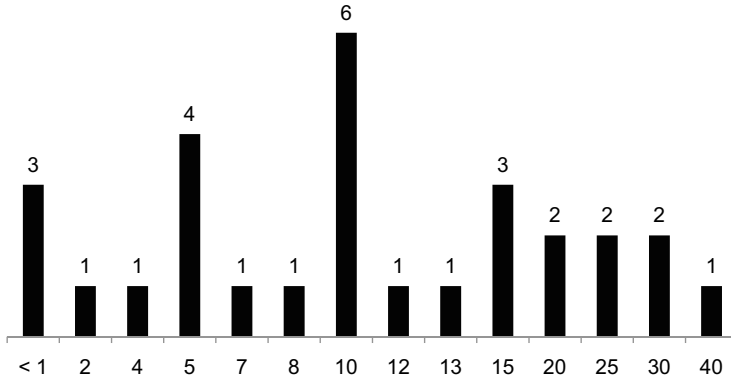
Fig. 16: Duration of buyer-supplier relationships in years

The percentage of internal production ranges from 10 % to 55 %. This indicates that the classical argument for make-and-buy which can often be found in the literature, i.e. that make-and-buy serves to reduce capacity shortages of internal production, does not apply for my sample.
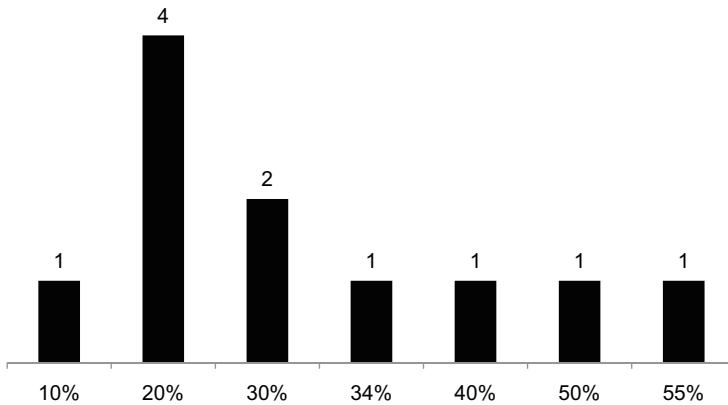
Fig. 17: Percentage of internal production

The components which are simultaneously made and bought cover all commodities which supports the relevance of this sourcing mode across all commodities. The frequency of

commodities in make-and-buy differentiated by make-and-buy type is shown by the following figure.
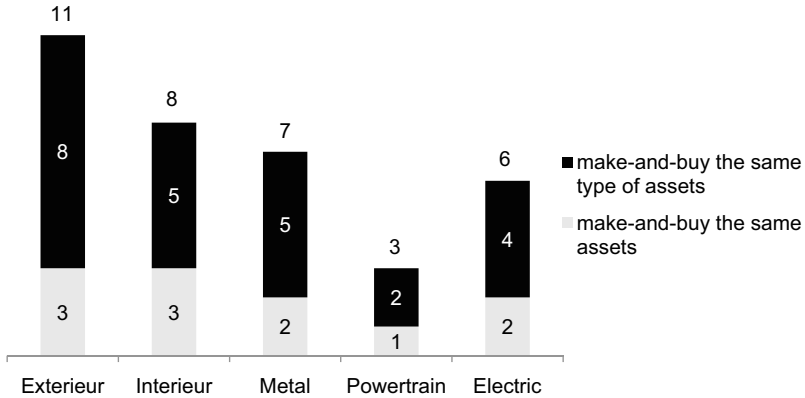
Fig. 18: Frequency of commodities in make-and-buy

Finally, a summary of descriptive statistics is given in the next table.

	N	Minimum	Maximum	Mean/Mode	SD/ Quartiles
Number external suppliers	32	1	40	4.4375	7.08446
Number internal suppliers	11	1	2	1.0909	0.30151
Duration of relationship	29	0.5	40	12.4483	9.95915
Percentage int. production	11	10	55	29.9091	13.93165
Commodity[113]	35	1	5	1	1 / 2 / 4

Tab. 13: Summary of descriptive statistics of non-theoretical variables

6.4. Empirical Results

The applicability of multivariate data analysis methods largely depends on the scale level of the measures (i.e. nominal, ordinal, or metrical), on the type of hypothesized relationships (i.e. directed vs. undirected relationships) and on the sample size (Homburg et al., 2000). Against this background, my hypotheses have to be subdivided into three different subgroups which at the same time also provide a logical distinction. These subgroups include hypotheses referring to (1) the determinants of make-and-buy, (2) the management of make-and-buy, and (3) the

---

113 Descriptive statistics of nominal variables entail the mode value instead of the mean value and quartiles instead of standard deviation.

performance of make-and-buy. The data analysis methods as well as results for each group will be presented in a separate paragraph in the following.

6.4.1. Evidence regarding the Determinants of make-and-buy

All 8 hypotheses which relate to the determinants of make-and-buy contain the nominally scaled governance choice as dependent variable. Furthermore the hypotheses are structured in a way to discriminate between the two governance forms of making and buying the same assets and making and buying the same type of assets. As a consequence the appropriate data analysis method is a multinomial logistic regression where the relationship between various metric or nominal independent variables and one categorical dependent variable is investigated. Multinomial logistic regression furthermore allows defining a base category of the dependent variable to which the remaining two categories can be compared. This is ideal for my purposes where the two categories "make-and-buy the same assets" and "make-and-buy the same type of assets" are compared to the reference category "buy". Discrimination between the two governance forms takes place by hypothesizing a positive effect of a focal variable with one governance form (e.g. make-and-buy the same assets) and at the same time hypothesizing that there is no relationship between this variable and the other governance form (e.g. make-and-buy the same type of assets).

6 of my 8 hypotheses on the determinants of make-and-buy are hypotheses of null. These assume that there is no relationship between two variables. In current methods of statistical hypothesis testing, it is assumed to be technically impossible to support null hypotheses which can only be rejected (e.g. Aberson, 2002; Lane et al., 1998; Cohen, 1992). On the one hand, this "shortcoming" arises due to the fact that the contemporary statistical approach to test scientific hypotheses works as a null hypothesis significance testing (NHST) procedure (Aberson, 2002; Jones/Tukey, 2000). This means that a support of the scientific hypothesis, H_1: $\mu_A - \mu_B \neq 0$, is tantamount to a rejection of the null hypothesis, H_0: $\mu_A - \mu_B = 0$. For the traditional hypotheses test which works as test for the equality of two population means (μ), an estimate of $\mu_A - \mu_B$, $y_A - y_B$, is obtained, where $y_A - y_B$ are estimates of $\mu_A - \mu_B$ When using linear regression y is computed as regression function $y = ß_0 + ß_1{*}x_1 + ß_2{*}x_2 + \ldots + ß_n{*}x_n$ (Backhaus, et al., 2006). For multinomial logistic regression the regression function is $y = \exp(ß_0 + ß_1{*}x_1 + ß_2{*}x_2 + \ldots + ß_n{*}x_n)/1 + \exp(ß_0 + ß_1{*}x_1 + ß_2{*}x_2 + \ldots + ß_n{*}x_n)$ (Hoetker, 2007). Including the estimated standard error of $y_A - y_B$, s_d, the statistic $(y_A - y_B)/s_d$ is formed. For this statistic a two-tailed rejection region of the sampling distribution is established by

setting a value for the probability of rejecting H_0 when it is true (α), often set as 0.05, in my work set as 0.10. When the statistic falls in either tail of the rejection region, H_0 is rejected in favor of H_1. Then the only acceptable conclusions are either a rejection of H_0 or a failure to reject that null hypothesis (Jones/Tukey, 2000; Nickerson, 2000). As Cohen (1994: 1001) warns, "don't look for a magic alternative to" this formulation of the null hypothesis significance test, because "It doesn't exist.".

On the other hand, the existing process of gaining scientific knowledge does not work as accumulation of "true knowledge" but rather as systematic falsification of "wrong statements" (Schnell et al., 2005: 62). As a consequence, hypotheses have to be formulated in way that allows their falsification (Popper, 1976). Against this background, null hypotheses simply lack the ability to be falsified. However, the scientific knowledge gaining process and the statistical procedure of null hypotheses testing have not remained without critique (Nickerson, 2000). Generally, it may also further the scientific understanding of phenomena to know that a variable A does not affect a dependent variable C, especially when a competing hypothesis says that another variable B does instead explain C. This is true for my hypotheses H1b and H4a which pose that not performance ambiguity affects make-and-buy the same type of assets (but technological volatility) and that not technological volatility affects make-and-buy the same assets (but performance ambiguity). Furthermore, it may also contribute to the gaining of scientific insights to check whether a variable A does affect the dependent variable C in order to reassess older knowledge which has either been successfully be supported earlier for another dependent variable or which has been accepted in the literature based on theoretical reasoning. Transported to my research context this means that it is, argued from a theoretical knowledge gaining process, important to understand whether asset specificity affects also make-and-buy or can only discriminate between make or buy (H2a and H2b). Similarly, it can further our understanding of governance forms to realize whether demand uncertainty is the driver of make-and-buy as a transitional governance form between make and buy or whether make-and-buy is an autonomous governance form (H3a and H3b). During theory develop-ment in my work, I have not admitted myself being directed by statistical feasibility but tried to follow the "ideal" research process in terms of logical deduction (Schnell et al., 2005).

Although a number of test approaches have been presented in previous literature (e.g. power analysis or confidence intervals), in the state-of-the-art of statistical hypotheses testing there is no approved approach for the test of null hypotheses up to now (Aberson, 2002; Nickerson, 2000). Regardless of the fact that the impossibility to test null hypotheses is unsatisfactory, I

decided to not use any unapproved approaches. Instead, I follow Hoetker (2007) for the interpretation of the null results by comparing statistical significance levels and effect sizes of the focal variables (Hoetker, 2007).[114]

Before reporting the results from the multinomial logit, descriptive statistics are provided including minimum, maximum, standard deviation, and mean values of the relevant variables in order to enhance understanding of the complete dataset of 89. Note that for nominal variables mode values are reported instead of means and quartiles instead of standard deviation.

Variables	N	Min	Max	Mean/Mode	SD/Quartiles
Sourcing mode	89	1	3	1	1 / 1 / 3
Commodity	89	1	5	5	1.5 / 3 / 5
Frequency	89[115]	1.00	7.00	3.49	1.755
Buyer Asset Specificity	89	1.00	7.00	5.26	1.837
Performance Ambiguity	89	1.00	5.93	2.64	1.236
Technological Volatility	89	1.00	7.00	3.51	1.288
Technological Complexity	89	1.00	7.00	4.34	1.495
Demand Uncertainty	89	1.00	7.00	3.91	1.440

Tab. 14: Descriptive statistics of determinant model variables

Furthermore, a correlation matrix is provided to give an overview of the relationships between the determinant model variables and also to provide first hints at potential multicollinearity[116] problems.

---

114 Hoetker proposes this approach for comparison of coefficients across subgroups in logistic regression. When this approach is appropriate for comparisons across groups it can also be used to compare coefficients inside one group.

115 As the frequency variable was not scaled in the questionnaire and values of frequency ranged from 1 to 500, I scaled this variable according to the other variables in seven categories. As the frequency variable had 13 missing values, I had to replace the missing values with means to ensure that the sample size for logistic regression was not reduced.

116 Collinearity occurs when one independent variable can be described as a linear combination of another variable which violates regression assumptions (Schneider, 2007).

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Buy	1													
2. Mab/S	-.466**	1												
3. Mab/ST	-.755**	-.228*	1											
4. Com: Exterieur	-.125	.022	.121	1										
5. Com: Interieur	-.053	.066	.009	-.289**	1									
6. Com: Metal	-.068	.013	.065	-.258*	-.227*	1								
7. Com: Powertr.	.068	-.026	-.056	-.204	-.179	-.160	1							
8. Com: Electric	.178	-.074	-.141	-.348**	-.306**	-.274**	-.216*	1						
9. Frequ.	-.163	.237*	.004	.063	-.004	-.032	.013	-.039	1					
10. Buyer AS	-.431**	.153	.361**	-.080	-.227*	.103	-.060	.239*	-.061	1				
11. Perf. Amb.	-.050	.208*	-.100	-.038	-.041	.051	.183	-.100	-.034	-.199	1			
12. Tech. Volatiltiy	-.136	.065	.101	-.084	-.117	-.096	.228*	.106	-.065	.089	-.160	1		
13. Tech. Complex	-.131	.221*	-.020	-.177	-.138	-.067	.292**	.147	.173	.144	-.066	.658**	1	
14. Demand Uncert.	-.046	.085	-.013	-.016	.043	.093	.086	-.163	.327**	-.188	.097	.028	.165	1

N= 89. Pearson Correlation with 2-tailed significance levels.

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed)

Tab. 15: Correlation matrix of determinant model variables

The correlation matrix provides some interesting insights: First, we can see that the three sourcing modes "buy", "make-and-buy the same assets", and "make-and-buy the same type of assets" are clearly distinguishable which is a first hint at the necessity to discriminate between the different make-and-buy types. Second, in alignment with classical TCE buyer asset specificity is negatively correlated with "buy". However, it is positively correlated with "make-and-buy the same type of assets" and not significantly correlated with "make-and-buy the same assets". Furthermore, we can see a positive correlation between both performance ambiguity and technological complexity and "make-and-buy the same assets" whereas technological volatility is not significantly correlated with "make-and-buy the same type of assets". Concerning multicollinearity, the table shows that there may be some multicollinearity problems regarding the independent variables "technological volatility" and "technological complexity" as both variables correlate with each other with a value of 0.658. The correlation

coefficients between the remaining independent variables are rather not critical as the magnitude of correlation indicates multicollinearity and not the significance of correlation (Schneider, 2007). In order to test for multicollinearity I used the variance inflation factor (VIF) and the tolerance value which are used in linear regression as there are no specific approaches for proving and handling multicollinearity in logistic regression (Menard, 1995). To do so, I simulated the same models[117] as linear regression which I use later on for the logistic regression and computed collinearity statistics for each variable. As I want my model to be robust I use pessimistic estimations of tolerable values of VIF and tolerance which define a VIF of 5 or higher and a tolerance value of 0.20 or lower as indications for multicollinearity (Hutcheson/Sofroniou, 1999).

Model		Tolerance	VIF
I	Commodity	0.997	1.003
	Frequency	0.997	1.003
II	Commodity	0.869	1.151
	Frequency	0.824	1.214
	Buyer Asset Specificity	0.869	1.150
	Performance Ambiguity	0.917	1.090
	Technological Volatility	0.518	1.932
	Technological Complexity	0.475	2.105
	Demand Uncertainty	0.834	1.200

Tab. 16: Multicollinearity statistics for the independent variables in the determinant model

As the table shows there is no cause for concern regarding multicollinearity in my determinants model.

The following table shows the results of the multinomial regression. Model I includes only the control variables which are transaction frequency and commodity. Model II shows additionally the theoretical variables buyer asset specificity, performance ambiguity, technological uncertainty divided into volatility and complexity, and demand uncertainty. As parameter estimates I provide coefficient beta for which I report the level of significance.

---

117 Model I includes only the control variables which are transaction frequency and commodity. Model II shows additionally the theoretical variables buyer asset specificity, performance ambiguity, technological uncertainty divided into volatility and complexity, and demand uncertainty.

To prove the quality and explanatory power of the models I report Nagelkerke's pseudo R-Square which estimates the proportion of variance explained by the model. For Nagelkerke's R-Square values of 0.2 and more are considered to be satisfactory, values of 0.4 and more are regarded as good, while values equal to or exceeding 0.5 are regarded as very good (Backhaus et al., 2006). Furthermore, I provide the level of significance of the model as well as the degrees of freedom, chi square, and -2 Log Likelihood.[118]

---

118 -2 Log Likelihood describes the goodness of model fit, while differences in chi square of the likelihood ratio test display the improvement of the considered model in comparison to the base model which only includes the control variables (Backhaus et al., 2006).

Sourcing mode (Reference category: buy)	Variables	Parameter Estimates			
		Model I		Model II	
		Beta	Sig.	Beta	Sig.
make-and-buy the same assets	Intercept	-2.431	*0.002*	-4.943	*0.000*
	Frequency	0.812	*0.029*	1.394	*0.016*
	Exterieur	0.800	0.438	3.012	*0.041*
	Interieur	1.042	0.313	4.196	*0.007*
	Metal	1.020	0.364	2.354	0.142
	Powertrain	0.298	0.823	0.339	0.856
	Electrics	.	.	.	.
	Buyer Asset Specificity			2.108	*0.001*
	Performance Ambiguity			2.010	*0.005*
	Technological Volatility			1.007	0.154
	Tech. Complexity			0.632	0.338
	Volume Uncertainty			0.001	0.999
make-and-buy the same type of assets	Intercept	-1.491	*0.007*	-3.369	*0.000*
	Frequency	0.142	0.586	0.572	0.121
	Exterieur	1.174	0.105	3.335	*0.003*
	Interieur	0.813	0.297	3.846	*0.004*
	Metal	1.036	0.193	2.782	*0.019*
	Powertrain	0.236	0.809	1.124	0.464
	Electrics	.	.	.	.
	Buyer Asset Specificity			2.142	*0.000*
	Performance Ambiguity			0.437	0.213
	Technological Volatility			0.994	*0.041*
	Tech. Complexity			-0.431	0.381
	Volume Uncertainty			0.178	0.629
Model Fit:	-2 Log Likelihood	104.448		102.626	
Likelihood Ratio Test	Chi-Square	9.733		60.241	
	df	10		20	
	Sig.	0.464		*0.000*	
Nagelkerke Pseudo R-Square		0.213		0.586	

N = 89.

Tab. 17: Results of multinomial regression of the determinants model

Regarding the model quality, the likelihood ratio test shows that the difference in chi square between the models with a value of 50.508 indicates a strong improvement of explanatory

power of Model I in comparison to Model II. Also, only Model II is significant and moreover provides a very good pseudo R square, while R square of Model I is only satisfactory.

In order to interpret effect size, I go beyond common hitherto practice and follow Hoetker (2007), who proposes to transform the beta coefficient to marginal probabilities of the occurrence of make-and-buy the same assets respectively make-and-buy the same type of assets (in comparison to buy) when the either one theoretical variable is increased by one standard deviation from the mean. To do so, I used standardized variables and computed the logistic regression function to yield the base line probability. Then I increased each theoretical variable one standard deviation from the mean which yields the marginal probability for the occurrence of the focal make-and-buy case when this variable is increased by one standard deviation.[119] The comparison of both marginal probabilities allows interpreting the magnitude of the effect of each theoretical variable on the probability of the occurrence of the make-and-buy case. The following table shows the marginal probabilities whether they are significant.

---

119 Logistic regression function for the "probability of sourcing mode" = exp(ß0 + ß1*Buyer Asset Specificity + ß2*Performance Ambiguity + ß3*Technological Volatility + ß4*Technological Complexity + ß5*Volume Uncertainty + ß6*Frequency + ß7*Commodity1 + ß8*Commodity2 + ß9*Commodity3 + ß10*Commodity4)/1 + exp(ß0 + ß1*Buyer Asset Specificity + ß2*Performance Ambiguity + ß3*Technological Volatility + ß4*Technological Complexity + ß5*Volume Uncertainty + ß6*Frequency + ß7*Commodity1 + ß8*Commodity2 + ß9*Commodity3 + ß10*Commodity4). Thereby all continuous variables were standardized and for the categorical commodity variable dummies were computed.

Sourcing mode	Increase in variable of one SD leads to…	…probability of the occurrence of sourcing mode
make-and-buy the same assets	Base line	0.2076
	Buyer Asset Specificity	*0.4071**￼
	Performance Ambiguity	*0.3966**￼
	Technological Volatility	0.2949
	Technological Complexity	0.2604
	Volume Uncertainty	0.2077
	Frequency	*0.3327*￼
make-and-buy the same type of assets	Base line	0.3408
	Buyer Asset Specificity	*0.6402**￼
	Performance Ambiguity	0.4001
	Technological Volatility	*0.4797*￼
	Technological Complexity	0.2867
	Volume Uncertainty	0.3644
	Frequency	0.4191

N = 89.

**. Coefficient is significant at the 0.01 level.

*. Coefficient is significant at the 0.05 level.

Tab. 18: Effect size of ß-coefficients from multinomial logit transformed to probabilities

As the table depicts clearly the two null hypotheses H2a and H2b regarding the effects of asset specificity on both types of make-and-buy must be rejected as asset specificity significantly affects a nearly doubling (96 %) (from 0.2076 to 0.4071) of marginal probability of make-and-buy the same assets (as compared to the base line probability) and an increase of the probability of make-and-buy the same type of assets of about 88 % (from 0.3408 to 0.6402).[120] When considering the results of the correlation matrix, this effect may be interpreted as negative relationship between buy and asset specificity, esp. regarding make-and-buy the same assets which is not positively correlated with specificity in the correlation matrix. However, as the correlation matrix showed a positive relationship between specificity and make-and-buy the same type of assets the positive association of make-and-buy the same type of assets and specificity seems to indicate a relationship between these two variables which is not generated by the reference sourcing mode of buy. As the sample contains no make case there is no possibility to juxtapose the positive effect of specificity on make-and-

---

120 Note that percentage of increase is reported referring to the base line probability. This means that a probability increase of 19.95 % percentage points from 0.2076 to 0.4071 is reported as 96 % increase of the base line probability of 0.2076.

buy when compared to buy with the effect of specificity on make-and-buy when compared to make. Hence, with the given sample the hypotheses H2a and H2b have to be rejected.

In contrast, the significant positive effect of performance ambiguity on make-and-buy the same assets (H1a) and the significant positive effect of technological volatility on make-and-buy the same type of assets (H4b) can both be supported. As the tables show, an increase in performance ambiguity of one standard deviation increases probability of make-and-buy the same assets of about 91 % (from 0.2076 to 0.3966). In comparison to the effects of asset specificity on make-and-buy generally and the effect of performance ambiguity on make-and-buy the same assets the effect of technological volatility turns out to be weaker. However, with an increase in technological volatility the probability of make-and-buy the same type of assets ascends from 0.3408 to 0.4797 which is an increase of about 41 %.

Another interesting result is that frequency has a significant positive effect on make-and-buy the same assets. Although, I have left aside this relationship in my theoretical model, this is consonant with my theoretical argumentation leading to proposition 6. The probability of make-and-buy the same assets increases to 0.3327 when frequency increases one standard deviation. The relationship of frequency and make-and-buy the same type of assets is non-significant.

As elaborated earlier the hypotheses H1b, H2a and H2b, H3a and H3b as well as H4a cannot be supported because they are hypotheses of null. But as the results of the logit indicate, except for H2a and H2b, the hypotheses also could not be rejected here. Although this is clearly no test of the null hypotheses, it gives us a weak hint that the hypothesized relation-ship may be true. When looking at the effect sizes in the above table, we can see that the insignificant effect of technological volatility on make-and-buy the same assets is about half as strong as the effects of asset specificity and performance ambiguity. Even clearer, the increase in the probability of the occurrence of make-and-buy the same assets affected by volume uncertainty is only 0.01 % which is really weak compared to the about 20 % increases affected by specificity and performance ambiguity. Similarly, the increase in the probability of the occurrence of make-and-buy the same type of assets affected by volume uncertainty is only about 2 % which is also weak in comparison to the main effects which bring about an increase of approximately 30 % affected by specificity and approximately 14 % affected by technological volatility.

Although technological complexity has a positive correlation with make-and-buy the same assets in the correlation analysis, this effect cannot be found in the logistic regression. It was

argued in the theoretical development that technological complexity is a condition for perfor-
mance ambiguity, since technological complexity is defined as multiplicity and interconnec-
tedness of components and technologies which "increases the difficulty in evaluating quality
through inspection prior to use" (Parmigiani, 2007: 290; see also e.g. Coles/Hesterly, 1998;
Bensaou/Anderson, 1999). Hence, I would have expected that technological complexity is on
the one hand correlated with performance ambiguity and on the other hand behaves diffe-
rently than technological volatility in terms of a positive effect on make-and-buy the same
assets. The first expectation cannot be reproduced in my data as technological complexity is
not correlated with performance ambiguity but rather with technological volatility. However,
concerning the second expectation, the results in the logit clearly show distinct effects of
technological complexity and technological volatility on the different make-and-buy cases
irrespective the insignificance of the effects of complexity. This supports the necessity of the
conceptual distinction of these two technological uncertainty dimensions even if these are not
immediately visible in the data by e.g. factor analysis.

6.4.2. Evidence regarding the Management of make-and-buy

In contrast to the hypotheses concerning the determinants of make-and-buy, the hypotheses
regarding the management of make-and-buy do not assume a directed relationship in terms
that a management mechanism leads to a governance choice or vice versa but simply that
management mechanisms and governance form are interrelated and hence occur together.
Instead, the management hypotheses include the condition that the interrelationship between
the variables exists only when the focal uncertainty type is high. Consequently, the proper
analysis method to test theses hypotheses are correlations (matrices).[121] In order to define the
subsample including the condition of high uncertainty, I distinguished high and low levels of
uncertainty according to the median value of the uncertainty type and subdivided the sample.
To additionally test for the fact whether the hypothesized effect is only valid under the given
condition, I compared the effect in the subsample including the condition of high uncertainty
with the effects in the total sample. As I offer no hypotheses concerning the condition of low
uncertainty, I did not compare subsamples with high vs. low uncertainty as this does not
properly reflect the test for the validity of the condition. Furthermore, the comparison of the
subsample including the condition with the total sample that omits the condition is a much

---

[121] As correlation matrices are provided as hypothesis test, no separate correlation matrices are reported.
Furthermore, multicollinearity is not an issue as correlations are computed bivariatly.

harder test to for the validity of this condition as it is more difficult to obtain significant results than with the comparison of subsamples with low and high uncertainty.[122]

For the combination of behavior and outcome control I provide two different measures: First, I measured control by concrete governance mechanisms and second by items representing the constructs of behavior and outcome control. Also I recoded the dependent variable sourcing mode in order to distinguish the focal make-and-buy type (coded as "1") in comparison to all other sourcing modes (coded as "0").

6.4.2.1.   Evidence regarding the Management of make-and-buy the same assets

For the management of make-and-buy the same assets, it was argued that under conditions of high performance ambiguity a positive relationship will exist between making and buying the same assets and both a combination of intensive behavior and output control mechanisms and high-powering incentive mechanisms inside the firm. Before reporting the results from the correlation analyses, descriptive statistics are provided including minimum, maximum, standard deviation, and mean values of the relevant variables.

Variables	N	Min	Max	Mean/Mode	SD/Quartiles
Omitting condition of high performance ambiguity					
Mab/S vs. all others	89	0	1	0	0 / 0 / 0
Outcome Control and Monitoring Mechanisms	89	1.00	7.00	4.0487	1.79051
Behavior Control and Monitoring Mechanisms	89	1.33	7.00	5.0412	1.31601
Combined Control and Monitoring Mechanisms	89	1.17	7.00	4.5449	1.27964
Outcome Control and Monitoring	89	1.00	7.00	5.9438	1.29562
Behavior Control and Monitoring	89	1.60	7.00	5.2899	1.22289
Combined Control and Monitoring	89	1.43	7.00	5.4767	1.10886
Incentive Intensity	89	1.00	22.00	4.3427	2.52330

---

122 Besides this reasoning, a comparison of subsamples with high vs. low uncertainty is impossible for at least make-and-buy the same assets, as the subsample with low performance ambiguity contains only 3 make-and-buy cases.

Variables	N	Min	Max	Mean/Mode	SD/Quartiles
Including condition of high performance ambiguity					
Mab/S vs. all others	32	0	1	0	0 / 0 / 0
Outcome Control and Monitoring Mechanisms	32	1.00	7.00	4.0521	1.88202
Behavior Control and Monitoring Mechanisms	32	3.33	7.00	5.3646	1.14647
Combined Control and Monitoring Mechanisms	32	3.00	7.00	4.7083	1.17318
Outcome Control and Monitoring	32	1.00	7.00	6.1875	1.31216
Behavior Control and Monitoring	32	1.60	7.00	5.4875	1.37718
Combined Control and Monitoring	32	1.43	7.00	5.6875	1.24616
Incentive Intensity	32	1.00	9.50	3.6406	1.72848

Tab. 19: Descriptive statistics of management model variables of make-and-buy the same assets

The following matrices show the results for the management of make-and-buy the same assets first omitting the condition of high performance ambiguity and then under this condition.

		Mab/S vs. all others	Outc. CaM Mech	Beh. CaM Mech	Comb. CaM Mech	Outc. CaM	Beh. CaM	Comb. CaM	Incent. Mech.
Mab/S vs. all others	Pearson Correlation	1							
	Sig.								
Outc. CaM Mech	Pearson Correlation	.252*	1						
	Sig.	0.017							
Beh. CaM Mech	Pearson Correlation	.188	.342**	1					
	Sig.	0.077	0.001						
Comb. CaM Mech	Pearson Correlation	.273**	.876**	.754**	1				
	Sig.	0.010	0.000	0.000					
Outc. CaM	Pearson Correlation	.136	.157	.329**	.279**	1			
	Sig.	0.205	0.141	0.002	0.008				
Beh. CaM	Pearson Correlation	.231*	.385**	.368**	.458**	.510**	1		
	Sig.	0.030	0.000	0.000	0.000	0.000			
Comb. CaM	Pearson Correlation	.227*	.356**	.399**	.454**	.735**	.958**	1	
	Sig.	0.033	0.001	0.000	0.000	0.000	0.000		
Incent. Mech.	Pearson Correlation	.371**	.058	.072	.078	.071	-.001	.023	1
	Sig.	0.000	0.587	0.505	0.470	0.508	0.993	0.830	

N = 89.
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Tab. 20: Correlation matrix of management mechanisms of make-and-buy the same assets without the condition of high performance ambiguity

		Mab/S vs. all others	Outc. CaM Mech	Beh. CaM Mech	Comb. CaM Mech	Outc. CaM	Beh. CaM	Comb. CaM	Incent. Mech.
Mab/S vs. all others	Pearson Correlation	1							
	Sig.								
Outc. CaM Mech	Pearson Correlation	.339	1						
	Sig.	0.058							
Beh. CaM Mech	Pearson Correlation	.454**	.150	1					
	Sig.	0.009	0.411						
Comb. CaM Mech	Pearson Correlation	.494**	.876**	.609**	1				
	Sig.	0.004	0.000	0.000					
Outc. CaM	Pearson Correlation	.187	.216	.343	.341	1			
	Sig.	0.307	0.236	0.055	0.057				
Beh. CaM	Pearson Correlation	.323	.275	.333	.384*	.603**	1		
	Sig.	0.072	0.127	0.062	0.030	0.000			
Comb. CaM	Pearson Correlation	.311	.282	.366*	.405*	.777**	.971**	1	
	Sig.	0.083	0.118	0.039	0.021	0.000	0.000		
Incent. Mech	Pearson Correlation	.401*	.079	.277	.199	.152	.226	.224	1
	Sig.	0.023	0.669	0.125	0.276	0.408	0.213	0.217	

N = 32.
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Tab. 21: Correlation matrix of management mechanisms of make-and-buy the same assets under the condition of high performance ambiguity

Omitting the condition of high performance ambiguity, both combined control measures, i.e., the mechanism and construct measure, show a significant positive correlation with make-and-buy the same assets. However, all control construct measures slip out of significance when the condition of high performance ambiguity is incorporated, while the (behavioral and combined) control mechanism measure shows an even stronger relationship to make-and-buy the same assets under this condition. The tables show some further interesting results concerning outcome vs. behavior control mechanisms: Without the condition of high performance ambiguity, outcome control mechanisms seem to outweigh behavioral control mechanisms, whereas under the condition of high performance ambiguity behavioral control

mechanisms outweigh outcome control mechanisms. These results support the intuitive guess that with increasing performance ambiguity, management focuses on behavioral aspects as outcomes become more difficult to measure. Also, incentive intensity shows a clear positive relationship with make-and-buy the same assets which is valid with and without the condition of high performance ambiguity, but turns out to be slightly stronger under the condition of high performance ambiguity. Hence, the tables show partial support for hypotheses 5a and 5b: Concerning hypothesis 5a, it can be seen that the effect of control and monitoring mechanisms measure has to be distinguished according outcome and behavior control, as the positive correlation of the combined effect is due to outcome control mechanisms omitting the condition of high performance ambiguity and due to behavioral mechanisms including this condition. Concerning hypothesis 5b, the condition of high performance ambiguity is not necessary for the relationship of incentive mechanisms and make-and-buy the same assets. To investigate whether these management mechanisms are appropriate to discriminate between the two types of make-and-buy, I additionally computed correlation matrices for the control and monitoring and incentives and make-and-buy the same type of assets. The results indicate that omitting the condition of high technological volatility, make-and-buy the same type of assets is negatively correlated with the control and monitoring construct (-0.278** for outcome control and monitoring, -0.249* for behavior control and monitoring, and -0.289** for combined control and monitoring). Including the condition of high technological volatility neither of the management mechanisms is correlated with make-and-buy the same type of assets. Incentive mechanisms and control and monitoring mechanisms are not significantly correlated with make-and-buy the same type of assets independently from the condition of high technological volatility. Hence, the results support the assumption that different management mechanisms are relevant for the different make-and-buy modes.

6.4.2.2.   Evidence regarding the Management of make-and-buy the same type of assets

For the management of make-and-buy the same type of assets it was argued that under conditions of high technological volatility, a positive relationship will exist between making and buying the same type of assets and both an intensive coordination between buyer and supplier and a combination of coordinated bilateral and coordinated hierarchical adaptation mechanisms. The following table shows the descriptive statistics for the hypothesized management variables relevant for making and buying the same type of assets.

Variables	N	Min	Max	Mean/Mode	SD/Quartiles
Omitting condition of high technological volatility					
Mab/ST vs. all others	89	0	1	0	0 / 0 / 1
Coordination	89	3.00	7.00	5.5918	0.93576
Coordinated Hierarchical Adaptation Mechanisms	79	0.00	1.00	0.2835	0.34779
Coordinated Bilateral Adaptation Mechanisms	89	0.00	1.00	0.5506	0.34488
Combined Adaptation Mechanisms	89	0.00	1.00	0.4311	0.24133
Including condition of high technological volatility					
Mab/ST vs. all others	41	0	1	0	0 / 0 / 1
Coordination	41	3.00	7.00	5.5772	0.92203
Coordinated Hierarchical Adaptation Mechanisms	41	0.00	1.00	0.2318	0.30786
Coordinated Bilateral Adaptation Mechanisms	41	0.00	1.00	0.5610	0.33697
Combined Adaptation Mechanisms	41	0.00	0.95	0.3964	0.22079

Tab. 22: Descriptive statistics of management model variables of make-and-buy the same type of assets

Concerning, the management of make-and-buy the same type of assets the following matrices show the results first omitting the condition of high technological volatility and then under this condition. As the table shows, without the condition of high technological volatility only the combined adaptation mechanisms are correlated with make-and-buy the same type of assets.

		Mab/ST vs. all others	Coordi-nation	Coord. Hierarch. Adapt.	Coord. Bilateral Adapt.	Comb. Coord. Adapt.
Mab/ST vs. all others	Pearson Correlation	1				
	Sig.					
Coordi-nation	Pearson Correlation	-.024	1			
	Sig.	0.826				
Coord. Hierarch. Adapt.	Pearson Correlation	.160	-.143	1		
	Sig.	0.159	0.209			
Coord. Bilateral. Adapt.	Pearson Correlation	.206	-.195	-.178	1	
	Sig.	0.053	0.066	0.117		
Comb. Coord. Adapt.	Pearson Correlation	.217*	-.256*	.644**	.677**	1
	Sig.	0.041	0.015	0.000	0.000	

N = 89 except for coordinated hierarchical adaptation which has an N =79.
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Tab. 23: Correlation matrix of management mechanisms of make-and-buy the same type of assets <u>without</u> the condition of high technological volatility

When considering the table below, which includes the condition of high technological volatility, it can be seen that the combined and bilateral coordinated adaptation mechanisms provide a positive correlation with make-and-buy the same type of assets due to the positive relationship of coordinated bilateral adaptation mechanisms. This at least partially supports hypothesis 5d, although the coordinated hierarchical adaptation mechanisms alone provide no significant correlation. Partial support results from the fact that the condition of high technological volatility is not necessary for the correlation of combined adaptation mechanisms and make-and-buy the same type of assets to occur. Instead, hypothesis 5c, which assumes a positive relationship between coordination and make-and-buy the same type of assets, cannot be supported under either condition of high and low technological volatility. This may be due to the measurement of this construct, which has poor reliability, especially in comparison the other measures used in my study. Furthermore, this result indicates that administrative support by bureaucracy is not as relevant for make-and-buy the same type of assets as for make-and-buy the same assets. It seems that volatility clearly drives adaptability concerns whereas the cooperation between buyer and supplier require no extra coordination when technology changes quickly.

		Mab/ST vs. all others	Coordi-nation	Coord. Hierarch. Adapt.	Coord. Bilateral adapt.	Comb. Coord. Adapt.
Mab/ST vs. all others	Pearson Correlation	1				
	Sig.					
Coordi-nation	Pearson Correlation	-.113	1			
	Sig.	0.480				
Coord. Hierarch. Adapt	Pearson Correlation	.220	-.043	1		
	Sig.	0.167	0.791			
Coord. Bilateral. Adapt.	Pearson Correlation	.312*	.022	-.064	1	
	Sig.	0.047	0.889	0.690		
Comb. Coord. Adapt.	Pearson Correlation	.391*	-.013	.648**	.718**	1
	Sig.	0.011	0.938	0.000	0.000	

N = 41.
**. Correlation is significant at the 0.01 level (2-tailed).
 *. Correlation is significant at the 0.05 level (2-tailed).

Tab. 24: Correlation matrix of management mechanisms of make-and-buy the same type of assets under the condition of high technological volatility

For these management mechanisms as well, I want to investigate whether they are appropriate to discriminate between the two types of make-and-buy. Hence, I additionally computed correlation matrices for the coordination and coordinated adaptation mechanisms and make-and-buy the same assets. The results indicate that omitting the condition of high performance ambiguity, make-and-buy the same assets is positively correlated with the coordinated hierarchical adaptation mechanisms (0.334**) and with combined coordinated adaptation mechanisms (0.209*). Instead, coordinated bilateral adaptation mechanisms and coordination yielded no significant results. However, including the condition of high performance ambiguity, all previously significant results loose significance and neither of the management mechanisms of make-and-buy the same type of assets is correlated with make-and-buy the same assets. If one wants to discover tendencies, the results can be interpreted in terms of indicating that make-and-buy the same type of assets is rather correlated with bilateral adaptation mechanisms while make-and-buy the same assets (admittedly only omitting the condition of high performance ambiguity) is rather associated with hierarchical adaptation mechanisms. Interestingly, the management of make-and-buy the same type of assets seems to be closer to hybrid governance forms (bilateral mechanisms) whereas the management of

make-and-buy the same assets seems to be closer to hierarchical governance forms (hierarchical mechanisms). Altogether, the results support the assumption that different management mechanisms are relevant for the different make-and-buy modes. To sum up the evidence regarding the management of make-and-buy, hypotheses 5a, 5b, and 5d could be supported at least partially while hypothesis 5c could not be supported.

6.4.3. Evidence regarding the Performance of make-and-buy

Contrary to the hypotheses regarding to the determinants of make-and-buy, hypotheses referring to the performance of make-and-buy frame the sourcing mode as independent variable. As elaborated in theory development, dependent variables differ depending on which case of make-and-buy is at hand, but all dependent variable measures have in common that they are scaled metrically. Consequently, the appropriate multivariate analysis is linear regression using ordinary least squares estimation (OLS) (Backhaus et al, 2006). A recently growing discussion regarding the analysis of performance implications in strategic management stresses the problem of endogeneity (Proppe, 2007). Endogeneity can occur due to a number of reasons (Proppe, 2007). Potential endogeneity in my analysis of the performance of make-and-buy basically refers to the possibility that performance effects may be determined by the same variables which have already explained the sourcing mode which now serves as independent variable. Hence, in a regression model which does not incorporate potential endogeneity, it cannot be indentified whether performance effects truly result from variations in the sourcing mode or from variations in the variables which have already been found to determine the sourcing mode, e.g. buyer asset specificity, performance ambiguity, or technological volatility. I solve potential endogeneity problems in my analysis by a two-stage approach[123]: First, I repeated the logistic regression which was used to identify the determinants of make-and-buy as binary regression (instead multinomial) as I want to test the performance implication of the each make-and-buy type in comparison to all other governance forms (instead only to the reference category "buy"), i.e. buy and the other make-and-buy case. Then, I used the coefficients from this regression to compute the logistic regression function and create a variable which entails the probability of the focal make-and-buy case based on its determinants and compared to all other governance forms. Finally, I use this

---

123   My approach is comparable to the two-stage-least-square approach which is typically used to solve endogeneity problems with the difference that the first stage is not a least squares estimation but a maximum likelihood estimation due to logistic regression.

variable to perform my performance OLS regression analyses, instead of the original sourcing mode variable.

To control for effects which were not hypothesized but generally consistent with my theoretical model, for each make-and-buy case, I first compute a model which includes the management variables for which I could show a positive relationship with the focal make-and-buy case in the previous paragraph. This shows whether the implementation of appropriate management mechanisms contributes to the explanation of the performance implications. Furthermore, I additionally include a control variable which is not part of or close to my extended TCE framework, e.g. supplier expertise or trust, to check whether and how much explanatory power concepts from other theories have regarding the performance of make-and-buy.

For each regression results table I provide the unstandardized beta coefficients because they are directly interpretable as effect size when the variables increase by one standard deviation, as I use standardized variables for regression. Furthermore, I report the level of significance for each coefficient as well as for both models. The F-value is the mean square regression divided by the mean square residual and is associated with the significance value. These values answer the question whether the independent variables reliably predict the dependent variable (Backhaus et al., 2006). Because my sample size is rather small, I report adjusted R square which considers the number of observations and the number of predictors. This attempts to yield a more honest value to estimate proportion of variance in the dependent variable which can be predicted from the independent variables (Backhaus et al., 2006).

6.4.3.1.   *Evidence regarding the Performance of make-and-buy the same assets*

It was predicted that making and buying the same assets under high performance ambiguity leads to higher supplier performance, lower buyer transaction costs, and lower supplier opportunism than other governance forms. Thereby, the logic is that performance ambiguity generally decreases supplier performance and increases buyer transaction costs and supplier opportunism. Therefore, the following analyses will entail an interaction effect, where making and buying the same assets under the condition of performance ambiguity shall invert the effect of performance ambiguity. Before reporting the results of the regression analyses, I provide descriptive statistics and correlation matrices for the used variables.

Variables	N	Min	Max	Mean	SD
Supplier Performance	89	1.20	7.00	5.1483	1.17687
Buyer Transaction Costs	89	1.00	7.00	4.4222	1.35969
Supplier Opportunism	89	1.00	5.43	2.8074	1.15980
P mab/S vs. all others	89	0.00	0.89	0.1236	0.19235
Performance Ambiguity	89	1.00	7.00	5.2584	1.83729
Incentive Intensity	89	1.00	22.00	4.3427	2.52330
Control and Monitoring Mechanisms	89	1.17	7.00	4.5449	1.27964
Control and Monitoring	89	1.43	7.00	5.4767	1.10886
Trust	89	1.00	7.00	4.8764	1.41366
Contract Volume	89	1.00	5.00	3.2584	1.09262
Supplier Reputation	89	1.00	7.00	4.7079	1.18899
Supplier Expertise	89	1.50	7.00	4.0056	1.47805

Tab. 25: Descriptive statistics of performance model variables of make-and-buy the same assets

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Supplier Perf.	1											
2. Buyer Transaction Costs	0.033	1										
3. Supplier Opp.	-.567**	.227*	1									
4. *P* mab/S vs. all others	-0.015	0.207	0.155	1								
5. Perf. Amb.	-0.144	-0.016	0.058	.359**	1							
6. Incentive Intensity	0.109	-0.013	0.088	.245*	0.063	1						
7. Control and Monitoring Mechanisms	.265*	0.096	-0.157	.249*	0.177	0.078	1					
8. Control and Monitoring	0.187	0.019	-.218*	0.117	0.119	0.023	.454**	1				
9. Trust	.665**	-0.027	-.568**	-0.067	-.215*	0.014	0.137	0.020	1			
10. Contract Volume	0.118	.267*	0.094	0.165	0.187	-0.078	0.085	-0.151	-0.104	1		
11. Supplier Reputation	.415**	-0.158	-.413**	-0.015	0.108	-0.015	.352**	.373**	.337**	0.011	1	
12. Supplier Expertise	.269*	0.059	-.244*	-0.014	0.048	-0.037	.316**	0.001	.222*	0.171	.318**	1

N= 89. Pearson Correlation with 2-tailed significance levels.
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Tab. 26: Correlation matrix of performance model variables for make-and-buy the same assets

In the correlation matrix, variables 1-3 are the dependent variables and the remaining variables 4-12 are independent variables. Among the independent variables, variables 4 and 5 will form the interaction effect of sourcing mode and performance ambiguity modeled in my hypotheses, whereas the remaining independent variables are controls.

When considering the remaining independent variables 7-12, although unlikely, there may be some multicollinearity between the independent variables "control and monitoring" and "control and monitoring mechanisms" as both variables correlate with each other with a value of 0.454, whereas the correlation coefficients of the remaining independent variables are not critical.[124] To be sure that multicollinearity is not an issue in my analyses, each of the following regression analysis will also include collinearity diagnostics always referring to the complete model III.

---

124 Note that the magnitude of correlation indicates multicollinearity and not the significance of correlation (Schneider, 2007).

The following table shows the regression results for the supplier performance of make-and-buy the same assets.

Make-and-buy the same assets		Dependent Variable: Supplier Performance							
		Model I		**Model II**		**Model III**		**Collinearity Diagnostics**	
	Variables	**Beta**	**Sig.**	**Beta**	**Sig.**	**Beta**	**Sig.**	**Tol.**	**VIF**
	Constant	0.000	1.000	0.000	1.000	-0.003	0.982		
	Incentive Intensity	0.105	0.306	0.121	0.247	0.121	0.251	0.935	1.070
	Control and Monitoring Mechanisms	0.126	0.306	0.163	0.194	0.163	0.197	0.650	1.539
	Control and Monitoring	0.127	0.277	0.136	0.237	0.136	0.240	0.768	1.302
	Supplier Expertise	0.233	*0.036*	0.231	*0.036*	0.231	*0.037*	0.862	1.161
	P mab/S vs. all others			-0.027	0.815	-0.054	0.859	0.309	3.231
	Performance Ambiguity			-0.198	*0.071*	-0.200	0.152	0.561	1.783
	P mab/S vs. all others u. cond. of high Perf. Amb.					0.029	0.969	0.357	2.804
Adj. R Square		0.090		0.112		0.101		---	
F		3.170		2.856		2.418		---	
Sig.		*0.018*		*0.014*		*0.027*		---	

N = 89.

Tab. 27: Regression results of supplier performance of make-and-buy the same assets

As the results concerning the supplier performance of make-and-buy the same assets show, hypotheses H8a cannot be supported. Although model II shows that performance ambiguity diminishes performance, this effect cannot be significantly reversed by make-and-buy the same assets. However, the signs of the coefficients point in the right direction, indicating that make-and-buy seems to act in the right manner. But, neither of the effects, i.e., make-and-buy the same assets under condition of high performance ambiguity, make-and-buy same assets, and performance ambiguity, is significant. The insignificance of results may be due to the small number of make-and-buy the same assets-cases (11) in comparison with all other governance forms (78). Also, the management control variables yield no significant results. Instead, supplier expertise as control variable shows a positive effect on supplier performance.

Altogether, adjusted R square remains small across all models, indicating a rather limited explanatory power of the models. Furthermore, there is no indication that multicollinearity is a problem in this analysis.

The next table shows the regression results for buyer transaction costs of make-and-buy the same assets.

Make-and-buy the same assets		Dependent Variable: Buyer Transaction Costs							
		Model I		Model II		Model III		Collinearity Diagnostics	
	Variables	Beta	Sig.	Beta	Sig.	Beta	Sig.	Tol.	VIF
	Constant	0.000	1.000	0.000	1.000	-0.044	0.724	0.346	2.892
	Incentive Intensity	-0.006	0.951	-0.041	0.699	-0.043	0.685	0.695	1.438
	Control and Monitoring Mechanisms	0.112	0.356	0.085	0.491	0.090	0.468	0.695	1.438
	Control and Monitoring	0.098	0.424	0.094	0.442	0.101	0.414	0.870	1.150
	Contract Volume	0.274	*0.012*	0.267	*0.016*	0.277	*0.014*	0.790	1.265
	Supplier Reputation	-0.237	*0.040*	-0.209	*0.070*	-0.217	*0.063*	0.346	2.892
	P mab/S vs. all others			0.186	0.116	0.093	0.625	0.551	1.815
	Performance Ambiguity			-0.134	0.234	-0.084	0.544	0.922	1.084
	P mab/S vs. all others u. cond. of high Perf. Amb.					0.124	0.540	0.290	3.447
Adj. R Square		0.070		0.082		0.075		---	
F		2.335		2.129		1.896		---	
Sig.		*0.049*		*0.050*		*0.072*		---	

N = 89.

Tab. 28: Regression results of buyer transaction costs of make-and-buy the same assets

Similar to the supplier performance model, the hypothesized effects of make-and-buy same assets under condition of high performance ambiguity on buyer transaction costs (H8b) cannot be supported. However, in contrast to the pervious regression results even the signs are not pointing in the proper direction as performance ambiguity has a negative sign towards transaction costs, while the interaction effect has a positive sign. Again, the insignificance of

results may be due to the small number of make-and-buy the same assets-cases (11) in comparison with all other governance forms (78). However, based upon these results, one may argue that buyer transaction costs are not necessarily associated with the governance form, which opposes traditional TCE reasoning assuming that governance modes are chosen to minimize transaction costs. Against this background, the given results could indicate that, although it may be hitherto empirically supported that asset specificity is the main explanatory variable for the choice of governance forms, asset specificity and governance form instead do not necessarily determine transaction costs, which is the "real" dependent variable in TCE. Instead, in my sample, two non-TCE control variables provide some explanation of buyer transaction costs. While contract volume increases costs probably due to the safeguarding requirements of the higher financial risk, reputation of the supplier decreases costs as the buyer can better assess the future relationship with the supplier. Altogether, R square, significance, and F-value indicate a strongly limited explanatory power of the model whereas multicollinearity is not a problem in this analysis.

The next table provides the regression results concerning the effects of make-and-buy the same assets on supplier opportunism.

Make-and-buy the same assets		Dependent Variable: Supplier Opportunism							
		Model I		Model II		Model III		Collinearity Diagnostics	
	Variables	Beta	Sig.	Beta	Sig.	Beta	Sig.	Tol.	VIF
	Constant	0.000	1.000	0.000	1.000	0.078	0.449		
	Incentive Intensity	0.100	0.252	0.068	0.445	0.073	0.406	0.936	1.068
	Control and Monitoring Mechanisms	0.009	0.924	-0.011	0.910	-0.022	0.830	0.722	1.385
	Control and Monitoring	-0.213	*0.031*	-0.209	*0.033*	-0.213	*0.029*	0.790	1.265
	Trust	-0.566	*0.000*	-0.574	*0.000*	-0.564	*0.000*	0.913	1.095
	P mab/S vs. all others			0.164	*0.092*	0.324	*0.038*	0.307	3.253
	Performance Ambiguity			-0.102	0.285	-0.189	0.103	0.551	1.815
	P mab/S vs. all others u. cond. of high Perf. Amb.					-0.221	0.186	0.355	2.820
Adj. R Square		0.346		0.355		0.361		---	
F		12.622		9.076		8.108		---	
Sig.		*0.000*		*0.000*		*0.000*		---	

N = 89.

Tab. 29: Regression results of supplier opportunism of make-and-buy the same assets

Again, the in H8c hypothesized effects cannot be supported. However, the results provide some interesting insights: There is a positive effect of make-and-buy the same assets on supplier opportunism when the condition of performance ambiguity is omitted. Moreover, this effect is robust and even increasing across the models. This means that, generally, make-and-buy the same assets favors opportunistic behavior in comparison to all over governance forms. This effect changes its sign when the condition of performance ambiguity is incorporated, but is not significant. The results also suggest that performance ambiguity seems to be negatively associated with opportunism, although this effect is not significant as well. These results seem to support the opposite of the logic in my theory, i.e. that performance ambiguity leads to opportunism and that the governance form of make-and-buy mitigates opportunism. The results at hand may be explained by the following logic: When the quality of a component is easy to assess for the buyer, he can more easily detect opportunistic behavior of the

supplier, which may be obscured when the quality of the component is difficult to assess. Hence, higher performance ambiguity possibly allows opportunism to stay undetected, whereas make-and-buy the same assets uncovers this opportunism but without mitigating it. It may be the case that Volkswagen AG does not succeed in properly manage make-and-buy in order to mitigate opportunistic behavior, which is uncovered by make-and-buy. This reasoning would also connect to the result that control and monitoring is significantly associated with a decrease in supplier opportunism. However, the negative effect of trust on supplier opportunism is even more than twice as strong as that of control. The latter two results seem to indicate that control and trust as formal and informal governance mechanisms do not exclude each other mutually. Altogether, R square is much higher than in the previous analyses indicating an acceptable explanatory power of these models. However, the increase in R square for model III compared with model I, reflecting the increase of explanatory power of the independent variables compared to the controls, is strongly limited. Furthermore, the R square in this model is very likely to be mainly driven by trust as trust represents the other side of the opportunism coin. Again, multicollinearity seems not to be problem here.

6.4.3.2.   Evidence regarding the Performance of make-and-buy the same type of assets

It was predicted that making and buying the same type of assets under high technological volatility leads to higher buyer flexibility as well as buyer scale and scope economies. Thereby, the logic is that technological volatility generally decreases buyer flexibility as well as buyer scale and scope economies. Therefore, the following analyses will entail an interaction effect where making and buying the same type assets under the condition of technological volatility shall invert the effect of technological volatility. Before reporting the results of the regression analyses, I provide descriptive statistics and correlation matrices for the used variables.

Variables	N	Min	Max	Mean	SD
Buyer Flexibility	89	1.50	6.75	4.2233	0.98628
Buyer Scale Economies	89	1.00	7.00	4.1236	1.49864
Buyer Scope Economies	89	1.00	7.00	3.9286	2.12908
P mab/ST vs. all others	89	0.00	0.89	0.2697	0.22809
Technological Volatility	89	1.00	7.00	3.5056	1.28804
Combined Coordinated Adaptation Mechanisms	89	0.00	1.00	0.3786	0.27729
Organizational Learning	89	1.00	7.00	4.5674	1.34880
Supplier Expertise	89	1.50	7.00	4.0056	1.47805
Buyer Expertise	89	1.00	6.33	2.8839	1.38088
Module-/Platform-Strategy	89	1.00	7.00	3.5393	1.97459

Tab. 30: Descriptive statistics of performance model variables of make-and-buy the same type of assets

Variables	1	2	3	4	5	6	7	8	9	10
1. Buyer Flexibility	1									
2. Buyer Scale Economies	.363**	1								
3. Buyer Scope Economies	.547*	0.352	1							
4. *P* mab/ST vs. all others	0.015	0.140	0.001	1						
5. Technological Volatility	0.092	0.170	0.058	0.198	1					
6. Comb. Coordinated Adapt. Mechanisms	-0.109	-0.090	-0.087	0.027	0.030	1				
7. Organizational Learning	.362**	.268*	-0.277	-0.040	.391**	-0.164	1			
8. Supplier Expertise	.359**	0.084	-.561*	-0.086	0.066	-.280**	.462**	1		
9. Buyer Expertise	0.062	-0.085	.648*	.293**	0.016	0.082	-0.011	-0.069	1	
10. Module-/Platform-Strategy	.335**	.402**	-0.147	0.014	0.064	-0.148	.298**	.274**	-0.097	1

N = 89. Pearson Correlation with 2-tailed significance levels.
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Tab. 31: Correlation matrix of performance model variables for make-and-buy the same type of assets

Again, in the correlation matrix, variables 1-3 are the dependent variables and the remaining variables 4-10 are independent variables. Among the independent variables, variables 4 and 5

will form the interaction effect of sourcing mode and technological volatility modeled in my hypotheses, whereas the remaining independent variables are controls.

When considering the remaining independent variables 7-10, although unlikely, there may be some multicollinearity between the independent variables "organizational learning" and "supplier expertise" as both variables correlate with each other with a value of 0.462, whereas the correlation coefficients of the remaining independent variables are not critical (Schneider, 2007). To be sure that multicollinearity is not an issue in my analyses, each of the following regression analysis will also include collinearity diagnostics always referring to the complete model III.

Make-and-buy the same type of assets		Dependent Variable: Buyer Flexibility							
		Model I		Model II		Model III		Collinearity Diagnostics	
	Variables	Beta	Sig.	Beta	Sig.	Beta	Sig.	Tol.	VIF
	Constant	0.000	1.000	0.000	1.000	-0.042	0.675		
	Comb. Coord. Adapt. Mech.	-0.005	0.958	-0.003	0.981	-0.032	0.758	0.894	1.118
	Org. Learning	0.247	*0.029*	0.263	*0.037*	0.272	*0.027*	0.645	1.550
	Supplier Expertise	0.249	*0.032*	0.247	*0.037*	0.214	*0.067*	0.718	1.394
	Buyer Expertise	0.082	0.410	0.073	0.488	0.074	0.474	0.904	1.106
	P mab/ST vs. all others			0.032	0.767	-0.002	0.988	0.842	1.188
	Technological Volatility			-0.035	0.759	-0.048	0.665	0.779	1.284
	P mab/ST vs. all others u. cond. of high Tech. Vola.					0.212	*0.033*	0.944	1.059
Adj. R Square		0.146		0.126		0.164		---	
F		4.747		3.120		3.467		---	
Sig.		*0.002*		*0.008*		*0.003*		---	

N = 89.

Tab. 32: Regression results of buyer flexibility of make-and-buy the same type of assets

The results in the table show support for hypothesis H8d. As predicted, make-and-buy the same type of assets under the condition of high technological volatility leads to higher buyer flexibility. Furthermore, the results concerning the control variables suggest the inference that

buyer flexibility increases due to the fact that the buyer learns from a skilled supplier, which is consistent with my theoretical argumentation. Instead, the management mechanisms, for which a correlation with make-and-buy the same type of assets could be shown in previous analyses, do not further buyer flexibility. R square indicates an admissible explanatory power of the models, however, the main independent variables account only for an increase of 2.1 % in R square comparing model I and III. The models are significant and do not point toward any multicollinearity problems.

Make-and-buy the same type of assets		Dependent Variable: Buyer Scale Economies							
		Model I		**Model II**		**Model III**		**Collinearity Diagnostics**	
	Variables	**Beta**	**Sig.**	**Beta**	**Sig.**	**Beta**	**Sig.**	**Tol.**	**VIF**
	Constant	0.000	1.000	0.000	1.000	0.005	0.958		
	Comb. Coord. Adapt. Mech.	-0.032	0.753	-0.034	0.740	-0.030	0.773	0.889	1.125
	Org. Learning	0.213	*0.063*	0.192	0.126	0.190	0.133	0.617	1.620
	Supplier Expertise	-0.126	0.276	-0.108	0.351	-0.105	0.374	0.707	1.414
	Buyer Expertise	-0.053	0.593	-0.098	0.345	-0.098	0.349	0.894	1.118
	Module/ Platform	0.363	*0.001*	0.354	*0.001*	0.357	*0.001*	0.858	1.165
	P mab/ST vs. all others			0.153	0.153	0.157	0.148	0.839	1.192
	Technological Volatility			0.052	0.640	0.054	0.630	0.776	1.288
	P mab/ST vs. all others u. cond. of high Techn. Vola.					-0.027	0.785	0.931	1.075
Adj. R Square		0.151		0.159		0.150		---	
F		4.140		3.382		2.935		---	
Sig.		*0.002*		*0.003*		*0.006*		---	

N = 89.

Tab. 33: Regression results of buyer scale economies of make-and-buy the same type of assets

Similar to the previous model, the regression results of buyer scale economies of make-and-buy the same type of assets provides an acceptable R square and no problems of multicollinearity. However, in contrast to previous models, R square decreases when the independent variables are added to the control variables model indicating no explanatory power of the

independent variables. The coefficients show that none of the independent variables has a significant effect on buyer scale economies leading to lacking support for H8e. The lacking support may be due to the measurement in terms of both reliability and validity of buyer scale economies measure. Concerning reliability scale economies are measured as single item constructs. Due to the length of the questionnaire it was not possible to measure all relevant variables as comprehensively as theoretically desirable. However, other important constructs in this study were successfully measured as single item constructs, which suggests that not primarily reliability but rather validity is the problem. Since it is very difficult to assess content validity, it seems that the measurement of buyer scale economies employed does not reflect production cost advantages based on learning curve effects but rather based on cost degression and mass purchasing or production. Organizational learning, which was assumed to lead to scale economies by learning curve effects, can unfold its positive effect on scale economies only in model I. Solely the existence of a module respectively platform strategy significantly increases buyer scale economies throughout the models. When a component is part of a module or platform strategy the same components are assembled in various different car types, which are based on the same platform or are assembled from the same modules. Hence, argued on the component level, the demand for this component is relatively higher than for components which are not part of such a strategy. As a consequence of higher demand, greater scale economies can be realized for this component than for others. The results seem to indicate the inadequacy of the measure against the background of my theoretical arguments, as in theory development I focused on scale economies rather in terms of learning curve effects than in terms of a reduction of per unit costs due to mass purchasing or production.

Finally, the next table shows the regression results for buyer scope economies of make-and-buy the same type of assets.

Make-and-buy the same type of assets		Dependent Variable: Buyer Scope Economies							
		Model I		Model II		Model III		Collinearity Diagnostics	
	Variables	Beta	Sig.	Beta	Sig.	Beta	Sig.	Tol.	VIF
	Constant	-0.919	0.106	-1.030	0.155	-0.914	0.204		
	Comb. Coord. Adapt. Mech.	-0.150	0.455	-0.097	0.701	-0.064	0.799	0.574	1.742
	Org. Learning	-0.090	0.782	-0.033	0.932	-0.006	0.987	0.601	1.663
	Supplier Expertise	-0.435	0.161	-0.459	0.199	-0.544	0.146	0.591	1.692
	Buyer Expertise	0.734	*0.092*	0.805	0.127	0.619	0.249	0.620	1.612
	P mab/ST vs. all others			0.026	0.929	-0.139	0.671	0.567	1.763
	Technological Volatility			-0.191	0.665	-0.244	0.579	0.528	1.893
	P mab/ST vs. all others u. cond. of high Tech. Vola.					0.348	0.300	0.602	1.662
Adj. R Square		0.378		0.225		0.256		---	
F		2.973		1.630		1.638		---	
Sig.		*0.081*		0.268		0.282		---	

N = 89.

Tab. 34: Regression results of buyer scope economies of make-and-buy the same type of assets

As the table shows, only model I is significant. Although R-square is quite high in comparison to previous models, it decreases as the independent variables are added to the model which means that these variables have no explanatory power concerning make-and-buy the same type of assets. Whereas, buyer expertise has a significant positive effect on buyer scope economies in model I, this effect looses statistical significance when the independent variables are introduced to the model. Similar to the previous regression results, organizational learning and supplier expertise do not contribute robustly to the explanation of buyer scope economies. As both models including the independent variables are insignificant, the results show no support for hypothesis H8f. Again, this may be due to unsatisfactory reliability and validity of measurement as buyer scope economies are measured with a single item and it seems that this item does not properly reflect production cost advantages due to learning effects. Also, the management variable lacks any explanatory power concerning the performance implications of make-and-buy the same type of assets.

To sum up empirical evidence concerning the performance of make-and-buy, only the effect of make-and-buy the same type of assets under conditions of high technological volatility on buyer flexibility could be supported here.

6.4.4. Summary of Evidence

The following table shows a synopsis of the empirical evidence regarding the theoretical hypotheses.

H 1a		The greater the performance ambiguity, the more likely the firm will make-and-buy the same assets.	supported
H 1b		No significant relationship will exist between performance ambiguity and making and buying the same type of assets.	not rejected
H 2a		No significant relationship will exist between asset specificity and making and buying the same assets.	rejected
H 2b	**Determinants**	No significant relationship will exist between asset specificity and making and buying the same type of assets.	rejected
H 3a		No significant relationship will exist between volume uncertainty and making and buying the same assets.	not rejected
H 3b		No significant relationship will exist between volume uncertainty and making and buying the same type of assets.	not rejected
H 4a		No significant relationship will exist between technological volatility and making and buying the same assets.	not rejected
H 4b		The greater the technological volatility, the more likely the firm will make-and-buy the same type of assets.	supported
H 5a		Under conditions of high performance ambiguity a positive relationship will exist between making and buying the same assets and a combination of intensive behavior and output control mechanisms.	partially supported
H 5b	**Management**	Under conditions of high performance ambiguity a positive relationship will exist between making and buying the same assets and high-powering incentive mechanisms inside the firm.	partially supported
H 5c		Under conditions of high technological volatility a positive relationship will exist between making and buying the same type of assets and an intensive coordination between buyer and supplier.	rejected
H 5d		Under conditions of high technological volatility a positive relationship will exist between making and buying the same type of assets and a combination of coordinated bilateral and coordinated hierarchical adaptation mechanisms.	partially supported

H 8a		Making and buying the same assets under high performance ambiguity leads to higher supplier performance than other governance forms under these conditions.	rejected
H 8b		Making and buying the same assets under high performance ambiguity entails lower buyer-specific transaction costs than other governance forms under these conditions.	rejected
H 8c		Making and buying the same assets under high performance ambiguity entails lower supplier (ex post) opportunism than other governance forms under these conditions.	rejected
H 8d	Performance & Alignment	Making and buying the same type of assets under high technological volatility leads to higher buyer flexibility than other governance forms under these conditions.	supported
H 8e		Making and buying the same type of assets under high technological volatility leads to higher buyer scale economies than other governance forms under these conditions.	rejected
H 8f		Making and buying the same type of assets under high technological volatility leads to higher buyer scope economies than other governance forms under these conditions.	rejected

Tab. 35: Empirical evidence for hypotheses

7. Conclusion

The subsequent conclusion will provide a critical assessment of the theoretical framework and its empirical testing. As many of the achieved contributions are closely connected to limitations and offer suggestions for future research, I will not structure my conclusion into contributions vs. limitations. In fact, I believe that contributions and limitations are often two sides of the same coin and follow Popper in his statement that we only get in contact with the "truth" by falsifying our assumptions:

> *"Niemand ist gegen Irrtümer gefeit; das Große ist, aus ihnen zu lernen. [...] Durch die Falsifikation unserer Annahmen bekommen wir tatsächlich Kontakt mit der »Wirklichkeit«.*

Popper, 1998: 193, 374.

Instead, I will try to structure my conclusion according to theoretical contributions and limitations on the one hand, and empirical contributions and limitations on the other hand.

7.1. Critical Assessment of the Theoretical Framework

Connecting to the initially pursued contributions, which were outlined in the introductory chapter, in this paragraph I assess to what extent these contributions could be accomplished throughout the dissertation. The structured outline and analysis of the determinants of make-and-buy revealed that the main deficit in the research on make-and-buy can be subsumed to a missing sufficient theoretical underpinning, including a disagreement about whether TCE, respectively asset specificity, is appropriate to explain make-and-buy in the literature.

Hence, the basic theoretical contribution of this work is the development of a make-and-buy framework based on an extension and adjustment of TCE. Thereby, I could show that make-and-buy is an autonomous governance form which is conceptually relevant and used in practice. Furthermore, I could show that make-and-buy can be reasonably subdivided into two distinct types, i.e., make-and-buy the same assets and make-and-buy the same type of assets. Concerning the different determinants of the distinct make-and-buy types, I could show that performance ambiguity is an important driver of make-and-buy the same assets, while technological volatility is an important driver of make-and-buy the same type of assets. Hence, concerning the alternative categorization of economic institutions presented in chapter 4, I succeeded in showing that uncertainty (in the form of performance ambiguity and technologi-

cal volatility) is an autonomous and big locomotive for the explanations of governance forms in general and for make-and-buy in particular. Importantly, the empirical results support the assumption that uncertainty is wronged when treated only as moderator of asset specificity and both variables should be treated as equitably important. The following figure shows the modified alternative categorization of economic institutions resulting from the empirical evidence in my work.
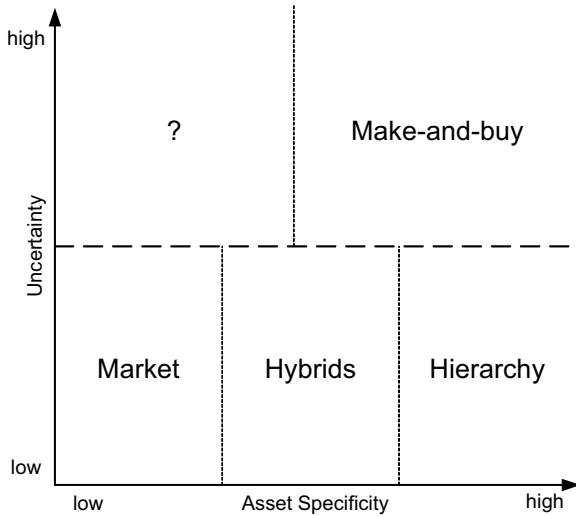
Fig. 19: Modified alternative categorization of economic institutions

However, given my dataset, uncertainty was not powerful enough to supersede asset specific-ity from its throne as "biggest locomotive" in the TCE based explanation of governance forms. In fact, in my sample asset specificity is strongly associated with make-and-buy, which supports the opposite logic as to my theoretical argumentation. As the market governance form is negatively associated with uncertainty, it remains unclear which governance form prevails under conditions of high uncertainty and low specificity. The lack of the "make" alternative in my sample limits the scope of analysis and interpretation excruciatingly, as I was not able to refer my results to hierarchical governance forms. Hence, it is possible that make-and-buy does prevail under conditions of low specificity and high uncertainty, but I just was not able to prove this with my dataset. Other explanations are that another hitherto not considered governance form is favorable when specificity is low but uncertainty high or that this situation is unlikely to occur in practice. This is clearly a limitation in my study. Future

studies on make-and-buy should pay attention to the existence of ideally all governance forms in the sample to not experience the mentioned limitations. Figuring out whether asset specificity is really a driver of make-and-buy or whether these results occurs in my sample due to the missing reference group of "make" is surely a very auspicious path for future research.

Against the background of the empirically supported effect of frequency on make-and-buy the same assets, the neglect of frequency in the make-and-buy framework clearly belongs to the theoretical limitations of this study, too. Particularly, in future make-and-buy studies, this variable should be incorporated into the theoretical explanation of make-and-buy. Also generally, this result should encourage researchers to more commonly consider this neglected variable when using TCE in their studies.

Based on the distinction of different make-and-buy types and the alignment of each type with either driver, I could show that control and monitoring together with incentive empowering mechanisms are relevant for the management of make-and-buy the same assets, whereas coordinated bilateral adaptation mechanisms are relevant for the management of make-and-buy the same type of assets. This is to my knowledge the first empirical evidence concerning the management of make-and-buy. The following table shows the results of this study, integrated into the systematization of governance modes and governance attributes.

Governance Attributes	Governance Modes				
	Market	Non-Market			
		Bilateral (Hybrid)	Unilateral (Hierarchy)	Mutual (Make-and-Buy)	
				Same assets	Similar assets
Administrative Support by Bureaucracy	Nil	Some	Much	Much	Nil[125]
Incentives	High-Powered	Less High-Powered	Low-Powered	High-Powered	Insig.
Adaptation *autonomous* *coordinated*	strong weak	medium medium	weak strong	weak hierarch. strong[126]	Insig. bilat. strong

Tab. 36: Governance modes and governance attributes with mutual governance forms completed[127]

Furthermore, I could show that the different management mechanisms also have the power to discriminate between the two make-and-buy modes. Additionally, I further detailed the hitherto used coordinated adaptation mechanisms into coordinated hierarchical and coordinated bilateral. Connecting to this, my study revealed that make-and-buy the same assets is associated rather with coordinated hierarchical adaptation, whereas make-and-buy the same type of assets is rather associated with coordinated bilateral adaptation. Based on my argumentation that governance mechanisms are interrelated with governance forms,[128] one can deduce from these results that make-and-buy the same assets can be specified more precisely as simultaneous use of the hierarchical and market governance form, whereas make-and-buy the same type of assets can be specified more precisely as simultaneous use of the hybrid and market governance form. However, based on my dataset, it is difficult to clearly interpret these results. Additionally, the results concerning the incentive and autonomous adaptation effects on make-and-buy the same type of assets are insignificant whereas, the effects of coordinated adaptation on make-and-buy the same assets are only valid omitting the condition

125 The results of administrative support by bureaucracy for make-and-buy the same type of assets are only valid when omitting the condition of high technological volatility and only refer to control and monitoring. The results for coordination and make-and-buy the same type of assets were insignificant.

126 The results of adaptation mechanisms for make-and-buy the same assets are only valid when omitting the condition of high performance ambiguity. The results of adaptation mechanisms for make-and-buy the same assets under the condition of high performance ambiguity are insignificant.

127 Adapted and augmented from Williamson (2003: 28).

128 See chapter 3.4.

of high performance ambiguity. As a suggestion for future research, beyond make, buy, and make-and-buy, also hybrid governance forms could be integrated in empirical analyses to further specify which governance forms, respectively governance mechanisms are combined to constitute different forms of make-and-buy. Furthermore, an eligible suggestion for future research is to apply, test, and further develop the presented TCE based management mechanisms, instead of limiting the scope of management statements to control and monitoring.

The developed make-and-buy framework is comprehensive in terms of entailing also hypotheses concerning the performance implications of make-and-buy, besides determinants and management. Furthermore, the performance implications consider both transaction cost-related and production cost-related implications However, in contrast to the hypotheses relationships referring to the determinants and the management of make-and-buy, hypotheses regarding the performance implications have received only little empirical support in my thesis. For make-and-buy the same assets none of the hypothesized performance implications could be proved. Possible reasons for this are discussed subsequently:

Based on the hot debate on the whole purpose of the research on success factors in and of firms (exemplarily Nicolai/Kieser, 2002 and Bauer/Sauer, 2004), I do not want to overestimate any significant or insignificant results concerning supplier performance in my study, especially against the background of a potential common method variance biasing these results, which I cannot definitely preclude. However, I still believe that the consideration of any kind of performance implication variables lies at the bottom of business studies and is therefore important. As I tried to accomplish here, a suggestion for future research is to use disaggregate measures of performance in terms of a measurement of performance not on the firm level, but on supplier, business unit or project level.

In discussions with procurement managers during the development of the questionnaire with Volkswagen AG, it already emerged that the sourcing process, which determines the transaction costs in terms of search, negotiation, and control and monitoring of the supplier, does not vary depending on the sourcing mode. This means that the process of searching, negotiating, and controlling and monitoring of the supplier always takes place following the same organizational rules and does not vary depending on whether the focal supplier is external (buy), internal (make), or as well as (make-and-buy). Hence, my results seem to support this statement and are against this background very interesting for the empirical testing of TCE. Based upon these results, one could argue that although it may be empirically supported that

asset specificity is the main explanatory variable for the choice of governance forms, asset specificity and governance form instead do not necessarily determine transaction costs, which is the "real" dependent variable in TCE. To my understanding, these results shall enforce the call for empirical testing of TCE, which goes beyond the "reduced form analysis".

The effect of various variables, such as make-and-buy the same assets (governance form), control and monitoring, and trust on supplier opportunism, indicate that opportunism is not constant, but varies systematically with different transaction cost related variables. Although - or maybe even because - the mitigating effect of make-and-buy on opportunism could not be proven in my analysis, an important suggestion for future research is to further analyze the drivers of opportunism by incorporating opportunism as variable in empirical analyses of TCE, regardless of its conception as behavioral assumption or performance implication or others.

7.2. Critical Assessment of the Empirical Analysis

Based on the developed theoretical framework, which to my understanding considers all TCE tenets and not only the reduced form, the basic empirical contribution of my work is the operationalization and test of this extended TCE model. Concerning operationalization, the developed measurement models are in many respects more sophisticated than previously used measures: As to the determinants variables, for instance, asset specificity and technological uncertainty cover multiple dimensions of the constructs that have been neglected in prior empirical tests of TCE. Here, I could show that the distinction of technological volatility and technological complexity is useful for the explanation of make-and-buy, and maybe also generally for the choice of governance forms. In terms of the management variables, my operationalization goes beyond the typically employed control and monitoring measures by also considering incentive empowering mechanisms and adaptation mechanisms. Further-more, I operationalized and tested the governance performance implications and thereby use different concepts for both transaction cost related and production cost related measures. However, most of the performance implications tests yield no significant results in my study. Differently from the performance variables of make-and-buy the same assets, I assume the insignificant results concerning the performance variables of make-and-buy the same type of assets to be rather due to the measurement in terms of reliability and validity of both buyer scale and scope economies measure. Concerning reliability, scale and scope economies are measured as single item constructs. Due to the length of the questionnaire it was not possible

to measure all relevant variables as comprehensively as theoretically desirable. However, other important constructs in this study were successfully measured as single item constructs, which suggests that not primarily reliability but rather validity is the problem. Since it is very difficult to assess content validity, it seems that the measurement of buyer scale and scope economies employed does not reflect production cost advantages based on learning curve effects, but rather based on cost degression and mass purchasing as well as efficient capacity utilization. Against the background of both TCE and the theoretical framework developed here, I still believe that scale and scope economies are important variables and have to be considered when using TCE. Hence, the development of more fine-grained multidimensional scales for measuring these constructs is surely a fruitful path for future research.

In order to account for assumption-based theory testing, I also integrate a variable as dependent, which has traditionally - but at the same time often criticizedly so - been treated as behavioral assumption, namely opportunism. Thereby, it can be shown that opportunism needs not necessarily to be mitigated by changes in governance form or, even worse, taken as granted, but can instead - proverbially speaking - be "managed" by the use of control and monitoring mechanisms. However, the effect of the investigated governance forms on opportunism is not clearly interpretable with my dataset. Hence, restating the suggestion already posed in the critical assessment of the theoretical variable opportunism, an interesting path for future research could be to further analyze the drivers of opportunism by incorporating opportunism as variable in empirical analyses of TCE, regardless of its conception as behavioral assumption or performance implication or others.

Although explicitly excluded from my theoretical framework, I measure transaction frequency as often neglected transaction characteristic and can even find a positive relationship with make-and-buy the same assets, which is consonant with my theoretical argumentation leading to proposition 6 where I identify the potential of frequency to explain make-and-buy. Against the background of the hierarchical character of make-and-buy the same assets regarding administrative support by bureaucracy and coordinated adaptation, this result seems to flesh out traditional TCE logic, since the extra costs of the concurrent use of two governance modes are easier to recover for (large) transactions of a recurring kind (Williamson, 1985). As such, an interesting path for future research is to more commonly consider transaction frequency as also important transaction cost determinant and to further disaggregate this variable into past and future dimensions, i.e. shadow of the past and shadow of the future.

When computing regression analyses, I always employed state-of-the-art methodology, e.g., effect size measurement for the logit or two-stage approaches for OLS. However, regarding general methodological limitations, it would have been desirable to have a larger sample size for empirical testing. Especially, as my hypotheses are quite fine-grained, a dataset with much more cases would probably have generated more significant results. Furthermore, a dataset including more participating firms in the function of the buyer as well as the supplier would have made results more generalizable. Having suppliers participating in the study would have allowed a two-sided measurement of core variables. This would have opened up the possibility to generate much more detailed results and a more reliable and valid measurement. Particularly, the dependence on single key respondents to gather data on both dependent and independent variables poses the problem of potential common method variance in my study. Although I have undertaken several procedures to remediate this problem ex post, potential common method bias can only be eliminated in the conceptualization of the study ex ante. Due to strict anonymity of respondents, I was not able to assess non response rate bias in my study. Hence, I was not able to assess whether my sample contains biases based on a non representativeness of respondents with respect to the complete target sample. I tried to tackle this problem by estimating representativeness of my sample with respect to the total population at Volkswagen AG.

A problem which lies at the interface between theory and methodology is the test of null hypotheses. To my understanding, the formulation and testing of null hypotheses can definitely contribute to the scientific knowledge gaining process (e.g. Aberson, 2002; Nickerson, 2000; Lane et al., 1998). But unless approved statistical methodologies exist, the scientific knowledge gaining process will remain limited in scope and content to the test of omnibus alternative hypotheses.

Altogether, the extended TCE framework, which was developed in this work, contributes the explanation of make-and-buy and has broadened our understanding of the choice of governance forms – a question which lies at the bottom of business studies. Also it gives multiple toe-holds for future research in the area of make-vs.-buy decisions, TCE, and the theory of the firm.

Connecting to the initial quotation of Jean Paul, to some extent, I tried to break new ground and hopefully left a trace worth following.

Appendix

Questionnaire

<div align="center">

Willkommen zur Untersuchung:

Effiziente Gestaltung von Lieferantenbeziehungen in der Automobilindustrie

</div>

Bearbeitungshinweise:

Vielen Dank, dass Sie unser Forschungsprojekt unterstützen! Im Vordergrund unserer Untersuchung stehen folgende Fragestellungen:

1. Welche Steuerungs- und Kontrollinstrumente sind für ein erfolgreiches Lieferantenmanagement von besonderer Bedeutung? **(Lieferantencontrolling)**
2. Was sind die erfolgsrelevanten Kriterien für eine lose oder feste Kopplung mit dem Lieferanten ("Partner oder Gegner")? **(Lieferantenentwicklung)**
3. Was sind die kritischen Erfolgsfaktoren zur Vermeidung von Lieferantenfehlverhalten und dem Abfluss von Unternehmens-Know-How? **(Risikomanagement)**

Bauteile und Module der Werkstoffgruppen werden zur Vereinfachung einheitlich als *Bauteile* bezeichnet.

Der Fragebogen enthält **fünf** Abschnitte:

- A: Angaben zu Beschaffung und Eigenschaften des Bauteils
- B: Angaben zu Unsicherheiten im Beschaffungsumfeld
- C: Angaben zur Beziehung zu Ihrem Lieferanten
- D: Angaben zum Management und dem Erfolg Ihrer Lieferantenbeziehung
- E: Angaben zu Eigenschaften Ihres Unternehmens und Ihres Lieferanten

Die Beantwortung des Fragebogens wird ca. 30 Minuten in Anspruch nehmen. Alle Angaben beziehen sich auf das von Ihnen beschaffte Bauteil und den dazugehörigen Lieferanten. Sollten Sie mehrere Bauteile oder Lieferanten betreuen, beziehen Sie sich bitte immer auf dasselbe **wichtigste Bauteil** bzw. den **wichtigsten Lieferanten (Hauptlieferanten)**.

Alle Informationen werden selbstverständlich anonym behandelt. Eine nach Werkstoffgruppen aufgeschlüsselte Auswertung erfolgt nicht.

Nochmals herzlichen Dank für Ihre Unterstützung!

Prof. Dr. Thomas Mellewigt	Dipl.-Kffr. Anna Krzeminska	Dipl.-Kff. Alexander Hickel
(Leiter des Lehrstuhles)	(Projektleiterin)	(Projektleiter)

Lfd. Nr. ☐☐☐

A. Angaben zu Beschaffung und Eigenschaften des Bauteils

1. Bitte geben Sie an, zu welcher Commodity das Bauteil gehört, dass Sie beschaffen:

Commodity: _____

2. Geben Sie bitte an, inwiefern es sich um ein unternehmensspezifisches Bauteil handelt!

Industrietypischer Standard	Unternehmensspezifisch
$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$	

Bitte geben Sie an, ob sich Ihr Unternehmen durch dieses Bauteil Wettbewerbsvorteile gegenüber der Konkurrenz verschaffen kann:

Stimme voll zu	Stimme gar nicht zu
$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$	

3. Wie genau wird dieses Bauteil beschafft?

A. $\square$ Das Bauteil wird ausschließlich von **externen Lieferanten bezogen** (Lieferanten, an denen Ihr Unternehmen nicht oder < 50% beteiligt ist).

a. Von wie vielen externen Lieferanten beziehen Sie dieses Bauteil?
_____ Lieferanten

b. Wie hat sich der Fremdbezug dieses Bauteils bei Ihrem Unternehmen entwickelt?

$\square$ Wir haben zunächst mit reiner Eigenerstellung begonnen und später die Herstellung vollständig ausgelagert.
$\square$ Wir haben das Bauteil früher teilweise selbst hergestellt und erst später die Herstellung vollständig ausgelagert.
$\square$ Wir haben das Bauteil von Anfang an vollständig fremdbezogen.

c. Wie lange schon bezieht Ihr Unternehmen Bauteile von Ihrem Hauptlieferanten?
_____ Jahre

d. Wie soll der Fremdbezug dieses Bauteils zukünftig aussehen?

$\square$ Es sind keine Änderungen vorgesehen.
$\square$ Wir wollen in Zukunft **teilweise** selbst fertigen.
$\square$ Wir wollen in Zukunft **vollständig** selbst fertigen.

*e. Existieren andere Bauteile, die in ihren technischen Funktionalitäten diesem Bauteil sehr ähnlich oder verwandt sind, aber **intern** (d. h. hauseigene Produktion oder Tochtergesellschaften) hergestellt werden?*

$\square$ Ja, solche Bauteile existieren.

Welches der beiden Bauteile ist das technologisch komplexere bzw. anspruchsvollere?

$\square$ Das intern hergestellte Bauteil.
$\square$ Das extern bezogene Bauteil.

Welches der beiden Bauteile ist das unternehmensspezifischere?

- ❑ Das intern hergestellte Bauteil.
- ❑ Das extern bezogene Bauteil.

❑ Nein, solche Bauteile existieren nicht.

B. ❑ Das Bauteil wird ausschließlich **intern gefertigt** (d.h. hauseigene Produktion oder Tochtergesellschaften).

a. *Von wie vielen internen Lieferanten beziehen Sie dieses Bauteil?*
_____ Lieferanten

b. *Wie hat sich die Eigenfertigung dieses Bauteils bei Ihrem Unternehmen entwickelt?*

- ❑ Wir haben zunächst mit reinem Fremdbezug begonnen und später die Herstellung vollständig integriert.
- ❑ Wir haben das Bauteil früher auch teilweise fremd bezogen und erst später die Herstellung vollständig integriert.
- ❑ Wir haben das Bauteil von Anfang an vollständig intern gefertigt.

c. *Wie lange schon bezieht Ihr Unternehmen Bauteile von Ihrem Hauptlieferanten?*
_____ Jahre

d. *Wie soll die Eigenfertigung dieses Bauteils zukünftig aussehen?*

- ❑ Es sind keine Änderungen vorgesehen.
- ❑ Wir wollen die Fertigung in Zukunft **teilweise** auslagern.
- ❑ Wir wollen die Fertigung in Zukunft **vollständig** auslagern.

e. *Existieren andere Bauteile, die in ihren technischen Funktionalitäten diesem Bauteil sehr ähnlich oder verwandt sind, aber **fremd bezogen** werden?*

❑ Ja, solche Bauteile existieren.

Welches der beiden Bauteile ist das technologisch komplexere bzw. anspruchsvollere?

- ❑ Das intern hergestellte Bauteil.
- ❑ Das extern bezogene Bauteil.

Welches der beiden Bauteile ist das unternehmensspezifischere?

- ❑ Das intern hergestellte Bauteil.
- ❑ Das extern bezogene Bauteil.

❑ Nein, solche Bauteile existieren nicht.

C. ❑ Das Bauteil wird **sowohl intern gefertigt als auch von externen** Lieferanten bezogen (Kombination aus A und B)

a. *Welchen Anteil Ihrer Bedarfsmenge produzieren Sie intern?*
_____ %

b. *Von wie vielen externen Lieferanten beziehen Sie dieses Bauteil?*
_____ Lieferanten

c. *Von wie vielen internen Lieferanten beziehen Sie dieses Bauteil?*
_____ Lieferanten

d. *Ist das Bauteil, das Sie von externen Lieferanten beziehen bzgl. der technischen Spezifikationen identisch mit dem intern hergestellten Bauteil?*

❑ Ja, das Bauteil ist exakt identisch.
❑ Nein, das Bauteil ist **nicht** exakt identisch.
Welches der beiden ist das technologisch komplexere bzw. anspruchsvollere?

        ❑ Das intern hergestellte Bauteil.
        ❑ Das extern bezogene Bauteil.

Welches der beiden Bauteile ist das unternehmensspezifischere?
        ❑ Das intern hergestellte Bauteil.
        ❑ Das extern bezogene Bauteil.

e. *Wie hat sich diese Form der Beschaffung bei Ihrem Unternehmen entwickelt?*

❑ Wir haben mit reiner Eigenerstellung des Bauteils begonnen und später externe Anbieter hinzugezogen.
❑ Wir haben mit reinem Fremdbezug des Bauteils begonnen und später eine interne Produktion hinzugezogen.
❑ Wir haben von Anfang an sowohl intern produziert als auch fremd bezogen.

f. *Wie lange schon bezieht Ihr Unternehmen Bauteile von Ihrem Hauptlieferanten?*
   _____ Jahre

g. *Wie soll die Beschaffung dieses Bauteils zukünftig aussehen?*

❑   Es sind keine Änderungen vorgesehen.
❑   Wir wollen in Zukunft vollständig selbst fertigen.
❑   Wir wollen in Zukunft vollständig fremd beziehen.
❑   Wir wollen in Zukunft mehr selbst fertigen.
❑   Wir wollen in Zukunft weniger selbst fertigen.

B. Angaben zu Unsicherheiten im Beschaffungsumfeld

4. Denken Sie an die Qualitätsprüfung bzw. Qualitätssicherung des Bauteils und beurteilen Sie folgende Aussagen:

	Stimme gar nicht zu Stimme voll zu
Unser Unternehmen erhält Qualitätszeugnisse von dem Lieferanten.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unser Unternehmen kann die Qualität des Bauteils durch eine einfache Sichtprüfung bestimmen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unser Unternehmen setzt verschiedene Formen der Qualitätsprüfung und verschiedene Qualitätsmaße ein, um die Güte des Bauteils zu bestimmen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wenn Probleme mit einem Bauteil auftreten, kann unser Unternehmen die Ursache üblicherweise gut bestimmen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Es ist schwierig, das Bauteil unseres Lieferanten mit dem eines anderen zu vergleichen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Es ist schwierig zu beurteilen, wie viele Bemühungen unser Lieferant in die Erfüllung seiner Aufgabe investiert.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

5. Bitte geben Sie an, inwieweit folgende Aussagen über die <u>Unsicherheit</u> von Nachfrage und Preisen zutreffen!

	trifft gar nicht zu trifft voll zu
Unsere Prognosen über den erforderlichen Bedarf an dem Bauteil sind sehr zuverlässig.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unsere Bedarfsmenge für das Bauteil ist konstant.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Schwankungen in der Produktion bei unserem Unternehmen führen zu häufigen Änderungen des Lieferzeitpunktes für das Bauteil.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die Materialpreise für dieses Bauteil schwanken stark.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die Preise für das Bauteil sind langfristig festgelegt.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unsere Prognosen über die Preisentwicklung des Bauteils sind sehr zuverlässig.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

6. Wie schätzen Sie die technologischen Innovationen bei diesem Bauteil ein?

	trifft gar nicht zu trifft voll zu
Die in dem Bauteil eingesetzten Technologien entwickeln sich sehr schnell.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
In den nächsten Jahren sind große technologische Innovationen bei der Funktionalität des Bauteils wahrscheinlich.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
In den nächsten Jahren sind große technologische Innovationen bei den Produktionsprozessen für das Bauteil wahrscheinlich.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die Lebenszyklen des Bauteils sind kurz.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Der technologische Entwicklungsdruck bei dem Bauteil ist stark.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Es handelt sich um ein technologisch komplexes Bauteil.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die Produktionsprozesse für das Bauteil sind technologisch komplex.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Es handelt sich um ein hoch innovatives Bauteil.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die Produktionsprozesse für das Bauteil sind hoch innovativ.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

C. Angaben zur Beziehung zu Ihrem Lieferanten

7. Denken Sie an _Ihre_ im Rahmen der Lieferantenbeziehung vorgenommenen Investitionen. Inwieweit können Sie folgenden Aussagen zustimmen?
(Beziehen Sie sich wie immer nur auf Ihren Hauptlieferanten).

	Stimme gar nicht zu $\quad\quad\quad\quad\quad\quad$ Stimme voll zu
Für die Zusammenarbeit mit dem Lieferanten hat unser Unternehmen hinsichtlich folgender Aspekte Investitionen getätigt:	
Allgemeine Apparaturen, Betriebsmittel o.ä., die auch außerhalb unerer Geschäftsbeziehung problemlos einsetzbar wären (z. B. standardisierte IT-Hard- und Software)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Transportmittel und Lagereinrichtungen (Fahrzeugflotte, LKWs, Gabelstapler, Hubwagen, Hochregallager, etc.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Bereitstellung von zusätzlichen Kapazitäten (z.B. Produktion, Lagerhaltung, Mitarbeiter, etc.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Anpassung und Abstimmung unserer bestehenden Anlagen und Maschinen	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
hochspezialisierte (Produktions-)Anlagen, Maschinen und Werkzeuge, die außerhalb der Geschäftsbeziehung nur schwierig Verwendung finden könnten	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
spezifische Werkzeuge und Geräte, die ausschließlich der Qualitätskontrolle unseres Lieferanten dienen	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Restrukturierung unseres Produktionsprozesses (z.B. um die Bauteile unseres Lieferanten besser verarbeiten zu können)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Entwicklung von auf unseren Lieferanten hin zugeschnittenen Prozesse und Routinen	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Erweiterung oder Anpassung etablierter Routinen (Bestellung, Logistik, Inventarisierung, etc.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Übersendung von Personal	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Ausbau unserer personellen Fähigkeiten (Schulungen, etc.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Erlernen und Verstehen der technischen Standards, Arbeitsweisen und Besonderheiten unseres Lieferanten	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Einrichtungen auf oder in der Nähe des Betriebsgeländes unseres Lieferanten, um Transport- und Inventarisierungskosten zu minimieren (z. B. Zwischenläger, Container, Verlagerung von Produktionsstufen o.ä.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Prozesse und Routinen, die sicher stellen, dass die von uns bezogene Leistung fristgerecht (z. B. just-in-time) zur Verfügung steht bzw. erbracht werden kann	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Patente, Lizenzen, technisches Wissen, Datenbanken o.ä. die außerhalb dieser Lieferantenbeziehung nur einen begrenzten Nutzen aufweisen würden	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Aufbau und Aufrechterhaltung einer guten Beziehung zu unserem Lieferanten	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

8. Denken Sie nun an die im Rahmen der Geschäftsbeziehungen vorgenommen Investitionen _Ihres Lieferanten_ und versuchen Sie folgende Aussagen einzuschätzen.
(Beziehen Sie sich wenn nötig auf Ihren Hauptlieferanten).

	Stimme gar nicht zu — — — — — — Stimme voll zu
Für die Zusammenarbeit mit unserem Unternehmen hat unser _Lieferant_ hinsichtlich folgender Aspekte Investitionen getätigt:	
Allgemeine Apparaturen, Betriebsmittel o.ä., die auch außerhalb unserer Geschäftsbeziehung problemlos einsetzbar wären (z. B. standardisierte IT-Hard- und Software)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Transportmittel und Lagereinrichtungen (Fahrzeugflotte, LKWs, Gabelstapler, Hubwagen, Hochregallager, etc.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Bereitstellung von zusätzlichen Kapazitäten (Produktion, Lagerhaltung, Mitarbeiter, etc.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Anpassung und Abstimmung seiner bestehenden Anlagen und Maschinen	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
hochspezialisierte (Produktions-)Anlagen, Maschinen und Werkzeuge, die außerhalb der Geschäftsbeziehung nur schwierig Verwendung finden könnten	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
spezifische Werkzeuge und Geräte, die ausschließlich der Qualitätskontrolle des von uns bezogenen Produktes dienen	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Restrukturierung seines Produktionsprozesses, um die Bauteile auf unsere Anforderung hin zuschneidern zu können	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Entwicklung von auf unser Unternehmen hin zugeschnittenen Prozessen und Routinen	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Erweiterung oder Anpassung etablierter Routinen (Bestellung, Logistik, Inventarisierung, etc.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Übersendung von Personal	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Erlernen und Verstehen unserer technischen Standards, Arbeitsweisen und Besonderheiten	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Ausbau seiner personellen Fähigkeiten (z. B. Schulungen, etc.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Einrichtungen auf oder in der Nähe _unseres_ Betriebsgeländes, um Transport- und Inventarisierungskosten zu minimieren (z. B. Zwischenläger, Container, Verlagerung von Produktionsstufen o.ä.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Prozesse und Routinen, um sicher zu stellen, dass die von uns bezogenen Bauteile fristgerecht (z.B. just-in-time) zur Verfügung steht bzw. erbracht werden kann.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Patente, Lizenzen, technisches Wissen, Datenbanken o.ä., die außerhalb dieser Lieferantenbeziehung nur einen begrenzten Nutzen aufweisen	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Aufbau und Aufrechterhaltung einer guten Beziehung zu uns	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

9. Wie beurteilen Sie folgende Aussagen zur Zusammenarbeit mit Ihrem Lieferanten?

	trifft gar nicht zu ... trifft voll zu
Unser Lieferant arbeitet für seine Leistungserstellung eng mit uns zusammen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unser Lieferant muss viel mit uns koordinieren, um seine Leistung erbringen zu können.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unsere Leistungserstellung erfordert eine ständige Abstimmung mit dem Lieferanten.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

10. Wie stellt sich das Verhältnis zu Ihrem Lieferanten dar?

	Stimme gar nicht zu ... Stimme voll zu
In unserer Beziehung können wir darauf vertrauen, dass die getroffenen Vereinbarungen eingehalten werden.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
In unserer Beziehung haben wir großes gegenseitiges Vertrauen in die Aktivitäten des Partners.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unser Lieferant steht zu seinem Wort, auch wenn ihm dadurch Nachteile entstehen können.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

11. Wie häufig pro Monat erhalten Sie Lieferungen von Ihrem Lieferanten?
   Anzahl Lieferungen: _____

12. Bitte schätzen Sie die bisherige und zukünftige Zusammenarbeit mit Ihrem Lieferanten ein!

	trifft gar nicht zu ... trifft voll zu
Wir haben in der Vergangenheit schon oft mit diesem Lieferanten zusammengearbeitet.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir würden die Möglichkeit einer verstärkten Zusammenarbeit mit unserem Lieferanten in der Zukunft begrüßen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

13. Wir erwarten, dass die Beziehung zu unserem Lieferanten noch über einen langen Zeitraum bestehen wird.

< 1 Jahr $\square$ 1-4 Jahre $\square$ 5-10 Jahre $\square$ > 10 Jahre $\square$

14. Bitte beurteilen Sie die Abhängigkeit zwischen Ihrem Unternehmen und Ihrem Lieferanten:

	trifft gar nicht zu ... trifft voll zu
Es wäre schwierig für uns, einen angemessenen Ersatz für unseren Lieferanten zu finden (z. B. aufgrund der Entwicklungsaktivitäten unseres Lieferanten).	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir sind in hohem Maße abhängig von unserem Lieferanten.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unseren Lieferanten zu ersetzen, hätte für uns den Verlust von erheblichen Investitionen zur Folge.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wenn unser Lieferant uns als Kunde verliert, kann er diesen Verlust über ein Mehrgeschäft mit anderen Herstellern vermutlich leicht ausgleichen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unser Lieferant ist in hohem Maße abhängig von uns.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unser Lieferant würde erhebliche Investitionen verlieren, wenn er uns als Kunde ersetzen müsste.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

15. Wie beurteilen Sie die Ihrer Lieferantenbeziehung zugrunde liegenden Normen und Maßstäbe?

	trifft gar nicht zu → trifft voll zu
In unserer Beziehung werden alle für den Partner hilfreichen Informationen zur Verfügung gestellt selbst wenn diese von sensibler Natur sind (Produktionspläne, Kosteninformationen o.a.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Informationen werden oft formlos, (informelle Meetings, „Flurgespräche") und „auf dem kleinen Dienstweg" ausgetauscht.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir halten uns gegenseitig über Ereignisse oder Veränderungen ständig auf dem Laufenden.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die im Rahmen unserer Beziehung auftretenden Probleme werden *gemeinsam* geklärt.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Im Rahmen unserer Beziehung sind wir am gegenseitigen Wohlergehen interessiert.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir engagieren uns gemeinsam für Verbesserungen, von denen unsere Beziehung als Ganzes und nicht nur der einzelne Partner profitiert.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Sowohl wir als auch unser Lieferant spielen eine aktive Rolle bei Entscheidungen, die unsere Zusammenarbeit betreffen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir beratschlagen uns gegenseitig, wenn es um die Festlegung von Zielen in unserer Beziehung geht.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Hinsichtlich der Aufgabenerfüllung suchen und beachten wir gegenseitig die Meinungen und Vorschläge aus beiden Unternehmen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

D. Angaben zum Management und Erfolg Ihrer Lieferantenbeziehung

16. Hält Ihr Unternehmen Eigenkapitalanteile an Ihrem *externen* Lieferanten?

nein $\square$ ja $\square$; und zwar in Höhe von etwa _____ %

Wie hoch ist der Eigenkapitalanteil von Ihrem Unternehmen an Ihrem *internen* Lieferanten? ungefähre Angabe in % _____

17. Enthält der Vertrag mit Ihrem Hauptlieferanten eine Laufzeitbeschränkung?

$\square$ Vertrag mit Laufzeitbeschränkung $\square$ Vertrag ohne Laufzeitbeschränkung

Wenn eine Laufzeitbeschränkung existiert, welche Laufzeit hat der Vertrag in Jahren? _____ Jahre

18. Welches Volumen hat der Vertrag mit Ihrem Hauptlieferanten?
Unser jährliches *Beschaffungsvolumen* beträgt *hierbei* in Mio. €:
< 1 Mio. € $\square$ 1-5 Mio. € $\square$ 6–50 Mio. € $\square$ 51-100 Mio. € $\square$> 100 Mio. € $\square$

19. Denken Sie bitte an den Vertrag mit Ihrem Hauptlieferanten und beurteilen Sie folgende Aussagen.

	trifft gar nicht zu → trifft voll zu
Der Vertrag spezifiziert genau, was unser Lieferant zu tun hat.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Teile des Vertrags sind offener gehalten.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Der Vertrag ist in hohem Maße auf unsere Partnerschaft zugeschnitten.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

20. Worauf basiert der mit Ihrem Lieferanten vereinbarte Preis der bezogenen Leistung?

Festpreisvertrag $\square$ Kostenzuschlagsvertrag $\square$ Target Costing $\square$

regelmäßigen Nachverhandlungen $\square$ keinen der genannten Spezifikationen $\square$

21. Wurden folgende Sachverhalte bei der Vertragsausgestaltung mit Ihrem Hauptlieferanten berücksichtigt?

Der Vertrag enthält Regelungen…	enthalten	nicht enthalten
…, dass regelmäßig schriftliche Berichte über das Bauteil zu erstellen sind.	$\square_1$	$\square_2$
… im Hinblick auf Geheimhaltungspflichten und Vertraulichkeiten.	$\square_1$	$\square_2$
… zu Vertragsstrafen bei Vertragsverstößen (z. B. Zeitpunkt und/oder Qualität der Lieferung).	$\square_1$	$\square_2$
… hinsichtlich einer (ggf. frühzeitigen) Kündigung der Lieferbeziehung.	$\square_1$	$\square_2$
… im Hinblick auf den Schutz von geistigem Eigentum (bspw. Eigentumsrechte, Zugang zu Produktionsanlagen etc.)	$\square_1$	$\square_2$
…, dass der Partner bei Abweichungen vom Liefervertrag unverzüglich zu benachrichtigen ist.	$\square_1$	$\square_2$
…, dass geschützte Informationen auch nach Beendigung der Lieferbeziehung nicht benutzt werden dürfen.	$\square_1$	$\square_2$
…, dass alle relevanten Aufzeichnungen (Protokolle) durch einen Wirtschaftsprüfer untersucht werden dürfen.	$\square_1$	$\square_2$
… zur außergerichtlichen Streitbeilegung (Schiedsgerichtsbarkeit).	$\square_1$	$\square_2$
… über Preisanpassungen (z. B. im Falle von Rohstoffpreiserhöhungen) oder Mengenanpassungen.	$\square_1$	$\square_2$
… zum zeitlichen Rahmen, in dem die Leistungen zu erbringen sind.	$\square_1$	$\square_2$
… zu Rollen und Verantwortungsbereichen.	$\square_1$	$\square_2$
… bezüglich des Umgangs mit höherer Gewalt.	$\square_1$	$\square_2$
… zur Abnahme einer bestimmten Mindestmenge der bezogenen Leistung.	$\square_1$	$\square_2$
… zu ggf. notwendigen Modifikationen der technischen Spezifikationen der Leistung.	$\square_1$	$\square_2$

22. Wie beurteilen Sie folgende Aussagen hinsichtlich der Steuerung und Kontrolle Ihres Hauptlieferanten?

	trifft gar nicht zu ——————————————— trifft voll zu
Bei der Auswahl unseres Lieferanten haben wir ein umfangreiches Screening-/Qualifikationsprogramm eingesetzt.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Falls unser Lieferant die vorgegebenen Leistungsziele nicht erreicht, ist er angehalten dies zu erklären.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir kontrollieren, wie gut unser Lieferant die vorgegebenen Leistungsziele erreicht (z. B. Qualität, Pünktlichkeit, etc.).	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die Vergütung unseres Lieferanten basiert auf einer Gegenüberstellung seiner tatsächlichen Leistung mit den vereinbarten Zielen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Im Hinblick auf den Erreichungsgrad der vereinbarten Leistungsziele geben wir unserem Lieferanten ein Feedback.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir kontrollieren, wie gut unser Lieferant vorgegebenen Routinen folgt (z. B. Verfahrens- oder Lagerungsrichtlinien).	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir bestehen darauf, dass unser Lieferant seine Routinen anpasst, wenn die gewünschten Ergebnisse nicht erreicht werden.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir geben unserem Lieferanten Hinweise, durch welche Verhaltensweisen er bestimmte Leistungsziele erreichen kann.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir bewerten die Prozeduren, die unser Lieferant anwendet, um unseren Auftrag zu erfüllen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir versorgen unseren Lieferanten mit z. T auch kritischen Informationen über unsere Aktivitäten, damit er seine Vorgehensweise besser planen kann.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir involvieren unseren Lieferanten in Planungsprozesse und Zielsetzungen bei dem von uns bezogenen Bauteil.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Im Hinblick auf Änderungswünsche unseres Lieferanten sind wir flexibel.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Konfliktsituationen mit unserem Lieferanten werden durch eine intensive Kommunikation zwischen uns begleitet.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die Interaktion zwischen uns und unserem Lieferanten wird genau überwacht, um Konflikte frühzeitig erkennen zu können.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir haben Mechanismen etabliert, um mögliche Konflikte zwischen uns und unserem Lieferanten adressieren und lösen zu können.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir helfen und fördern unseren Lieferanten, seine Selbstkontrolle (setzen eigener Verhaltensstandards und Zeitpläne, Einsatz von Steuerungsmechanismen, etc.) zu verbessern und zu erweitern.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir setzen Mechanismen ein, die die gemeinsamen Ziele zwischen uns und unserem Lieferanten fördern.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir achten darauf, gemeinsame Werte und Überzeugungen zu intensivieren und auszubauen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

23. In welchem Ausmaß setzen Sie folgende konkrete Instrumente zur Steuerung und Kontrolle Ihres Hauptlieferanten ein?

	Geringes Ausmaß Hohes Ausmaß
Projektbudgetpläne	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Ergebnis-, Kosten- oder Wirtschaftlichkeitsrechnungen	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Kennzahlen(systeme)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Cost-Break-Down Methoden (Materialquoten, Zuschlags- und Stundensätze etc.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Berichte (z. B. Status-, Finanz-, Kosten- oder Umsatzberichte)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Informations- oder Qualitätsmanagement-Systeme (z. B. Auditprogramme, System- oder Prozessreviews)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Gemeinsame Planungsrunden, regelmäßige Meetings oder Konferenzen etc.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Vorgabe von Handlungs- oder Verfahrensrichtlinien (Prozeduren, Regeln)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Besetzung von Fachausschüssen (z. B. Lenkungsgremien, Qualitätsausschüsse) oder Schlüsselpositionen (z. B. Verbindungsmanager)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Zeitlich befristete Projektgruppen/Teams	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Abgabe von Handlungsempfehlungen an den Lieferanten (hinsichtlich seiner/(s) Bauteil-Testprozeduren, Qualitätsmanagement, etc.)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Schulungsmaßnahmen (z. B. Trainingsprogramme)	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

24. Wie gut bewerten Sie die Leistung des Hauptlieferanten hinsichtlich der folgenden Sachverhalte?

	sehr schlecht sehr gut
Preis des Bauteils	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Qualität (z.B. geringe Ausschussquote) des Bauteils	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Pünktlichkeit der Lieferung	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Zuverlässigkeit der Lieferung	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Beurteilung der Gesamtleistung	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

E. Angaben zu Eigenschaften Ihres Unternehmens und Ihres Lieferanten

25. Allgemeine Angaben zu Ihrem Lieferanten

An welcher Position in der Zulieferpyramide befindet sich Ihr Lieferant?
❏ Automobilhersteller (OEM) ❏ Systemintegrator ❏ Modullieferant ❏ Systemlieferant
❏ Teilelieferant ❏ Vormateriallieferant

Wo ist Ihr Lieferant ansässig?
❏ Deutschland ❏ restl. Westeuropa ❏ Osteuropa ❏ USA ❏ China
❏ Mexiko ❏ Südamerika ❏ Südafrika ❏ Sonstige: _____

26. Wie viele alternative Lieferanten <u>könnten</u> Ihnen gleichwertige Leistungen zur Verfügung stellen?
_____ Lieferanten

Wie schätzen Sie die Wettbewerbsintensität im Markt Ihres Lieferanten ein?
❑ sehr gering ❑ ❑ ❑ ❑ ❑ ❑ sehr hoch

Wie groß ist das jährliche Umsatzvolumen Ihres Lieferanten in Mio. Euro?
❑ < 1 Mio. € ❑ 1- 5 Mio. € ❑ 6- 10 Mio. € ❑ 11- 50 Mio. €
❑ 51- 100 Mio. € ❑ > 100 Mio. €

27. Wie beurteilen Sie die Wichtigkeit von Reputation in Ihrer Branche?

	trifft gar nicht zu ... trifft voll zu
In der Automobilindustrie ist es hinlänglich bekannt, welche Zulieferer im Hinblick auf Leistung und Zusammenarbeit führend sind.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Falls sich unser Zulieferer nicht ausreichend kooperativ zeigen würde, so hätte dies negative Auswirkungen auf seine Reputation in der Automobilindustrie.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Bei der Auswahl des Lieferanten war uns seine Reputation wichtig.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

28.Wie charakterisieren Sie Ihren Lieferanten?

	trifft gar nicht zu ... trifft voll zu
Der Lieferant …	
… macht leere Versprechungen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
... verhält sich uns gegenüber distanziert.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
… stellt seine Bemühungen wesentlich besser dar, als sie tatsächlich sind.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
… erwartet von uns, dass wir mehr als nur den gerechtfertigten Anteil der Kosten zur Korrektur eines Problems übernehmen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
… lehnt es ab, Verantwortung zu übernehmen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
… gibt unvollständige/verzerrte Informationen heraus.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
… benachrichtigt uns nicht angemessen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

29.Wie beurteilen Sie die Anpassungsfähigkeit Ihres Lieferanten?

	trifft gar nicht zu ... trifft voll zu
Unser Lieferant zeigt sich gegenüber unseren Änderungswünschen überaus aufgeschlossen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unserem Lieferanten fällt es leicht Anpassungen vorzunehmen, um mit veränderten Gegebenheiten besser umgehen zu können.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unser Lieferant ist bereit unsere gegenseitigen Vereinbarungen zu modifizieren, wenn unerwartete Ereignisse dies notwendig machen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die mangelnde Anpassungsfähigkeit unseres Lieferanten schränkt uns bei unerwarteten Ereignissen in unserer Handlungsfähigkeit ein.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

30. Bitte beurteilen Sie die Expertise Ihres Lieferanten und die Ihrer Unternehmung!

	Stimme gar nicht zu Stimme voll zu
Unser Lieferant verfügt über patentgeschütztes Wissen, das ihm einen Vorteil gegenüber seinen Wettbewerbern verschafft.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unser Lieferant verfügt bei der Herstellung des Bauteils über besondere(s) bzw. einzigartige(s)…	
Werkzeuge, Anlagen und Produktionsfertigkeiten	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
technische(s) Verständnis bzw. Konstruktions-Know-how	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unsere Mitarbeiter können das Bauteil auch kostengünstig selbst herstellen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die Herstellung dieses Bauteils erfordert ein besonderes Know-how, das in unserem Unternehmen vorhanden ist.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die Fähigkeiten zur Produktion dieses Bauteils sind eng verwandt mit Fähigkeiten, die wir zur Herstellung anderer, ähnlicher Bauteile einsetzen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

31. Bitte nehmen Sie zum Wissensmanagement mit Ihrem Lieferanten Stellung!

	trifft gar nicht zu trifft voll zu
Die Zusammenarbeit mit unserem Lieferanten hat uns dabei geholfen, unser vorhandenes Wissen zu *verbessern*.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir haben durch die Beziehung zu unserem Lieferanten *neues* Wissen aufgebaut und/oder neue Fähigkeiten erlernt.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unser in der Lieferantenbeziehung eingesetztes techno-logisches oder prozessbasiertes Wissen ist leicht dokumentierbar (z. B. durch technische Zeichnungen, Formeln, Instruktionen etc.).	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Wir schützen unser technologisches oder prozessbasiertes Wissen in dieser Lieferantenbeziehung in besonderem Maße	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
. Das Bauteil bzw. seine Herstellung wird von unserem Unternehmen (patent-)rechtlich geschützt	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

32. Wie beurteilen Sie die Skalen- und Verbundkosteneffekte in Ihrer Geschäftsbeziehung?

	trifft gar nicht zu trifft voll zu
Durch die *interne* Herstellung dieses Bauteils können wir die Stückkosten (A-Preis) mehrerer Produkte verringern.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Durch die *interne* Herstellung dieses Bauteils können wir Produktionsanlagen besser auslasten.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Durch die Herstellung des Bauteils für uns kann der Lieferant seine Stückkosten (A-Preis) mehrerer Produkte verringern.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Neben diesem Bauteil beziehen wir noch weitere Leistungen von diesem Lieferanten.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Auch wenn sich unsere Nachfrage nach diesem Bauteil verdoppeln würde, würden sich die durchschnittlichen Stückkosten (A-Preis) kaum verändern.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unser Einkaufsvolumen an diesem Bauteil ist so hoch, dass wir von enormen Mengenrabatten profitieren können.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Das Bauteil ist Teil einer Plattformstrategie.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Das Bauteil ist Teil einer Modulstrategie.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

33. Aufgrund der Beschaffungsstrategie bei diesem Bauteil kann unser Unternehmen besonders flexibel...

	trifft gar nicht zu — trifft voll zu
... das Beschaffungs- bzw. Produktionsvolumen an Nachfrageschwankungen anpassen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
… eigene Preise anpassen, wenn sich die Preise am Markt ändern.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
… bei Einführung neuer Produkte oder Dienstleistungen der Wettbewerber mit eigenen Neueinführungen nachziehen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
… neue Technologien produktiv einsetzen.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

34. Wie schätzen Sie die Kosten des Fremdbezugs des Bauteils <u>im Vergleich zur Eigenerstellung</u> ganz allgemein ein?

	trifft gar nicht zu — trifft voll zu
Beim Sourcingprozeß für dieses Bauteil sind/waren folgende Aufgaben mit hohem Aufwand verbunden:…	
…Suche nach einem geeigneten Lieferanten	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
…Bewertung und Auswahl eines geeigneten Lieferanten	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
…Verhandlung mit dem Lieferanten	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
…Vertragsabschluß mit dem Lieferanten	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
…Koordination der durchzuführenden Aufgaben	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
…Kontrolle der Ergebnisse	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
…Nachträgliche Anpassungen an Wettbewerbsveränderungen	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Das Bauteil kann im Vergleich zum Fremdbezug *intern* nur zu höheren Stückkosten produziert werden.	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unsere internen Fertigungsmitarbeiter werden leistungsabhängig entlohnt (z. B. Boni, Leistungszuschläge).	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Unsere internen Fertigungsmitarbeiter erhalten nicht-monetäre Leistungsanreize (z.B. Sachprämien).	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$
Die intern hergestellten Bauteile werden bzgl. Kosten und technischer Eigenschaften mit am Markt erhältlichen Bauteilen verglichen (Produkt Benchmark).	$\square_1$—$\square_2$—$\square_3$—$\square_4$—$\square_5$—$\square_6$—$\square_7$

Ende des Fragebogens.

Herzlichen Dank für Ihre Unterstützung!

References

Aberson, C. (2002). Interpreting Null Results: Improving Presentation and Conclusions with Confidence Intervals, *Journal of Articles in Support of the Null Hypothesis*, **1** (3): 36-42.

Alchian, A. A., Demsetz, H. (1972). Production, Information Costs, and Economic Organization, *American Economic Review*, **62** (5): 777-795.

Al-Obaidan, A. M., Scully, G. W. (1995). The economic efficiency of backward vertical integration in the international petroleum refining industry, *Applied Economics*, **25** (12): 1529-1539.

Anderson, E. (1985). The Salesperson as Outside Agent or Employee: A Transaction Cost Analysis, *Marketing Science*, **4** (3): 234-254.

Anderson, S. W., Glenn, D., Sedatole, K. L. (2000). Sourcing Parts of Complex Products: Evidence on Transactions Costs, High-Powered Incentives and Ex-Post Opportunism, *Accounting, Organizations, and Society*, **25** (8): 723-749.

APA/AERA/NCME (1985). Standards for Educational and Psychological Testing. Washington, DC.

Armstrong, S. J., Overton, T. S. (1977). Estimating Nonresponse Bias in Mail Surveys, in: *Journal of Marketing Research*, **14** (3): 396-402.

Arrow, K. (1969). The Organization of Economic Activity: Issues Pertinent to the Choice of Market versus Non-market Allocation, reprinted in Arrow (1983), *Collected Papers of Kenneth Arrow: General Equilibrium,* Cambridge.

Azoulay, P., Henderson, R. (2001). Relational Contracts and Tapered Integration: Evidence from Drug Development, *unpublished workingpaper*.

Backhaus, K., Erichson, B., Plinke, W., Weiber, R. (2006). *Multivariate Analysemethoden: Eine anwendungsorientierte Einführung*, 11. ed., Berlin.

Balakrishnan, S., Wernerfelt, B. (1986). Technical change, competition, and vertical integration. *Strategic Management Journal,* **7** (4): 347-359.

Bauer, H. H., Sauer, N. E. (2004). Die Erfolgsfaktorenforschung als schwarzes Loch?, *Die Betriebswirtschaft*, **64** (4): 621-622.

Bea, F. X., Göbel, E. (2002). *Organisation*. Stuttgart.

Bensaou, M., Anderson, E. (1999). Buyer-supplier relations in industrial markets: when do buyers risk making idiosyncratic investments?, *Organization Science,* **10** (4): 460-481.

Boerner, C. S., Macher, J. T. (2002). Transaction cost economics: An assessment of empirical research in the social sciences, *Haas School of Business working paper*, University of California, Berkeley.

Bortz, J. (1993). *Statistik für Sozialwissenschaftler*, 4. ed. Berlin et al.

Bradach, J. L. (1997). Using the plural form in the management of restaurant chains, *Administrative Science Quarterly*, **42** (2): 276-303.

Bradach, J. L., Eccles, R. G. (1989). Price, Authority, and Trust: From Ideal Types to Plural Forms, *Annual Review of Sociology*, **15**: 97-118.

Bronner, R. (1992). Komplexität, Frese, E. (eds.), *Handwörterbuch der Organisation*, 3. ed, Stuttgart: 1121-1130.

Buvik, A. (2000). Order Frequency and the Co-ordination of Industrial Purchasing Relationships, *European Journal of Purchasing & Supply Management*, **6** (2): 95-103.

Buvik, A., Andersen, O. (2002). The Impact of Vertical Coordination on Ex Post Transaction Costs in Domestic and International Buyer–Seller Relationships, *Journal of International Marketing*, **10** (1): 1-24.

Buvik, A., Haugland, S.A. (2005). The Allocation of Specific Assets, Relationship Duration, and Contractual Coordination in Buyer-Seller Relationships, *Scandinavian Journal of Management*, **21** (1): 41-60.

Buvik, A., Reve, T. (2001). Asymmetrical Deployment of Specific Assets and Contractual Safeguarding in Industrial Purchasing Relationships, *Journal of Business Research*, **51** (2): 101-113.

Camerer, C., Weber, M. (1992). Recent developments in modelling preferences: Uncertainty and ambiguity, *Journal of Risk and Uncertainty*, **5** (4): 325-370.

Carson, S. J., Madhok, A., Wu, T. (2006). Uncertainty, opportunism and governance: The effects of volatility and ambiguity on formal and relational contracting, *Academy of Management Journal,* **49** (5): 1058-1077.

Cassiman, B., Veugelers, R. (2006). In Search of Complementarity in Innovation Strategy: Internal R&D and External Knowledge Acquisition, *Management Science*, **52** (1): 68-82.

Challagalla, G. N., Shervani, T. A. (1997). A Measurement Model of the Dimensions and Types of Output and Behavior Control: An Empirical Test in a Salesforce Context, *Journal of Business Research,* **39** (3): 159–172.

Chiles, T. H., McMackin, J. F. (1996). Integrating variable risk preferences, trust, and transaction cost economics, *Academy of Management Review,* **21** (1): 77-99.

Christensen, C. M., Carlile, P., Sundahl, D. (2001). The Process of Theory-Building, *Harvard Business School Working Paper Series*, No. 02-016.

Chung, W. H. (1998). *Spezifität und Unternehmenskooperation: eine institutionen-ökonomische Analyse unter besonderer Berücksichtigung dynamischer Aspekte*. Berlin.

Celly, K. S., Spekamn, R E., Kamauff, J. W. (1999). Technological Uncertainty, Buyer Preferences, and Supplier Assurances: An Examination of Pacific Rim Purchasing Arrangements, *Journal of International Business Studies*, **30** (2): 297-316.

Coase, R. H. (1937). The Nature of the Firm, *Economica*, **4** (16): 386-405.

Cohen, J. (1992). A power primer. *Psychological Bulletin,* **112** (1): 155-159.

Cohen, J. (1994). The earth is round (p < .05). *American Psychologist*, **49** (12): 997-1003.

Cohen, W., Levinthal, D. (1990). Absorptive capacity: a new perspective on learning and innovation, *Administrative Science Quarterly,* **35** (1): 128-152.

Coles, J. W., Hesterly, W.S. (1998). The impact of firm-specific assets and the interaction of uncertainty: An examination of make or buy decisions in public and private hospitals, *Journal of Economic Behavior and Organization*, **36** (3): 383-409.

Combs, J. G., Ketchen, D. J. (2003). Why Do Firms Use Franchising as an Entrepreneurial Strategy?: A Meta-Analysis, *Journal of Management,* **29** (3): 443-465.

Conlisk, J. (1996). Why Bounded Rationality?, *Journal of Economic Literature*, **34** (2): 669-700.

Cronbach, Lee J. (1951). Coefficient Alpha and the Internal Structure of Tests, *Psychometrika*, **16** (3): 297-334.

David, R. D., Han, S-K. (2004). A Systematic Assessment of the Empirical Support for Transaction Cost Economic, *Strategic Management Journal,* **25** (1): 39-58.

DFV – Deutscher Franchise Verband e.V. (2007). Der Begriff „Franchising“, URL: http://www.dfv-franchise.com/wcms/bin/Server.dll?Article?ID=632&Session=1-aqLy2NRK-0-491903200708061521&Via=Nav, 21.06.2007.

Du, J., Lu, Y., Tao, Z. (2006). Why do firms conduct bi-sourcing?, *Economic Letters*, **92** (2): 245-249.

Duncan, R. B. (1972). Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly,* **17** (3): 313-327.

Dussauge, P., Garrette, B., Mitchell, W. (2000). Learning from Competing Partners Outcomes and Durations of Scale and Link Alliances in Europe, North America, and Asia, *Strategic Management Journal*, **22** (2): 99-126.

Dutta, S., Bergen, M., Heide, J. B., and John, G. (1995). Understanding Dual Distribution: The Case of Reps and House Accounts, *The Journal of Law, Economics and Organization*, **11** (1): 189-204.

Ebers, M., Gotsch, W. (2006). „Institutionenökonomische Theorien der Organisation, Kieser, A.; Ebers, M. (eds.). *Organisationstheorien*, Stuttgart, Berlin: 247-308.

Eggert, A., Fassot, G. (2003). *Zur Verwendung formativer und reflektiver Indikatoren in Strukturgleichungsmodellen. Ergebnisse einer Metaanalyse und Anwendungs-empfehlungen*, paper presented at the 65. VHB-Pfingsttagung, Zürich.

Farlow, D., Schmidt, G., Tsay, A., Holloway, C. A. (1996a). Supplier Management at Sun Microsystems (A): Managing Risk in the Supplier Relationship, *Stanford University Graduate School of Business Case Study*, Palo Alto.

Farlow, D., Schmidt, G., Tsay, A., Holloway, C. A. (1996b). Supplier Management at Sun Microsystems (B): Managing Risk in the Supplier Relationship, *Stanford University Graduate School of Business Case Study*, Palo Alto.

Geyskens, I., Steenkamp, J.-B. E. M., Kumar, N. (2006). Make, buy, or ally: Transaction Cost Theory Meta-Analysis, *Academy of Management Journal,* **49** (3): 519-543.

Ghoshal, S., Moran, P. (1996). Bad for Practice: A Critique of the Transaction Cost Theory, *Academy of Management Review,* **21** (1): 13-47.

Götzfried, A. (2004). Anstieg der europäischen Beschäftigung im Dienstleistungssektor und insbesondere bei wissensintensiven Dienstleistungen, *Statistik kurz gefasst* – Wissenschaft und Technologie, 10/2004, Eurostat.

Grant, R. M. (1996). Toward a Knowledge-Based Theory of the Firm, *Strategic Management Journal*, **17** (Winter Special): 109-122.

Grossman, S. J., Hart, O. D. (1986). The costs and benefits of ownership: A theory of vertical and lateral integration, *Journal of Political Economy,* **94** (4): 691–719.

Gulati, R. (1995). Does Familiarity bread Trust? The Implications of Repeated Ties for Contractual Choice in Alliances, *Academy of Management Journal*, **38** (1): 85-112.

Gulati, R., Puranam, P. (2006). Complementarity & Constraints: Why Firms Both Make and Buy the Same Thing, *SSRN working paper*.

Gulati, R., Singh, H. (1998). The Architecture of Cooperation: Managing Coordination Costs and Appropriation Concerns in Strategic Alliances, *Administrative Science Quarterly*, **43** (4): 781-814.

Hammann, P., Erichson, B. (2000): *Marktforschung*, 4. ed, Stuttgart.

Harrigan, K. R. (1983a). A framework for looking at vertical integration, *Journal of Business Strategy*, **3** (3): 30-37.

Harrigan, K. R. (1983b). Research Methodologies for Contingency Approaches to Business Strategy, *Academy of Management Review*, **8** (3): 398-405.

Harrigan K. R. (1984). Formulating Vertical Integration Strategies, *Academy of Management Review,* **9** (4): 638-652.

Hart, O. D., Moore, J. (1990). Property rights and the nature of the firm, *Journal of Political Economy,* **98** (6): 1119–1158.

Hayek, F. A. (1945). The use of knowledge in society, *American Economic Review*, **35** (4): 519-530.

He, D., Nickerson, J. A. (2006). Why do firms make and buy? Efficiency, appropriability and competition in the trucking industry, *Strategic Organization*, **4** (1): 43-69.

Heide, J. B. (1994): "Interorganizational Governance in Marketing Channels", *Journal of Marketing*, **58** (1): 71-85.

Heide, J. B. (2003). Plural Governance in Industrial Purchasing, *Journal of Marketing*, **67** (4): 18-29.

Heide, J. B., John, G. (1990).Alliance in Industrial Purchasing: The Determinants of Joint Action in Buyer-Supplier Relationships, *Journal of Marketing Research,* **27** (1): 24-36.

Heide, J. B., John, G. (1992). Do Norms Matter in Marketing Relationships?, *Journal of Marketing,* **56** (2): 32-44.

Heide, J. B., Miner, A. S. (1992). The shadow of the future of anticipated interaction and frequency of contact on buyer-seller cooperation, *Academy of Management Journal,* **35** (2): 265-291.

Henderson, R., Cockburn, I. (1996). Scale, scope and spillovers: the determinants of research productivity in drug discovery, *RAND Journal of Economics*, **27** (1): 32-59.

Hennart, J.-F. (1993). Explaining the Swollen Middle: Why Most Transactions Are a Mix of "Market" and "Hierarchy", *Organization Science*, **4** (4): 529-547.

Heriot, K. C., Kulkarni, S. P. (2001). The Use of Intermediate Sourcing Strategies, *Journal of Supply Chain Management*, **37** (1): 18-26.

Hild, R. (2005): IFO Report Automobilindustrie: stark reduzierte Wertschöpfungsquote und gebremste Produktivitätsentwicklung*, IFO Schnelldienst,* **58** (21): 39-46.

Hill, C. W. L. (1990). Cooperation, Opportunism, and the Invisible Hand: Implications for Transaction Cost Theory, *Academy of Management Review,* **15** (3): 500-513.

Hoetker, G. (2007). The Use of Logit and Probit Models in Strategic Management Research: Critical Issues, *Strategic Management Journal*, **28** (4): 331-343.

Homburg, C., Herrmann, A., Pflesser, C. (2000). Methoden der Datenanalyse im Überblick, Herrmann, A., Homburg, C. (eds.), *Marktforschung - Methoden, Anwendungen, Praxisbeispiele*, Wiesbaden: 101-125.

Hutcheson, G., Sofroniou, N. (1999). *The Multivariate Social Scientist*, 1. ed. London et al.

Jap, S., Anderson, E. (2003). Testing the Life-Cycle Theory of Inter-Organizational Relations: Do Performance Outcomes Depend on the Path Taken?, *INSEAD working paper series*, 2003/17/MKT.

Jaworski, B.J. (1988). Toward a Theory of Marketing Control: Environmental Context, Control Types, and Consequences, *Journal of Marketing*, **52** (7): 23-39.

John, G., Weitz, B. (1989). Salesforce Compensation: An Empirical Investigation of Factors Related to Use of Salary Versus Incentive Compensation, *Journal of Marketing Research*, **26** (1): 1-14.

Jones, L. V.; Tukey, J. W. (2000). A Sensible Formulation of the Significance Test, *Psychological Methods*, **5** (4): 411-414.

Joshi, A. W., Stump, R. L. (1999). Transaction Cost Analysis: Integration of Recent Refinements and an Empirical Test, *Journal of Business to Business Marketing*, **4** (5): 37-72.

Joskow, P. L. (1987). Contract Duration and Relationship-Specific Investments: Empirical Evidence from Coal Markets, *The American Economic Review*, **77** (1): 168-185.

Kale, P., Singh, H., Perlmutter, H. (2000). Learning and protection of proprietary assets in strategic alliances: Building relational capital, *Strategic Management Journal*, **21** (3): 217-237.

Kerschbamer, R., Maderner, N., Tournas, Y. (2002). Idiosyncratic investments, outside opportunities and the boundaries of the firm, *International Journal of Industrial Organization*, **20** (8): 1119-1141.

Klein, S., Frazier, G. L., Roth, V. J. (1990). A transaction cost-analysis model of channel integration in international markets, *Journal of Marketing Research,* **27** (2): 196-208.

Klein, B., Crawford, R., Alchian, A. (1978). Vertical integration: appropriable rents and the competitive contracting process, *Journal of Law and Economics,* **21** (2): 279-326.

Koopmans, T. C. (1957). *Three Essays on the State of Economic Science*, New York.

Kogut, B., Zander, U. (1992). Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology, *Organization Science,* **3** (3): 383-397.

Kraemer, K. L, Dedrick, J. (1999). Sun Microsystems: Integrating its Own Enterprise, *CRITO working paper, Center for Research on Information Technology and Organizations,* University of California, Irvine.

Krishnan, R., Martin, X., Noorderhaven, N. G. (2006). When does Trust matter to Alliance Performance?, *Academy of Management Journal*, **49** (5): 894-917.

Kromrey, Helmut (2006). *Empirische Sozialforschung*, 11. ed., Stuttgart.

Krzeminska, Anna (2002). *Bedeutung der Transaktionskostentheorie und des Resource-based View für das strategische Management: Eine theoretische Analyse zur Erklärung des Outsourcings,* Master Thesis, Mainz, University of Mainz.

Lafontaine, F., Shaw, K. L. (2001). *Targeting Managerial Control: Evidence from Franchising*, *NBER working papers*, No. 8416, National Bureau of Economic Research, Inc.

Lane, P.J., Cannella, A.A., Lubatkin, M. H. (1998). Agency problems as antecedents to unrelated mergers and diversification: Amihud and lev reconsidered. *Strategic Management Journal*, **19** (6): 555-578.

Lane, P. J., Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning, *Strategic Management Journal,* **19** (8): 461-477.

Lane, P. J., Salk, J. E., Lyles, M. A. (2001). Absorptive capacity, learning, and performance in interorganizational joint ventures, *Strategic Management Journal,* **22** (12): 1139-1161.

Lee, K. S., Lim, W. S. (2001). A Game-theoretic perspective on transaction cost and the decision to make, buy or make-and-buy, *unpublished working paper*.

Leiblein, M. J. (2003). The Choice of Organizational Governance Form and Performance: Predictions from Transaction Cost, Resource-based, and Real Options Theories, *Journal of Management*, **29** (6): 937-961.

Leiblein, M. J. (2004). Comparing capability acquisition mechanisms: experience, organizational form and the development of new semiconductor capabilities, *unpublished working paper*.

Leiblein, M. J., Miller, D. J. (2003). An Empirical Examination of Transaction- and Firm – Level Influences on the Vertical Boundaries of the Firm, *Strategic Management Journal*, **24** (9): 839-859.

Lewin-Solomons, S. B. (1998). The Plural Form in Franchising: A Synergism of Market and Hierarchy, *unpublished working paper*.

Luo, Y. (2002). Building Trust in Cross-Cultural Collaborations: Toward a Contingency Perspective, *Journal of Management*, **28** (5): 669-694.

Macher, J. T., Boerner, C. S. (2006). Experience and Scale and Scope Economies: Trade-offs and Performance in Development, *Strategic Management Journal,* **27** (9): 845-865.

Madhok, A. (1996). The Organization of Economic Activity: Transaction Costs, Firm Capabilities, and the Nature of Governance, *Organization Science,* **7** (5): 577-590.

Madhok, A. (2002). Reassessing the Fundamentals and beyond: Ronald Coase, the Transaction Cost and the Resource-based Theories of the Firm and the Institutional Structure of Production, *Strategic Management Journal,* **23** (6): 535-550.

Madhok, A., Tallman, S. B. (1998). Resources, Transactions and Rents: Managing Value Through Interfirm Collaborative Relationships, *Organization Science,* **9** (3): 326-339.

Masten, S. E., Meehan, J. Jr., Snyer, E. A. (1989). Vertical integration in the U.S. auto industry: A note on the influence of transaction specific assets, *Journal of Economic Behavior & Organization,* **12** (2): 265-273.

Masters, J. K., Miles, G., D'Souza, D., Orr, J.P. (2004). Risk propensity, trust, and transaction costs in relational contracting, *Journal of Business Strategies,* **21** (1): 47-67.

Matiaske, W., Mellewigt, T. (2002). Motive, Erfolge und Risiken des Outsourcings – Befunde und Defizite der empirischen Outsourcing-Forschung, *Zeitschrift für Betriebswirtschaft*, **72** (6): 641-659.

McNaughton, R. B. (2002). The use of multiple export channels by small knowledge-intensive firms, *International Marketing Review*, **19** (2/3): 190-203.

Macneil, I. (1980): Power, Contract, and the Economic Model, *Journal of Economic Issues*, **14** (4): 909-924.

Mellewigt, T. (2003). *Management von Strategischen Kooperationen*. Wiesbaden.

Mellewigt, T. (2004). Drittes Doktorandenseminar – The First Generation, presentation at the doctoral seminar, Universität Leipzig, 11. – 12. 3.2004.

Mellewigt, T., Eckhard, B. (2006). Contractual Functions and Contractual Dynamics in Inter-Firm Relationships: What We Know and How to Proceed, *Working Paper 2006-04*, Universität Paderborn, Fakultät für Wirtschaftswissenschaften, Neue Folge Nr. 88.

Mellewigt, T., Hickel, A., Krzeminska, A. (2007). Sourcingstrategien in ausgewählten Branchen: Ein Praxisbericht, Bresser, R. K. F., Mellewigt, T. (eds.), *Diskussionsbeiträge des Instituts für Management*, Neue Folge # 02/2007, Freie Universität Berlin.

Menard, S. (1995). *Applied Logistic Regression Analysis,* London et al.

Milgrom, P., Roberts, J. (1992). *Economics, Organization and Management*, Englewood Cliffs.

Mols, P. M. (2000). Dual channels of distribution: a transaction cost analysis and propositions, *International Review of Retail, Distribution, and Consumer Research*, **10** (3): 227-246.

Monteverde, K., Teece, D. J. (1982a). Appropriable Rents and Quasi-Vertical Integration, *Journal of Law and Economics,* **25** (2): 321-328.

Monteverde, K., Teece, D. J. (1982b). Supplier Switching Costs and Vertical Integration in the Automobile Industry, *The Bell Journal of Economics*, **13** (1): 206-213.

Mortanges, Pahud de C., Vossen, J. (1999). Mechanisms to control the marketing activities of foreign distributors, *International Business Review*, **8** (1): 75-97.

Murray, J. Y., Kotabe, M., Wildt, A. R. (1995). Strategic and Financial Performance Implications of Global Souring Strategy: A Contingency Analysis, *Journal of International Business Studies*, **26** (1): 181-202.

Murray, J. Y, Kotabe, M. (1999). Sourcing Strategies of U.S. Service Companies: A Modified Transaction-Cost Analysis, *Strategic Management Journal*, **20** (9): 791-809.

Netemeyer, R. G., Bearden, W. O., Sharma, S. (2003). *Scaling Procedures: Issues and Applications*, Thousand Oaks et al.

Nickerson, R S. (2000). Null Hypothesis Significance Testing: A Review of an Old and Continuous Controversy, *Psychological Methods*, **5** (2): 241-301.

Nicolai, A., Kieser, A. (2002). Trotz eklatanter Erfolglosigkeit: Die Erfolgsfaktorenforschung weiter auf Erfolgskurs, *Die Betriebswirtschaft*, **62** (6): 579-596.

Nokia (2003). *Nokia Form 20-F 2003*, Annual Report Pursuant to Section 13 or 15(D) of the Securities Exchange Act of 1934.

Noordewier, T. G., John, G., Nevin J. R. (1990). Performance Outcomes of Purchasing Arrangements in Industrial Buyer-Vendor Relationships*, Journal of Marketing*, **54** (4): 80-93.

Nooteboom, B. (1996). Trust, opportunism and governance: A process and control model, *Organization Studies,* **17** (6): 985-1010.

Norton, Seth W. (1988). An Empirical Look at Franchising as an Organizational Form, *Journal of Business*, 61 (2): 197-218.

Nunnally, Jum C. (1978*). Psychometric theory*, 2. ed., New York.

Ouchi, W. G. (1979). A conceptual framework for the design of organizational control mechanisms, *Management Science*, **25** (9): 833-848.

Ouchi, W. G. (1980). Markets, Bureaucracies, and Clans, *Administrative Science Quarterly*, **25** (1): 120-142.

Parmigiani, A. E. (2003). *Concurrent sourcing: When do firms both make and buy?*. PhD Dissertation, Michigan, University of Michigan.

Parmigiani, A. E. (2007). Why do firms both make and buy?, *Strategic Management Journal*, **28** (3): 285-311.

Pearce, J. L., Gregersen, H. B. (1991). Task Interdependence and Extrarole Behavior: A Test of the Mediating Effects of Felt Responsibility, *Journal of Applied Psychology*, **76** (6): 838-844.

Picot, A. (1982). Transaktionskostenansatz in der Organisationstheorie: Stand der Diskussion und Aussagewert, *Die Betriebswirtschaft*, **42** (2): 267-284.

Pies, I. (1993). *Normative Institutionenökonomik zur Rationalisierung des politischen Liberalismus,* Tübingen.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies, *Journal of Applied Psychology*, **88** (5): 879-903.

Popper, K. R. (1976). *Logik der Forschung*, 6. ed., Tübingen.

Popper, K. R. (1998). *Objektive Erkenntnis. Ein evolutionärer Entwurf*, 4. ed., Hamburg.

Poppo, L., Zenger T. (1998). Testing Alternative Theories of the Firm: Transaction Cost, Knowledge-based, and Measurement Explanations for Make-or-Buy Decisions in Information Services, *Strategic Management Journal,* **19** (9): 853-877.

Porter, M. E. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors,* New York.

Proppe, D. (2007). Endogenität und Instrumentenschätzer, Albers, S., Klapper, D., Konradt, U., Walter, A., Wolf, J. (eds.), *Methodik der empirischen Forschung*, 2. ed., Wiesbaden: 231-244.

Ramstad, Y. (1996). Is a Transaction a Transaction? *Journal of Economic Issues*, **30** (2): 413-425.

Rindfleisch, A., Heide, J. B. (1997). Transaction Cost Analysis: Past, Present and Future Applications, *Journal of Marketing,* **61** (4): 30-55.

Riordan, M., Williamson, O. E. (1985). Asset Specificity and Economic Organization, *International Journal of Industrial Organization,* **3** (4): 365-378.

Robertson, T. S., Gatignon, H. (1998). Technology Development Mode: A Transaction Cost Conceptualization, *Strategic Management Journal*, **19** (6): 515-531.

Robins, J. A. (1987). Organizational Economics: Notes on the Use of Transaction-Cost Theory in the Study of Organizations, *Administrative Science Quarterly*, **32** (1): 68-86.

Rokkan, A., Heide, J. B., Wathne, K. H. (2003). Specific Investments in Marketing Relationships: Expropriation and Bonding Effects, *Journal of Marketing Rese*arch, **40** (2): 210-224.

Schilling, M. A., Steensma, K. H. (2002). Disentangling the Theories of Firm Boundaries: A Path Model and Empirical Test, *Organization Science*, **13** (4): 387-401.

Schneider, H. (2007). Nachweis und Behandlung von Multikollinearität, Albers, S., Klapper, D., Konradt, U., Walter, A., Wolf, J. (eds.), *Methodik der empirischen Forschung*, 2. ed., Wiesbaden: 183-198.

Schnell, R., Hill, P. B., Esser, E. (2005). *Methoden der empirischen Sozialforschung*, München, Wien.

Shelanski, H. A., Klein, P. G. (1995). Empirical Research in Transaction Cost Economics: A Review and Assessment, *Journal of Law, Economics, and Organization* **11** (2): 335-361.

Simon, H. (1961). *Administrative Behavio*r, 2. ed., New York.

Smith, A. (1776). *The Wealth of Nations*, edited by Edwin Cannan (1904) reprint edition 1937, New York,

Soanes, C., Hawker, S. (2005). *Compact Oxford English Dictionary of Current English*, 3. ed., Oxford et al.

Söhnchen, F. (2007). Common Method Variance und Single Source Bias, Albers, S., Klapper, D., Konradt, U., Walter, A., Wolf, J. (eds.), *Methodik der empirischen Forschung*, 2. ed., Wiesbaden: 135-150.

Statistisches Bundesamt (2002). *Klassifikation der Wirtschaftszweige, Ausgabe 2003 (WZ 2003),* Wiesbaden.

Subramani, M. R., Venkatraman, N. (2003). Safeguarding Investments in Asymmetric Interorganizational Relationships: Theory and Evidence, *Academy of Management Journal,* **46** (1): 46-62.

Tallon, P. P., Kraemer, K. L. (2003). Using Flexibility to Enhance the Alignment between Information Systems and Business Strategy: Implications for IT Business Value, *unpublished working paper*.

Tsang E. W. K. (2006). Behavioral Assumptions and Theory Development: The Case of Transaction Cost Economics, *Strategic Management Journal*, **27** (11): 999-1011.

Veugelers, R., Cassiman, B. (1999). Make and Buy in Innovation Strategies: Evidence from Belgian Manufacturing Firms, *Research Policy*, **28** (1): 63-80.

Vogt, J. (1997). *Vertrauen und Kontrolle in Transaktionen: eine institutionenökonomische Analyse*, Wiesbaden.

Walker, G., Weber, D. (1984). A Transaction Cost Approach to Make-or-Buy Decisions, *Administrative Science Quarterly,* **29** (3): 373-391.

Wathne, K. H., Heide, J. B. (2000). Opportunism in Interfirm Relationships: Forms, Outcomes, and Solutions, *Journal of Marketing*, **62** (4): 36-51.

Wathne, K., Heide, J. (2004). Relationship Governance in a Supply Chain Network, *Journal of Marketing*, **68** (1): 73-89.

Wilken, C., Kracht, H.-J. (2003). Beschaffung und strategisches Controlling in globalisierten Märkten, Bogaschewsky, R., Götze, U. (eds.). *Management und Controlling von Einkauf und Logistik*, Gernsbach: 113-136.

Williamson, O. E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implication,* New York, London.

Williamson, O. E. (1985). *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*, New York, London.

Williamson, O. E. (1991a). Comparative Economic Organization: The Analysis of Discrete Structural Alternatives, *Administrative Science Quarterly,* **36** (2): 269-296.

Williamson, O. E. (1991b). Strategizing, Economizing, and Economic Organization, *Strategic Management Journal*, **12** (8): 75-94.

Williamson, O. E. (1993). Opportunism and its Critics, *Managerial and Decision Economics,* **14** (2): 97-107.

Williamson, O. E. (1998). Transaction Cost Economics: How it works; Where it is headed, *De Economist,* **146** (1): 23-58.

Williamson, O. E. (2000). Strategy Research: Governance and Competence Perspectives, Foss, N., Mahnke, V. (eds.). *Competence, Governance, and Entrepreneurship*, Oxford et al.: 21-54.

Williamson, O. E. (2003). Transaction Cost Economics and Economic Sociology, *CSES Working Paper Series*, Paper #13.

Yin, X., Zajac, E. J. (2004). The Strategy/Governance Structure Fit Relationship: Theory and Evidence in Franchising Arrangements, *Strategic Management Journal,* **25** (4): 365-383.

Yin, R. K. (2003). *Case Study Research: Design and Methods*, Thousand Oaks, London.

Zaheer, A., McEvily, B., Perrone, V. (1998). Does Trust Matter? Exploring the Effects of Interorganizational and Interpersonal Trust on Performance, *Organization Science*, **9** (2): 141–159.

Zinnbauer, M., Eberl, M. (2004). Die Überprüfung von Spezifikation und Güte von Strukturgleichungsmodellen: Verfahren und Anwendung, *Schriften zur Empirischen Forschung und Quantitativen Unternehmensplanung,* Arbeitspapier **21**.