

Pekka Torvinen

CATCHING UP WITH COMPETITIVENESS IN EMERGING MARKETS – AN ANALYSIS OF THE ROLE OF THE FIRM’S TECHNOLOGY MANAGEMENT STRATEGIES

Thesis for the degree of Doctor of Science (Technology) to be presented with due permission for public examination and criticism in the Auditorium of the Student Union House at Lappeenranta University of Technology, Lappeenranta, Finland on 15 April 2016 at noon.

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Abstract

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Emerging markets have experienced rapid economic growth, and manufacturing firms have had to face the effects of globalisation. Some of the major emerging economies have been able to create a supportive business environment that fosters innovation, and China is a good example of a country that has been able to increase value-added investments. Conversely, when we look at Russia, another big emerging market, we witness a situation in which domestic firms struggle more with global competitiveness.

Innovation has proven to be one of the most essential ingredients for firms aiming to grow and become more competitive. In emerging markets, the business environment sets many constraints for innovation. However, open strategic choices in new product development enable companies in emerging markets to expand their resource base and capability building. Networking and close inter-firm cooperation are essential in this regard. In this dissertation, I argue that technology transfer is one of the key tools for these companies to become internationally networked and to improve their competitiveness. It forces companies to reach outside the company and national borders, which in many cases, is a major challenge for firms in emerging markets.

This dissertation focuses on how companies can catch up with competitiveness in emerging markets. The empirical studies included in the dissertation are based on analyses of survey data mainly of firms and their strategies in the Russian manufacturing industry. The dissertation contributes to the current strategic management literature by further investigating technology management strategies in manufacturing firms in emerging markets and the benefits of more open approaches to new product development and innovation.

Keywords: technology management, strategic management, technology transfer, networks, cooperation, innovation, open innovation, emerging markets, Russia, competitiveness, firm performance

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Abbreviations

BEEPS	Business, Environment and Enterprise Performance Survey
EBRD	European Bank of Reconstruction and Development
EM	Emerging markets
ETA	External technology acquisition
ETC	External technology commercialisation
FDI	Foreign direct investment
IP	Intellectual property
MNE	Multinational enterprise
NPD	New product development
R&D	Research and development
SME	Small or medium-sized enterprise

Publications

This dissertation is based on the research papers listed below, including descriptions of their role in the dissertation. The publications have been authored in collaboration with other authors, and thus, the authors' contribution to each publication has been described in detail below. Complete versions of these publications are included in Part II of the dissertation. The rights have been granted by the publishers to include the papers in the dissertation.

Publication 1

Torvinen, P. and Väättänen, J. (2013) 'Review of the competitiveness of Russian manufacturing industry', *International Journal of Business Excellence*, vol. 6, no. 3, pp. 293–309.

Publication 1 examines the development of Russian manufacturing industry competitiveness on the basis of statistical data. This publication describes the setting in Russian manufacturing and the motivation for future research. The paper was accepted for publication in the *International Journal of Business Excellence* following a double-blind review process. The publication was planned together with the co-author. The first author was responsible for coordinating the writing process, the literature review and the data analysis. The conclusions were written in conjunction with the co-author.

Publication 2

Torvinen, P. and Väättänen, J. (2014) 'Building competitiveness of emerging market firms: The role of interfirm technology transfer', proceedings of the 40th Annual Conference of the European International Business Academy (EIBA), 11–13th December 2014, Uppsala, Sweden.

Publication 2 is conceptual and examines the importance of inter-firm technology transfer in improving firm competitiveness and catching up in emerging markets. The paper was accepted for the Annual Conference of the European International Business Academy (EIBA) and was presented at the conference session. It followed a double-blind review process. The publication was planned together with the co-author. The first author was responsible for the coordination of the writing process, the literature review and the conceptual development. The discussion and conclusions were jointly written with the co-author.

Publication 3

Torvinen, P., Podmetina, D., Hinkkanen, J.J. and Väättänen, J. (2014) 'External technology acquisition in Russian firms', *International Journal of Procurement Management*, vol. 7, no. 3, pp. 257–278.

Publication 3 investigates the exploitation of external technology acquisition in the Russian manufacturing industry and uses firm-level survey data from Russian manufacturing. The paper was accepted for publication in the *International Journal of Procurement Management* following a double-blind review process. The publication was planned together with the co-authors. The first author was responsible for the coordination of the writing process, the literature review and the data analysis. The conclusions and discussion were written in conjunction with the co-authors.

Publication 4

Torvinen, P. and Väättänen, J. (2015) 'External technology commercialisation and markets for technology in Russian manufacturing industry', *International Journal of Technology Marketing*, vol. 10, no. 1, pp. 4–24.

Publication 4 assesses the exploitation of external technology commercialisation and the functioning of technology markets in the Russian manufacturing industry. It uses firm-level survey data from Russian manufacturing. The paper was accepted for publication in the *International Journal of Technology Marketing* following a double-blind review process and was planned together with the co-author. The first author was responsible for the coordination of the writing process, the literature review and the data analysis. The conclusions and discussion were written jointly with the co-author.

Publication 5

Torvinen, P. and Väättänen, J. (2015) 'Technology management strategies in emerging markets', proceedings of the XXVI International Society for Professional Innovation Management (ISPIM) Conference – Shaping the Frontiers of Innovation Management, 14-17 June 2015, Budapest, Hungary.

Publication 5 examines the use of different management strategies between groups of countries based on their level of competitiveness. It uses firm-level survey data from manufacturing companies in developing and developed EU, Eastern European and Central Asian countries. The paper was accepted for the International Society for Professional Innovation Management (ISPIM) conference and was presented at the conference session. It followed a double-blind review process based on an extended abstract. The publication was planned together with the co-author. The first author was responsible for the coordination of the writing process, the literature review and the data analysis. The conclusions and discussion were written jointly with the co-author.

Part I: Overview of the thesis

1 Introduction

1.1 Background, motivation and objectives

Globalisation and the attendant increase in global competition variously impact companies, their operations and decisions more than ever. The world has become smaller for many companies operating globally due to rapid technology and infrastructure development. For some companies, increasing global competition is creating barriers to internationalisation as well as to success in the domestic market. Companies have to be able to develop their international competitiveness as well as their operations. In today's competitive environment, this requires companies to develop new and more agile strategies, especially for innovation, and to increasingly network with other companies. In this dissertation, I argue that this is especially beneficial for manufacturing companies in emerging markets with regards to new product development processes and performance. In this thesis, the Russian manufacturing industry is empirically investigated to ascertain the manner in which more open technology management strategies and networking support companies in becoming more competitive.

Firm competitiveness is dependent on firm, industrial and national structures. At the firm level, the successful coordination of strategically important activities can lead to competitive advantages (Porter, 1980; 1985; 1990). Innovation and technology management strategies are also vital for manufacturing firms to improve their innovation performance and competitiveness. Firms need to implement strategies that can complement the results of internal R&D and improve the efficiency and speed of new product development (Cassiman and Veugelers, 2006; Granstrand et al., 1992; Pavitt, 1990). Technology transfer and functioning technology markets are key tools for improving new product development performance and access to international networks (Tsai, 2001; Arora et al., 2001). The acquisition of external technologies is essential to complementing internal R&D and improving the efficiency of new product development. The commercialisation of internally developed technologies can offer companies additional income and help them establish new inter-organisational connections. However, all this requires that firms develop internal capabilities to succeed (Cohen and Levinthal, 1989). International expansion and networking can help companies reduce home market constraints (Turnbull et al., 1996; Luo and Tung, 2007). Many companies in emerging markets are domestically focused, and the environment, for example, for intellectual property protection, remains challenging. Notwithstanding, this may further support technology transfer and the acquisition of external technologies.

Emerging markets are an interesting research setting to further analyse this issue. The current literature, still mostly focused on developed markets, has begun the conversation about firms in emerging markets. Many manufacturing firms have faced international competition in domestic markets; they also aim to become more internationalised and to match the level of competitiveness in international markets. However, companies continue to be challenged on a global scale, and an underdeveloped business environment

presents many constraints for manufacturing companies. It does not encourage companies to innovate or internationalise, incidentally two key components for improving performance. This thesis aims to ascertain how change could occur and what actions would help companies in emerging markets to overcome current challenges, especially concerning innovation, and become more prepared for global markets.

Russia and other emerging markets have experienced significant economic progress. In Russia, however, the main source of this progress has been rising energy prices rather than vibrant industries (Hanouz and Prazdnichnykh, 2011). This makes the Russian manufacturing industry an interesting subject for further research on innovation. There is an indication of attempts at modernising the Russian economy to become more competitive, but local companies still lack competitiveness and generally remain on the domestic market. However, the situation in domestic markets is becoming increasingly competitive (Desai and Goldberg, 2007; Filippov, 2011). Markets are continuously opening up to foreign imports and foreign direct investment, which offer ever better and cheaper products on the Russian market (Hanouz and Prazdnichnykh, 2011; Trifilova, 2009; Valdaytsev and Sergeyev, 2011). Local companies need to meet these growing requirements by increasing their competitiveness. Key issues in the future success and productivity growth of Russia are technology and innovation development. Russian companies need to become more sensitised to the fact that they will lose their market position even in the domestic market if they do not introduce radical technological product and process innovations (Dirks and Keeling, 2009; Valdaytsev and Sergeyev, 2011). Russia has well-educated industry and business specialists and researchers who can potentially create an excellent source for innovation and R&D. However, the innovation output is still weak in Russia. Russian companies are still quite closed when it comes to business models and innovation, and they have relatively insufficient R&D and NPD processes (Podmetina et al., 2011).

The business environment, with the attendant market competition, sets constraints on firm competitiveness. Building management and innovation capabilities can help companies overcome these challenges (Hoskisson et al., 2000; Khanna et al., 2005; Peng et al., 2008; Xu and Meyer, 2013; Wright et al., 2005). For companies, competition and external pressure have had a positive effect on competitiveness, forcing local companies to focus on their core competences (Dunning, 1993; Porter 1990; Prahalad and Hamel, 1990; Duysters and Hagedoorn, 2000). Competition also puts pressure on domestic companies to focus on productivity. This is important as Russian companies need to reduce the technology and innovation gap that exists in comparison to companies in developed countries (Desai and Goldberg, 2007; Filippov, 2011) if they wish to survive increasing levels of competition, even in the domestic markets. Companies create knowledge and technologies through R&D and new product development (NPD) processes. Russian companies tend to be domestically oriented, and only international competition forces them to develop processes and collaborate (Hinkkanen et al., 2013). They are also relatively closed with regards to the use of external technologies and innovations, which limits their access to international networks (Podmetina et al., 2011). International cooperation and technology acquisition may be one of the key factors to enhance firm

competitiveness. Moreover, external sources of knowledge are often important for the entire innovation process (Cohen and Levinthal, 1990). Even technologies that are not necessarily aligned with the company's core business and business models can create great value for companies through successful technology transfer and commercialisation (Anokhin et al., 2011; Frishammar et al., 2012). Increasing innovativeness and more open business models are a necessity for Russian companies aiming for growth and international competitiveness. Open business models are also vital when companies cooperate with external partners. Inbound and outbound open innovation are essential in the case of technology acquisition and commercialisation where focal companies or external partners actively pursue external technology exploitation (Chesbrough, 2003). This kind of development is needed in emerging market companies and their technology management strategies.

1.2 Research scope, questions and research gap

This dissertation aims to contribute to the current management literature by examining the link between competitiveness – on the firm, industry and national levels – and the technology management strategies that firms select in the manufacturing industry in emerging markets. The external business environment and a firm's internal capabilities and resource base are critical prerequisites for the positive or negative development of the firm's competitiveness and performance.

In manufacturing, strategic choices in technology management concerning innovation activities and new product development are vital in facilitating firm performance. Outbound and especially inbound technology transfer can be seen as one of the most viable tools to enable firms in emerging markets to catch up and improve their performance and competitiveness. This also encourages firms to cooperate and be more networked domestically and internationally.

This dissertation focuses mainly on the Russian manufacturing industry in its endeavour to find empirical evidence on the topic and contribute to current research. The publications incorporated in the thesis analyse the development of competitiveness in the Russian manufacturing industry. The papers also focus on the role of technology management and technology transfer in improving firm competitiveness. This is more closely empirically investigated in the case of Russian manufacturing firms focusing on technology acquisition, technology commercialisation and the functioning of the technology markets in Russia. The use of different technology management strategies is also compared at the national level between countries at different stages of economic development and competitiveness. The empirical research spans different levels, including the firm, industry and national levels, with the aim of illustrating a more complete picture of the research topic.

Research problem and gap

Competitiveness has been a leading topic in international business for many years. The competitive advantage of a firm is dependent on firm, industrial and national structures (Porter, 1980; 1985; 1990). This topic has now become essential for companies, especially in fast growing emerging economies where the institutional and market environment and constraints affect the firm's strategies (Peng, 2002; Yiu et al., 2007). This research field contributes to this study, especially in discussions of the firm's competitiveness on the industry and national levels.

The previous literature on strategic management has highlighted the role of technology management strategies in improving firm performance and competitiveness (Cassiman and Veuglelers, 2006; Tsai 2001; 2009; Stuart, 2000). The firm's resource base has been recognised as one of the most essential factors affecting its competitive advantage (Barney 1991; 2001; Grant, 2002; Peteraf, 1993). The resource base can be developed within the firm, but it can also be extended by exploiting external sources (Dyer and Singh, 1998). This requires an open approach to innovation, including the exploitation of technology transfer, cooperation and networking (Cassiman and Veugelers, 2006; Arora et al., 2001; Tsai, 2001; Stuart, 2000; Fu et al., 2011). Altogether, innovation and a firm's technology and innovation management strategies have been recognised as essential in improving firm competitiveness (Pavitt, 1990; Chesbrough, 2003; Radosevic, 1999). The development of the firm's internal capabilities is a prerequisite for the positive development and commercialisation of innovation (Cohen and Levinthal, 1989). These are ultimately critical factors enabling firms to catch up with competitiveness. These fields of research contribute to the current study, especially research on the firm level.

Local industries and enterprises in emerging markets have been faced with global competition whereby only the most competitive companies survive and grow. This has put many companies in a difficult situation. These countries and industries do have hidden potential to become more competitive. Developing companies' capability to innovate and exploit technologies can enhance company competitiveness to meet international standards. It places significant requirements on company management but offers unlimited opportunities. The research context of emerging markets contributes to research on large and growing economies that play an important role in the future development of the global economy. This research field has been paying increasing attention to emerging markets, with many topics being extensively investigated. In many cases, this research focus creates an interesting research setting in comparison to the majority of research on developed countries (Mayer and Peng, 2005; Hoskisson et al., 2000; Wright et al., 2005). There is clearly room for further research, especially in the case of Russia where the historical background, rapid economic development and manufacturing-related challenges in becoming globally competitive create an interesting research setting that can potentially contribute to current research in strategic management and international business. Figure 1 presents the gap in this research.

Literature streams	
Strategic management	Competitiveness
Resource-based view and relational view	Market-based view
Research areas	
Technology and innovation management	Firm capabilities
Technology transfer	Cooperation and networks
Research context	
Emerging and developing markets	
Research gap	
How can manufacturing firms in emerging markets catch up with competitiveness? – An analysis of the role of the firm's technology management strategies	

Figure 1. Literature streams and research gap

This research assesses the firm competitiveness in emerging markets by contributing on two theoretical approaches. First is the market level where the constraints of the business environment create gap in competitiveness (Hoskisson et al., 2000; Peng, et al., 2009). This is also evident in the case of Russia (Desai and Goldberg, 2007; EBRD, 2012). The second is the firm level where the interfirm cooperation and technology transfer enables companies to expand their resource base and catch up in the competitiveness (Barney 1991; 2001; Dyer and Singh, 1998; Lavie, 2006; Chesbrough, 2003; Fu, et al., 2011). This study contributes mostly on the second theoretical approach by providing empirical evidence on the preconditions and implications of more open technology management strategies.

The main research question of this thesis is: How can manufacturing firms in emerging markets catch up with competitiveness? I aim to answer this question with support from the current research literature as well as by means of the evidence presented in the publications included in the thesis.

The first sub-question relates to publication 1: How has the competitiveness of the Russian manufacturing industry developed, and is there a gap in competitiveness? This sub-question and corresponding publication describe the motivation and background for the research leading to the other publications, which utilise empirical industry-level evidence.

The second sub-question is related to publication 2: How can companies in emerging markets increase their competitiveness through inter-organisational technology transfer? This sub-question and corresponding publication review the current literature and conceptualise

the main notions of the thesis regarding the exploitation of technology transfer and inter-organisational cooperation to catch up with competitiveness.

The third sub-question relates to publication 3: How can external technology acquisition (ETA) improve firm competitiveness? This sub-question and corresponding publication address the exploitation of ETA as a strategy in the context of empirical evidence from the Russian manufacturing industry.

The fourth sub-question corresponds to publication 4: How can external technology commercialisation (ETC) and technology exchange improve firm competitiveness? This sub-question and corresponding publication address the use of ETC as a strategy in the context of empirical evidence drawn from the Russian manufacturing industry.

The fifth sub-question relates to publication 5: How does the business environment affect technology management strategies? This sub-question and corresponding publication address the application of different technology management strategies in manufacturing firms located in Central and Eastern European countries with different levels of host country competitiveness.

Altogether, the publications cover the essential themes and assess the main research question, from a variety of angles, with a focus on the application of technology management strategies. The path followed by this research and the corresponding research questions are presented in Table 1. The sub-questions correspond to each publication included in the thesis.

Table 1. Research questions and corresponding publications

Research question:	
How can manufacturing firms in emerging markets catch up with competitiveness?	
Publication 1: Review of the competitiveness of Russian manufacturing industry	Sub-question 1: How has the competitiveness of the Russian manufacturing industry developed, and is there a gap in competitiveness?
Publication 2: Building competitiveness of emerging market firms: The role of interfirm technology transfer	Sub-question 2: How can companies in emerging markets increase their competitiveness through inter-organisational technology transfer?
Publication 3: External technology acquisition in Russian firms	Sub-question 3: How can ETA improve firm competitiveness?
Publication 4: External technology commercialisation and markets for technology in Russian manufacturing industry	Sub-question 4: How can ETC and technology exchange improve firm competitiveness?

Publication 5: Technology management strategies in emerging markets	Sub-question 5: How does the business environment affect technology management strategies?
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1.3 Definition of key terms

This section defines the basic terms used in this dissertation. These definitions are closely connected to the concepts and theories described later in this introductory part of the dissertation.

Competitiveness and competitive advantage

Competitiveness is one of the key notions in this dissertation. In discussions about the different levels of competitiveness, the works of Michael Porter (1980; 1985; 1990) can be seen as foundational. His frameworks have also been used as a foundation for measuring competitiveness in the *Global Competitiveness Report* (Schwab, 2015), which is one of the most extensive comparative studies, published annually, measuring competitiveness on the national level.

Competitiveness can be measured on different levels (product, firm, industry and country) using different indicators (e.g. growth, profitability and market share) (Buckley et al., 1988). The *Global Competitiveness Report* defines competitiveness as ‘the set of institutions, policies, and factors that determine the level of productivity of a country’ (Schwab, 2015: 4). This notion follows the concepts developed by Porter whereby productivity ultimately depends on the sophistication of local competition and the development of the microeconomic capability of the economy. This includes the quality of the business environment, the state of cluster development and the sophistication of company operations and strategy. Microeconomic development is based on macroeconomic competitiveness, which is based on sound monetary and fiscal policies, human development and effective political institutions. This is supported by the endowments of a certain location, which thereby create the foundation for prosperity. Ultimately, prosperity is about the use of the location’s human, capital and natural endowments to create value (HBS, 2015).

One source defines competitiveness as ‘the ability of a region to export more in value added terms than it imports’ (Atkinson, 2013: 2). This calculation takes into account artificially low currencies, suppressed wages in export sectors, artificially low taxes and direct export subsidies. It also controls for tariff and non-tariff barriers to imports. Productivity growth in trade sectors is one of the key factors enabling the improvement of competitiveness. Productivity itself is more easily defined. It is measured as economic output per unit of input. The unit of input can be labour hours in the case of labour productivity or all production factors, including labour, machines and energy, when calculating total factor productivity (Atkinson, 2013).

Barney (1991: 102) defines competitive advantage when a firm implements a value-creating strategy that is not simultaneously being implemented by current or potential competitors. It can be called sustained competitive advantage in cases when other firms are unable to duplicate the benefits of this strategy (Barney, 1991). This also relates to the *strategic assets* of a company, defined as ‘the set of difficult to trade and imitate, scarce, appropriable and specialized *resources and capabilities* that bestow the firm’s *competitive advantage*’ (Amit and Schoemaker 1993: 36).

Firm performance

Firm performance is most commonly assessed by reviewing and analysing the financial indicators of a firm. However, in this dissertation, firm performance is measured through indicators based on the responses of firm managers in the surveys (publications 3 and 4). Innovation performance is mainly measured through the survey questions regarding the new product development results (e.g. the number of new products developed in the last 3 years). Financial performance is measured through indicators based on the responses of firm managers to questions on how they assess changes in their company’s performance against competitors or previously set goals in, e.g. market share, sales growth, profitability and return on investment.

Innovation

There are many definitions of innovation. Common among most of these definitions is that innovation is not only a conception of ideas or inventions; it also requires the commercial and practical application of these ideas and inventions. Innovation can also be radical (new and major innovations) or incremental (minor technological advances). It is also often accompanied by organisational changes (Trott, 2012). In what follows, I present definitions from the *Oslo Manual* (OECD/Eurostat, 2005) because the empirical analysis and methodology are based primarily on the application of these definitions. The manual was consulted in developing the surveys for the empirical data used in the publications included in the dissertation.

‘*An innovation* is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations’ (p. 46). ‘*Innovation activities* are all scientific, technological, organisational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations. Some innovation activities are themselves innovative, others are not novel activities but are necessary for the implementation of innovations. Innovation activities also include R&D that is not directly related to the development of a specific innovation’ (p. 47). ‘*An innovative firm* is one that has implemented an innovation during the period under review’ (p. 47).

‘*A product innovation* is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant

improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics' (p. 48). Following this definition, the *Oslo Manual* has defined process, marketing and organisational innovations more closely. This dissertation focuses on product innovation and does not examine the other innovation types.

Technology transfer

In this dissertation, the term technology transfer is used as a concept in relation to innovation. The term has been used quite widely in the literature throughout the years. Even though technology transfer includes both outward and inward technology flows, very often, inter-organisational technology transfer involves only one-directional transactions (Amesse and Cohendet, 2001; Radosevic, 1999).

Seaton and Cordey-Hayes (1993: 46) define technology transfer as the process of promoting technical innovation through the transfer of ideas, knowledge, devices and artefacts from leading edge companies, R&D organisations and academic research to a more general and effective application in industry and commerce.

According to UNCTAD (2014: 1), the term 'transfer of technology' can

be applied to the process by which a technology developed for a specific use or sector becomes applicable in a different productive setting. Transfer of technology may refer to a process that takes place within or across national boundaries, and on a commercial or noncommercial (concessionary) basis. It may refer to the physical movement of assets or to immaterial elements such as know-how and technical information, or most often to both material and immaterial elements. Transfer of technology may be linked to the movement of physical persons or more specifically to the movement of a specific set of capabilities.

Emerging markets

Emerging markets is widely used term which is often used interchangeably with emerging and developing economies. The term is often used with countries undergoing rapid economic growth, industrialization, structural changes, and having weak legal systems (Luo and Tung, 2007). Kvint (2009: xxiv) defines the term as follows:

Emerging market country is a society transitioning to a free-market-oriented-economy, with increasing economic freedom, gradual integration with the Global Marketplace and with other members of the GEM (Global Emerging Market), an expanding middle class, improving standards of living, social stability and tolerance, as well as an increase in cooperation with multilateral institutions.

1.4 Outline and structure of the thesis

Figure 2 summarises the structure and outline of the thesis. It presents the input and motivation and the output and main results for each section. This first section of the thesis presents the motivation, basic idea and concept behind the study. It also delineates the research scope and research questions. The second section focuses on the theoretical background and previous research seen as essential for the study and illustrates the study's contribution to current research. The third section describes the research design, methodology and the data used. The fourth section summarises the objective, main findings and role of the publications included in the thesis. The fifth section concludes the results, implications and study limitations and discusses future research directions.

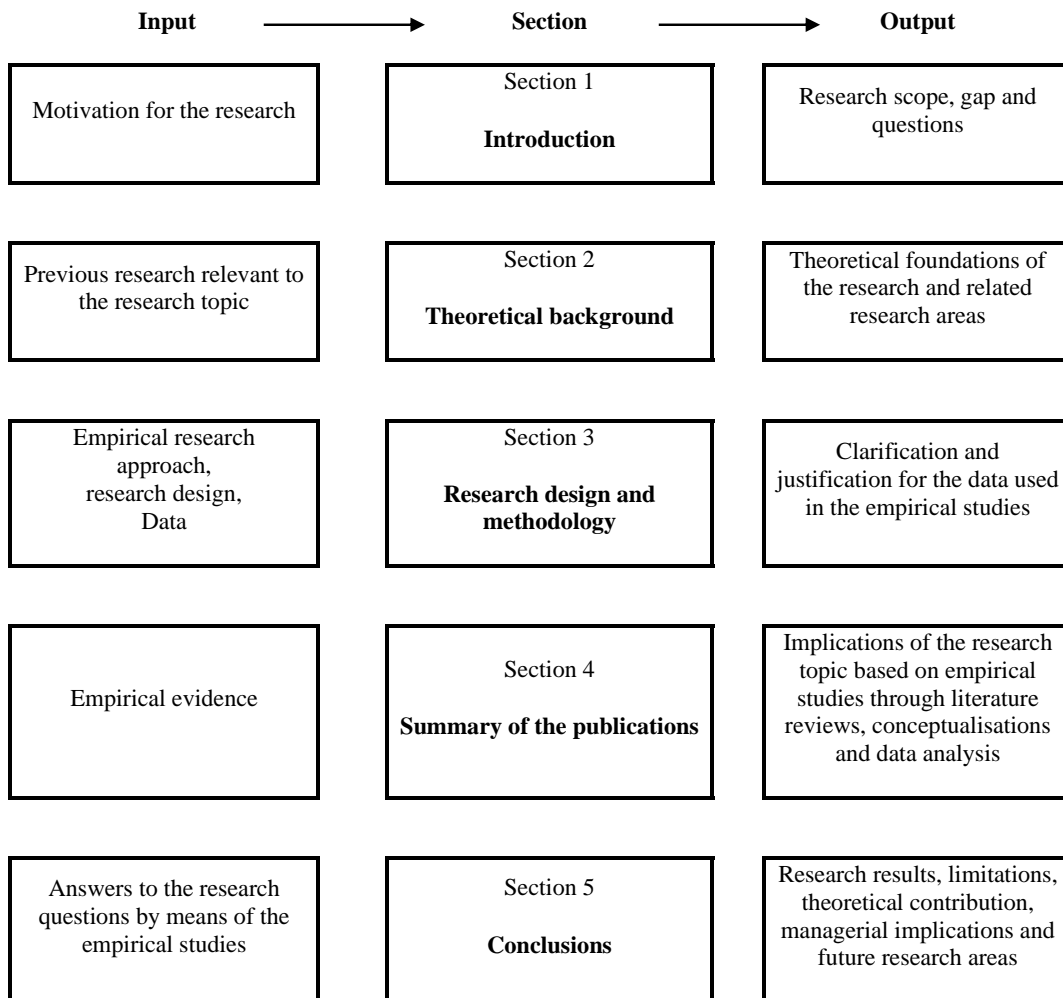


Figure 2. Structure of the thesis

2 Theoretical background

This section of the thesis presents the theoretical background and foundation for the study. This is mainly divided into two main topics. The first relates to the market-driven factors that are essential for building a firm's competitive advantage in emerging markets. It discusses the market constraints that firms have to overcome to catch up with competitiveness in domestic and international markets. The second main topic concerns firm-related factors and how firms can expand their resource base to gain competitive advantage. A synthesis and conceptual framework are presented upon covering these main foundations for this research.

2.1 The basis of firm competitiveness in emerging markets

2.1.1 The decisive role of the business environment – market- and industry-based views

The market-based view explains the competitiveness and competitive advantage of firms in the context of the structures of the external environment, industry and firms' competitive position within the industry. In this approach, the location and business environment of a firm play a decisive role in shaping the firm's strategies in building competitiveness (e.g. Porter, 1998; 1980). The market-based view has its foundation in industrial organisation (IO) economics and the works of Mason (1939) and Bain (1956; 1968) and has been further developed by Porter (1980; 1985; 1990).

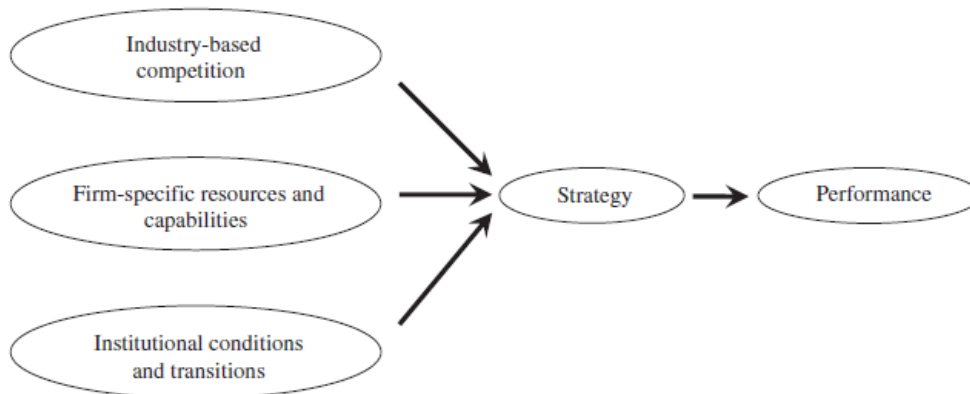
According to Porter (1980; 1985; 1990), the competitive advantage of a firm is dependent on the firm, industrial and national structures. At the level of the firm, the successful coordination of strategically important activities can lead to competitive advantages for focal firms if they are able to better organise activities than competitors. Porter also highlights that besides the coordination of activities within the value chain, coordination with vertical linkages – suppliers and channels – is important for the firm's performance. The interrelationships and role of horizontal strategies and cooperation with related business units have also become vital for firms. This can take place in the form of tangible, intangible or competitor interrelationships (Porter, 1980).

There are competitive market forces within the industry and at the national level that influence the strategies firms adopt. The industry structure affects firm strategies through different competitive forces. A firm's strategic choices are essential to its position within the industry. By responding to industry-set market forces with the right strategies, firms may be able to sustain competitive advantages in their industry. There are also factors on the national level that affect firm competitiveness. These factors are difficult to control but may be critical to the firm's development and competitiveness (Porter, 1980).

Even though this research mainly focuses on the Porterian approach to analyse the industry structure and market environment, it can be acknowledged that recent

discussions in the strategy literature also highlight the role of institutions and institutional conditions as an important variable in influencing firm strategy and performance. This applies especially in the emerging market context (Peng, 2002). Peng et al. (2008; 2009) suggest that the institution-based view is ‘a third leg’ in the strategy tripod, adding to the industry- and resource-based views. The institutional approach has been recognised as one of the most discussed theoretical perspectives in the strategy literature regarding emerging markets research (Hoskisson et al., 2000). ‘Institutions govern societal transactions in the areas of politics (e.g., corruption, transparency), law (e.g., economic liberalisation, regulatory regime), and society (e.g., ethical norms, attitudes toward entrepreneurship)’ (Peng et al., 2008: 922). Thus, institutions and the institutional environment can be seen as a driving force for firm strategy and performance, especially in emerging markets where the institutional environment and support are still developing (Peng et al., 2008).

Figure 3. The institution-based view: A third leg of the strategy tripod (Peng et al., 2009)



While the market-based view (MBV) has been widely used in the strategic management literature, it has some shortcomings. It places little emphasis on firm-level attributes and their effects on the firm’s competitive position. It assumes high resource heterogeneity and mobility between firms in an industry. It also assumes that firms have similar strategic goals (Barney, 1991). The approach focuses on responding to changes in the markets and improving a firm’s market position and competitiveness vis-à-vis competitors. The business strategy is based on the environment and competitors. Thus, the MBV is primarily a reactive and defensive approach and does not take innovation into account. Noteworthy, it is also difficult for firms to influence the markets and business environment. Thus, it is critical for companies in emerging markets to also develop their capabilities internally and to expand their boundaries and open their strategical views to improve their performance and competitiveness by reducing the constraints set by the home environment.

2.1.2 Catching-up competitiveness in emerging markets

The home market environment and the opportunities it offers are important for emerging market companies. In the case of emerging markets, domestic rivalry, networks and the business environment usually set constraints for companies. This plays an important and facilitating role in the international expansion and development of firms (Yiu et al., 2007). International expansion is critical for companies to reduce home market constraints (Luo and Tung, 2007). The institutional setting, low resource availability and continuous economic liberalisation present challenges for companies in emerging markets, which in turn affect the strategies that companies employ (Khanna et al., 2005; Peng et al., 2008; Xu and Meyer, 2013; Wright et al., 2005; Yiu et al., 2007; Peng, 2002). From a theoretical perspective, the MBV enables insights into these business environment-related issues which are vital for the growth and development of emerging market firms. These factors are also critical when analysing the competitiveness gap between developed and developing markets. Emerging markets create an interesting context in which to study firms' management strategies. These markets have faced major economic changes that have impacted on companies' management strategies. Increasing competition and market constraints force companies to be efficient and develop their processes to catch up with competition.

The current literature on emerging markets has a strong focus on internationalisation and international business, especially regarding how firms from developed countries can manage their business in emerging markets (Hoskisson et al., 2000; Wright et al., 2005). The role of emerging market firms and their competitiveness and performance remains under-studied in the current international business and strategic management literature. In particular, the strategic management literature has not focused much attention on the emerging markets context despite many well-known authors recognising that there are major differences in discussions about management and business in emerging markets (Xu and Meyer, 2013). For this section, I have selected articles from leading management and international business journals that illustrate current and future research topics regarding emerging market firms as well as differences in doing business in emerging markets. The selected articles have been divided into two tables. The first (Table 2) presents the conceptual and literature review papers which have played an important role in discussions about future research directions and topics. The second table (Table 3) presents empirical papers regarding evidence of the current situation and developments in emerging market firms.

Table 2. Selected conceptual studies and literature reviews on emerging market research

Publication	Topic and focus	Data and context	Results
Fu, X., Pietrobelli, C. and Soete, L. (2011) 'The role of foreign technology and indigenous innovation in the emerging economies: Technological change and catching-up', <i>World Development</i> , vol. 39, no. 7, pp. 1204–1212.	The role of indigenous and foreign innovation in technological change and catching up in emerging economies	Literature review and statistical analysis	The study supports the notion that indigenous and foreign innovation efforts are complementary. The benefits of international technology diffusion can only be delivered with parallel indigenous innovation efforts. This also requires the presence of modern institutional and governance structures and supporting innovation systems.
Khanna, T., Palepu, K.G. and Sinha, J. (2005) 'Strategies that fit emerging markets', <i>Harvard Business Review</i> , vol. 83, no. 6, pp. 63–74.	Adapting to the different business environments and institutional contexts when doing business in emerging markets	Review article	Multinational companies depend on specialised intermediate firms and regulatory systems which are lacking in emerging markets. Successful businesses recognise institutional voids and work around them. Critical issues in different institutional contexts include political and social systems, openness to foreign investment and the quality of the product, labour and capital markets.
Hoskisson, R.E., Eden, L., Lau, C.M. and Wright, M. (2000) 'Strategy in emerging economies', <i>Academy of Management Journal</i> , vol. 43, no. 3, pp. 249–267.	Analyses different theoretical perspectives and their insights into firm strategies in the context of emerging markets	Literature review	Discusses institutional theory, transaction cost economics and the resource-based view in an emerging market context and points to methodological and empirical challenges as well as the need for emerging markets research.
Jormanainen, I. and Koveshnikov, P.C. A. (2012) 'International activities of emerging market firms', <i>Management International Review</i> , vol. 52, no. 5, pp. 691–725.	Analyses conventional theories on micro and macro levels and how sufficient they are in explaining the internationalisation of emerging market firms	Literature review	Research on the internationalisation of emerging market firms can be improved with a broader range of methodologies such as longitudinal and mixed-methods studies. The geographic focus of studies also needs to be widened. Current research is biased towards China.

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<p>Kumar, V., Mudambi, R. and Gray, S. (2013) 'Internationalization, innovation and institutions: The 3 I's underpinning the competitiveness of emerging market firms', <i>Journal of International Management</i>, vol. 19, no. 3, pp. 203–206.</p>	<p>Discusses three main themes concerning firm competitiveness in emerging markets: innovation, internationalisation and institutions</p>	<p>Literature review</p>	<p>Innovation, internationalisation and institutions are very much interconnected and are the key issues in building competitiveness among emerging market firms.</p>
<p>Luo, Y. and Tung, R.L. (2007) 'International expansion of emerging market enterprises: A springboard perspective', <i>Journal of International Business Studies</i>, vol. 38, no. 4, pp. 481–498.</p>	<p>Expansion of emerging market MNEs</p>	<p>Conceptual</p>	<p>By expanding, emerging market firms are able to acquire strategic resources and reduce their institutional and market constraints. The acquisition of critical assets from mature MNEs compensates their competitive weaknesses and helps them overcome their latecomer disadvantages.</p>
<p>Peng, M.W., Wang, D.Y. and Jiang, Y. (2008) 'An institution-based view of international business strategy: A focus on emerging economies', <i>Journal of International Business Studies</i>, vol. 39, no. 5, pp. 920–936.</p>	<p>Drivers of firm strategy and performance in international business</p>	<p>Conceptual</p>	<p>The paper argues that an institution-based view of international business strategy has emerged alongside the industry- and resource-based views. Strategic choices are driven by industry conditions, and firm resources and capabilities, but also constrains the institutional framework.</p>
<p>Pietrobelli, C. and Rabellotti, R. (2011) 'Global value chains meet innovation systems: Are there learning opportunities for developing countries?' <i>World Development</i>, vol. 39, no. 7, pp. 1261–1269.</p>	<p>The role of global value chains in accessing knowledge and enhancing learning and innovation</p>	<p>Conceptual</p>	<p>Global value chains and inter-firm cooperation are important for firms in developing countries. The characteristics and governance of value chains have an impact on learning and innovation. A well-structured and efficient innovation system helps to reduce the complexity of transactions and risks. Global value chains and their governance are dynamic and continuously changing.</p>
<p>Wright, M., Filatotchev, I., Hoskisson, R.E. and Peng, M.W. (2005) 'Strategy research in emerging economies: Challenging the conventional wisdom*', <i>Journal of Management Studies</i>, vol. 42, no. 1, pp. 1–33.</p>	<p>Future of strategy research in emerging markets</p>	<p>Conceptual</p>	<p>Institutional theory is the most prominent in emerging markets research, but it should be combined with other dominant perspectives such as transaction cost theory, resource-based theory and agency theory. Current research has focused mainly on firms from developed economies entering emerging economies and domestic firms competing within emerging economies; however, future studies should focus more on firms from emerging economies entering other</p>

<p>Xu, D. and Meyer, K.E. (2013) 'Linking theory and context: "Strategy research in emerging economies" after Wright et al. (2005)', <i>Journal of Management Studies</i>, vol. 50, no. 7, pp. 1322–1346.</p>	<p>Future emerging markets research and new theoretical perspectives</p>	<p>Literature review</p>	<p>emerging economies and those from emerging economies entering developed economies.</p>
			<p>Emerging economy contexts challenge some of the assumptions of theories originally developed for relatively stable and efficient markets. In emerging markets research, institutional theory is still the most commonly utilised theoretical viewpoint; however, new theoretical concepts have emerged, focusing on learning, relationships, real options and spill-over.</p>

The theoretical discussion regarding research in emerging markets highlights an understanding of the institutional and business environment in which domestic and foreign firms have to adapt. Emerging economy contexts challenge some of the theoretical assumptions originally developed for relatively stable and efficient markets. In emerging markets research, institutional theory is still the most common theoretical viewpoint alongside transaction cost economics and the industry- and resource-based views; however, new theoretical concepts have emerged, and the most prominent theories are also incorporating other dominant theoretical perspectives. Strategic choices in emerging market firms are driven by industry conditions, as well as firm resources and capabilities, but are also constrained by the institutional framework (Hoskisson et al., 2000; Khanna et al., 2005; Peng et al., 2008; Xu and Meyer, 2013; Wright et al., 2005). Current research is also notably geographically uneven, with much of the current research focusing on China while other emerging markets have received less attention and remain under-studied. Future studies should also focus more on firms from emerging economies entering other emerging economies as well as firms from emerging economies entering developed economies (Jormanainen and Koveshnikov, 2012; Wright et al., 2005).

The recent literature has also alluded to many important factors and actions, especially when discussing emerging market firms and their development. Technological change, innovation, internationalisation and institutions are very much interconnected and are the key issues in industrialisation, increased productivity, competitiveness building and catching up of firms located in developing countries (Fu et al., 2011; Kumar et al., 2013). Involvement in global value chains and inter-firm cooperation has been observed as important for firms in developing countries. Value chains have a major impact on learning and innovation within emerging market firms. The benefits of international technology diffusion can only be delivered with parallel indigenous innovation efforts. This also requires the presence of modern institutional and governance structures and supporting innovation systems. Indigenous innovation is important as a reinforcement. Local capability building and innovation are extremely important for the catching up of emerging market firms; here, the excessive use of foreign innovation can decrease internal R&D and capability building (Fu et al., 2011; Pietrobelli and Rabellotti, 2011). For emerging market firms, international expansion also facilitates the acquisition of strategic resources and reduces their institutional and market constraints at home. With aggressive strategies, firms may be able to overcome their latecomer disadvantage by acquiring critical assets from mature MNEs to compensate for their competitive weaknesses (Luo and Tung 2007).

Table 3 presents empirical papers regarding evidence of the current situation and developments in emerging market firms, especially, regarding technology management strategies and issues which create the gap or support in decreasing the gap in competitiveness. These papers support the above mentioned literature and research which have highlighted the critical issues in business in emerging markets.

Table 3. Selected empirical studies on emerging markets research

Publication	Topic and focus	Data and context	Results
Dyker, D.A. (2001) 'Technology exchange and the foreign business sector in Russia', <i>Research Policy</i> , vol. 30, no. 5, pp. 851–868.	Technology exchange and collaboration of Russian firms	Secondary data and case studies	There is a strong basis to develop R&D collaboration and technology transfer between firms in Russia and those in advanced economies. Russian firms benefit from collaborations that are still challenged by the Russian business environment.
Filatovchev, I., Liu, X., Buck, T. and Wright, M. (2009) 'The export orientation and export performance of high-technology SMEs in emerging markets: The effects of knowledge transfer by returnee entrepreneurs', <i>Journal of International Business Studies</i> , vol. 40, no. 6, pp. 1005–1021.	Export performance of high-technology small and medium enterprises (SMEs) in an emerging economy	Survey of 711 SMEs in China	A firm's export orientation and performance in emerging market SMEs depend not only on the development of capabilities through R&D and technology transfer but also on entrepreneurial issues, such as the founder's international experience which supports knowledge transfer, internationalisation and joining global networks.
Guan, J.C., Mok, C.K., Yam, R.C., Chin, K.S. and Pun, K.F. (2006) 'Technology transfer and innovation performance: Evidence from Chinese firms', <i>Technological Forecasting and Social Change</i> , vol. 73, no. 6, pp. 666–678.	Studies the relationship between technology transfer and innovation performance	Nationwide survey covering 2,334 Chinese industrial firms	Capability building and management are essential in technology transfer. Technology transfer has both positive and negative impacts and involves high risk. Technology transfer generally improve firm innovation performance but not in the case of high-technology firms.
Liu, X. and Buck, T. (2007) 'Innovation performance and channels for international technology spillovers: Evidence from Chinese high-tech industries',	Innovation performance and technology spillovers in Chinese high-tech industries	Panel data from 21 sub-sectors of high-tech industry in	Foreign R&D activities by MNEs in host countries significantly affect the innovation performance of domestic firms. Indigenous innovation is also required to take advantage of international technology spillovers.

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<p><i>Research Policy</i>, vol. 36, no. 3, pp. 355–366.</p>		<p>China from 1997 to 2002</p>	
<p>London, T. and Hart, S.L. (2004) 'Reinventing strategies for emerging markets: beyond the transnational model', <i>Journal of International Business Studies</i>, vol. 35, no. 5, pp. 350–370.</p>	<p>MNEs aiming to enter emerging markets have to be able to adapt and develop new business strategies</p>	<p>An exploratory analysis based on interviews, case studies, and archival material</p>	<p>Strategies that exploit the strengths of the existing market environment outperform those that focus on overcoming weaknesses. These strategies include developing relationships with non-traditional partners, co-inventing custom solutions and building local capacity. MNCs need to develop global capability in social embeddedness.</p>
<p>Wu, J. and Pangarkar, N. (2006) 'Rising to the global challenge: Strategies for firms in emerging markets', <i>Long Range Planning</i>, vol. 39, no. 3, pp. 295–313.</p>	<p>How local firms in emerging markets can counter the threat posed by the entry of multinational corporations</p>	<p>Primary and secondary data about 155 listed Chinese firms</p>	<p>Firms following internationally-oriented strategies targeting either near-by or global markets outperform others. Large size helps the performance of most strategy types.</p>
<p>Yiu, D.W., Lau, C. and Bruton, G.D. (2007) 'International venturing by emerging economy firms: the effects of firm capabilities, home country networks, and corporate entrepreneurship', <i>Journal of International Business Studies</i>, vol. 38, no. 4, pp. 519–540.</p>	<p>Outward FDIs by emerging market firms</p>	<p>Two questionnaire surveys from 2003 and 2014, including 565 companies in China</p>	<p>Home country network ties facilitate emerging market firms in pursuing international expansion. Firms' technological capabilities and R&D intensity depend on domestic industry competition, which leads to internationalisation. Corporate entrepreneurship also mediates the abovementioned factors, thus facilitating internationalisation.</p>

Empirical studies have also shown that emerging market firms following internationally-oriented strategies that target either near-by or global markets seem to perform better than domestically-oriented competitors. Large size typically helps companies to adapt to new strategies (Wu and Pangarkar, 2006). Research shows that innovation activities, venturing and strategic renewal are critical for emerging market firms aiming to expand operations and become competitive (Yiu et al., 2007). The development of capabilities through R&D, technology transfer and the institutional environment are found to drive the internationalisation of companies in emerging markets. FDI and trade are important for firms to expand their operations and be part of global networks; moreover, knowledge transfer and the mobility of people are important factors in the future development of firms (Filatotchev et al., 2009).

Empirical studies also show that technology transfer contributes to the innovation performance and competitiveness of firms as well as the economic development of a country. In emerging market firms, technology transfer requires possession of absorptive and transformative capabilities to succeed. Evidence from Chinese firms shows that technology transfer involves high risk and does not necessarily improve the performance of high-technology firms (Guan et al., 2006). Russian firms continue to be challenged by the domestic business environment but are benefiting from technology transfer and collaboration with firms located in developed markets (Dyker, 2001). MNEs and their innovation spillovers in emerging markets have a significant impact on the innovation performance of domestic firms. However, indigenous innovation efforts and absorptive capacity are needed to fully exploit the benefits (Liu and Buck, 2007). Firms operating in and aiming for emerging markets have to be ready with new strategies that build on the strengths of the market environment. There is also a need for them to develop relationships with non-traditional partners (London and Hart, 2004).

According to the recent literature, there is room for further research on firms in emerging markets, especially in the Russian context. Previous studies on emerging markets highlight an understanding that the institutional and business environments have a major impact on firm development and competitiveness. The literature also suggests that innovation and modern technology management strategies are one of the most critical tools for firms aiming to catch up and become more competitive.

2.2 Building competitive advantage within the firm

2.2.1 Resource-based view

According to the resource-based view (RBV), firms' internal resources and capabilities are the basis of their competitive advantage and performance (Penrose, 1959; Wernerfelt, 1984; Barney 1991, 1997; Grant, 2002; Peteraf, 1993). The RBV complements the previously presented MBV by looking inside the firm and focusing on internal resources and capabilities as the competitive force and foundation for competitive advantage.

The RBV is based on the idea that a firm has resources that are valuable, rare, imperfectly imitable and non-substitutable. These non-tradable and imperfectly mobile resources are the key in protecting the firm's sustained competitive advantage (Barney, 1991; 1997). Barney (1991) suggests that a firm's strategically relevant resources can include physical capital resources (technology, plants, equipment, location and access to raw materials), human capital resources (training, experience, judgement, intelligence, relationships and individual insights) and organisational capital resources (reporting structures, planning, controlling and coordinating systems and informal relations inside the firm and with the outside environment).

According to Grant (1991), the RBV can be applied to a firm's strategy analysis by first identifying the resources that the firm has relative to its competitors and, second, identifying the company's capabilities. According to the RBV, the role of the firm's internal capabilities and competences is essential in gaining competitive advantages in changing markets (Prahalad and Hamel, 1990). The landscape and business environment in which firms operate change over time, and firms need to react and alter their strategies. They also need new resources and to develop and acquire new capabilities. Capabilities cannot easily be transferred or assembled through markets; they must be built inside the company (Teece and Pisano, 1994; Kogut and Zander, 1992; Teece et al., 1997; Winter, 2003; Eisenhardt and Martin, 2000). Here, the RBV literature discusses the concept of dynamic capabilities, which Eisenhardt and Martin (2000: 1107) define as: 'The firm's processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match and even create market change. Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die'. In the literature, dynamic capabilities has its roots in Schumpeter's (1934) *Theory of Economic Development* (Teece and Pisano, 1994).

Responsiveness, rapid and flexible product innovation and management's capability to coordinate internal and external competences are critical factors for firm success. Besides capabilities and competences, other essential factors are a firm's processes and current position in relation to technology endowment, intellectual property as well as its customer base and relations with suppliers. The firm's position and future strategic paths are shaped by the paths it currently pursues. This path dependency affects the strategic choices between the different alternatives and opportunities available for the firm, particularly in relation to technological opportunities (Teece and Pisano, 1994).

The management literature also recognises knowledge-based theory building in the RBV (Grant, 1991; Kogut and Zander, 1992; Spender, 1996). This approach can be seen as complementing but also critiquing the RBV. For example, Conner and Prahalad (1996) highlight the role of the knowledge-based view as the essence of RBV, recognising knowledge as a firm's most critical resource. Knowledge can be information or know-how and can appear in different forms and at different levels (individual, group, organisational and network) (Kogut and Zander, 1992; Conner and Prahalad, 1996).

The RBV has been recognised as one of the most widely utilised theories in the case of emerging markets research where competition and the institutional context create differences in firm strategies and innovation compared to developed economies (Hoskisson et al., 2000; Peng, 2001).

2.2.2 The relational view

The relational view offers a complementary approach to the RBV and was developed on the backdrop of the RBV. Here, a firm's access to external as well as internal resources represents the source of its competitive advantages (Dyer and Singh, 1998). The MBV and RBV regard firms as autonomous entities that gain their competitive advantage from either external industry sources (e.g. Porter, 1980) or from internal resources and capabilities (e.g. Barney, 1991). However, the world has changed, and firms are increasingly embedded in networks and horizontal and vertical relationships with other organisational actors across industries and nations (Gulati et al., 2000).

The relational view discusses the competitive advantage of firms or the dyad/network of firms where the advantages or disadvantages of an individual firm are often connected to those of the network of relationships in which the firm is involved. The relational view explains that to understand the competitive advantage of firms, we need to increasingly take the relationships between firms into account. The essential resources of firms can extend beyond firm boundaries. Inter-organisational relationships allow companies to access and gain, for example, new relation-specific assets, shared knowledge, complementary resources and capabilities and effective governance (Dyer and Singh, 1998).

The relational approach extends the RBV and discusses the competitive advantage gained through the alliances and networks of interconnected firms when resources are pooled (Lavie, 2006; Das and Teng, 2000). Besides technological or resource-based competitive advantages, a company's ability to develop and manage its networks and relationships has been recognised as an important source of its competitiveness and performance (Das and Teng, 2000). Firms with viable network structures are able to efficiently exploit their internal capabilities to improve their performance. Network contacts alone do not necessarily improve performance without developed network-enabled capabilities. Firms can also complement their structure by using networks (Zaheer and Bell, 2005). The central network position and the ability to exploit external knowledge are the most decisive factors affecting the firm's innovation and performance (Tsai, 2001). Stuart (2000) also highlights that large companies with leading technological resources are the most valuable partners in alliances. In particular, young and small firms benefit in many ways by partnering with large and innovative partners (Stuart, 2000). Lavie (2006) suggests that the nature of the relationships may be more important than the nature of the resources in the networked environments.

Firms' embeddedness in networks gives them access to external network resources which offer them strategic opportunities, thereby affecting their decisions and performance.

Prior alliance experience affects firms' decision to enter into new alliances (Gulati, 1999). Gulati (1998: 293) defines strategic inter-firm alliances as 'voluntary arrangements between firms involving exchange, sharing, or co-development of products, technologies, or services'. Alliances can be formed through different organisational forms. These inter-firm ties form networks which lead to new opportunities that may also constrain and lead to unproductive relationships or prevent partnering with other firms (Gulati et al., 2000).

The application of open management strategies in firm operations has been one of the most prominent current research areas in innovation management (Gassmann, 2006). Many of the current research topics, such as the open innovation approach, rely on the foundation laid by the relational view. The ownership of resources and different assets has become less critical for companies as business models have become more open. The utilisation of these strategies is essential, especially in the case of emerging markets when companies need to catch up with competitiveness.

2.2.3 Technology transfer and inter-firm cooperation

Successful companies know their technology portfolio well and understand how their technologies relate to the requirements of others. Technologies are often the basis of companies' existence although, in themselves, they have no value until they are commercialised or transmitted over a process of interaction between companies. Many companies, especially large firms, even have surplus technologies as a result of internal R&D that they neither utilise internally nor commercialise (Turnbull et al., 1996). Open approaches to innovation and new product development have engendered new realities, which have gained attention in the recent strategic management literature and among practitioners. Knowledge does not have to be created or exploited within the firm, and it is not linked to where innovation is created. Firms should seek new ways to commercialise ideas developed in-house as well as ideas that can be created outside the firm. These realities have led to three core process archetypes that companies follow in their technology strategies: the outside-in process where external sources are exploited to improve a firm's innovation performance, the inside-out process where a firm's ideas are exploited and commercialised externally and the coupled process where firm combine these and work in networks complementing their resources and knowledge base (Gassmann and Enkel, 2004).

Increased interest and demand in external sources of technology are mainly driven by increased global competition, which in turn forces companies into shorter development cycles. Another driving force is the increasing pressure on operating margins and profits. Companies are also interested in further networking and collaborating to share the risk in business and product development. There are also many success stories in innovation that lend support to this phenomenon. On the supply side, the drivers include increased levels of scientific and engineering knowledge that create new sources of knowledge and innovation. Increased levels of available venture capital are also driving many technology-based start-ups. There is also an increasing pool of capable and experienced people available for new companies (Chatterji, 1996).

Technology transfer is closely connected to the RBV (e.g. (Wernerfelt, 1984; Barney 1991) and the KBV (e.g. Grant, 1996; Kogut and Zander, 1992; Spender, 1996). It focuses on resources and knowledge as a firm's most critical resources and sources of competitiveness. Knowledge and technologies can be transferred between companies, but in many cases, they appear in many different forms. Technology transactions might involve very detailed contracts or form different technological alliances. Technology and technology-related knowledge can be more tangible (e.g. in the form of licenses or embodied in existing products) or intangible intellectual property (e.g. design, knowhow). It is also difficult to define the distinction between physical products and technology in relation to technical knowledge. In the case of technology, Radošević (1999) highlights the clear distinction between technology as information and technology as knowledge. In this case, knowledge is regarded as a firm-specific asset rooted in the specific organisational context and is more difficult to transfer than information and techniques that can be easily accessed and transferred to other firms. This process also requires already developed internal capabilities for companies to be able to transfer and successfully apply external technologies for their own use (Cohen and Levinthal, 1990; Zahra and George, 2002). Firms have to develop internal processes to identify and manage external technologies and the outcomes of internal R&D. Inter-organisational technology transfer offers companies a way to acquire new technologies without heavy R&D investments. By commercialising developed technologies, firms can gain additional financial benefits and revenues from their R&D outcomes and technologies from which they do not otherwise profit (Amesse and Cohendet, 2001).

Knowledge and technology transfer traditionally deal with the dyadic relationship and exchange of technology between the technology developer and recipient. However, studies have shown that the focus should move from dyadic stakeholder research to studying multiple stakeholders, business networks and wider business structures (Rowley, 1997; Turnbull et al., 1996; Ritter and Gemünden, 2003). It can also be noted that the open innovation concept is widely used in current research on the area. However, Trott and Hartmann (2009) note that this concept overlooks research on technology transfer and absorptive capacity by focusing, e.g. on the accessibility of outside technologies and neglecting research on R&D and capabilities that allow the exploitation of external technologies. This thesis discusses both inbound and outbound technology transfer, which also relate closely to inter-firm cooperation. These topics are discussed in greater detail below.

Technology acquisition

The successful innovation process has its foundation in the internal capabilities of the organisation. This enables firms to diversify their innovation activities and search for external innovations. To succeed, firms also have to be able to integrate and exploit the acquired external knowledge (Cassiman and Veugelers, 2000; Chesbrough, 2003). At the organisational level, internal R&D contributes to the development of absorptive capacity, which is a prerequisite for supporting the assimilation of external knowledge (Cohen and Levinthal, 1990). R&D cooperation and contracted R&D are also proven to have positive

effects on the internal R&D of firms if they have an R&D department which guarantees the level of absorptive capacity (Veugelers, 1997).

Cassiman and Veugelers (2006) highlight that internal R&D and ETA are complements rather than supplements and that innovating firms perform better when they combine internal R&D and technology acquisition activities. They further maintain that the degree of complementarity is dependent on the firm's strategic environment. Studies have shown that the technological knowledge and technologies acquired increase companies' economic performance and innovation outputs (Granstrand et al., 1992; Pavitt, 1990; Cohen and Levinthal, 1989; Chatterji, 1996; Lambe and Spekman, 1997).

Today, one of the most important issues in a firm's innovation management is the ability to integrate external knowledge into the innovation process. Firms often face the situation whereby they have to evaluate whether to produce or purchase what they need (Williamson, 1999). Technology acquisition, also referred as the buy decision, has become one of the most essential choices in firms' technology strategies. Technology can be embodied in acquired assets such as personnel, other firms or equipment. It can also be disembodied through licensing or by outsourcing the technology development. Better legal protection, in general, favours disembodied technology transactions while strategic protection favours more embodied transactions. This affects the strategy, the mode of how technologies are acquired and the buy decision (Cassiman and Veugelers, 2000). External sourcing can lead to more specialised knowledge, lower costs and time savings in new product development. However, it can create considerable transaction costs in searching, negotiating and executing and reinforcing contracts (Veugelers and Cassiman, 1999).

There are many organisational modes for acquiring technologies and knowledge. Different modes allow different levels of cooperation and organisational interdependence. This also varies between different forms of targeted technologies and knowledge. Firms can have modest organisational interdependence through one-directional technology flows, e.g. licensing and sourcing. Interdependence increases when companies co-create technologies through contractual modes. Even higher levels of interdependence often require joint R&D agreements, cross-licensing or mutual second-sourcing of technologies. The highest levels of interdependence emanate from direct investments (minority or majority shares) in other companies or in the creation of joint ventures and research corporations. Different organisational forms have their benefits and challenges; they also affect and depend on firms' strategies for the companies involved (Hagedoorn, 1990; Chatterji, 1996).

Technology commercialisation and markets for technology

All technology transactions between companies have increased; however, outward technology transfer has proven to be more challenging for companies. Companies also have strategic reasons not to commercialise. They are fearful of creating competitors and cannibalising markets, or they perceive that costs are higher than returns. The transfer and

commercialisation of technology have proven to be much more complex than the commercialisation of products (Arora et al., 2001).

Successful external technology commercialisation can offer companies additional revenues from technologies from which they do not otherwise profit. As in technology acquisition, companies also have to be able to identify the opportunities for external knowledge exploitation. The firm's ability to externally exploit knowledge can be called *desorptive capacity* (Lichtenthaler and Lichtenthaler, 2009).

For functional inter-organisational technology transfer, both commercialisation and acquisition are crucial in enabling real market supply and demand. Technology markets have made knowledge and technology more accessible, and different technology transactions play a central role in fostering innovation. Without the opportunity to benefit from trading in developed technologies, many firms would not innovate or invest in R&D and create new technologies (Arora et al., 2001). Functioning markets for technology and networks are essential for supporting technology transfer. However, this is challenged, especially in emerging markets, by the institutional environment and difficult IP protection frameworks. Market intermediaries and public intervention play a major role and can support companies in ultimately transferring their technologies (Howells, 2006). External intermediaries are a complement rather than a substitute for firms' internal activities. Internal capabilities and competences play the most critical role in the technology exchange (Arora et al., 2001).

Inter-firm cooperation and networks

Increased inter-firm cooperation and involvement in business networks have become necessary for companies and their competitiveness. Networks enable companies to learn and access new knowledge, technologies and resources. Networks can span across borders, connecting different firms, industries and markets. Central network position and absorptive capacity play an essential role in improving firms' innovation results and performance (Tsai, 2001). Companies' involvement in networks and their network position are also important for their internationalisation (Johanson and Mattsson, 1988). Network advantages are also linked to network partners' resource profiles. Large and innovative high-technology firms, in particular, are usually the most valuable associates in networks (Stuart, 2000).

Different institutional environments in emerging markets affect the behaviour of firms and their partner selection (Hitt et al., 2004). Domestic networks in emerging markets may lack global competitiveness; thus, strategic alliances, cooperation and partner selection have become increasingly important for emerging market firms. The extant literature suggests that a partner's characteristics, as well as its access to resources and organisational learning opportunities, affect partner selection, which in turn helps firms build their capabilities (Hitt et al., 2000). A firm's competitiveness is affected by various factors, particularly its home country network connections and internal capabilities (Yiu et al., 2007). Networking and vertical and horizontal cooperation have positive effects on

a firm's performance (Alvarez et al., 2009; Lechner and Dowling, 2003). A suitable network structure and the firm's capabilities enhance its performance (Zaheer and Bell, 2005). Network connections and involvement are critical for learning and building the firm's capabilities. The extent of cooperation and a firm's network position in domestic and international networks affect its performance, capabilities and future development. Building the firm's capabilities is vital and, to some extent, represents a prerequisite for accessing competitive international networks (Lee et al., 2001; Zaheer and Bell, 2005; Zahra and George, 2002).

Companies use a variety of organisational forms to cooperate and transfer knowledge and technology. Different modes are dependent on the industry, the technology and the level of a country's development. FDI and licensing are commonly used, but there are also more networked organisational forms, such as subcontracting and alliances, whereby technology is embedded in inter-firm relationships. Successful technology transfer results in combining appropriate modes and channels (Radosevic, 1999). Different organisational arrangements have different requirements that impact performance and inter-firm relationships (Hagedoorn, 1990).

Companies should be able to gain access to knowledge and retain it from inter-firm relationships and within their network. Their ability to retain knowledge outside their organisational boundaries can be called *connective capacity*. This is also affected by prior knowledge gained through relationships and cooperation (Lichtenthaler and Lichtenthaler, 2009).

2.3 Synthesis and conceptual framework

The competitive advantage of manufacturing firms in emerging markets is largely affected by the business and institutional environments, which are difficult to control, and the internal capabilities and resource base of the firm, which can be expanded by reaching outside the firm's boundaries. This thesis is based largely on the theme of competitiveness and the building of competitive advantage in emerging market firms. The research topic is analysed through the MBV, the RBV and the relational view. These theories are applied and discussed in an emerging market context whereby market competition, industry structures and the business and institutional environments create a challenging setting where the rules of Western management studies do not necessarily apply. These theoretical foundations are illustrated in figure 4.

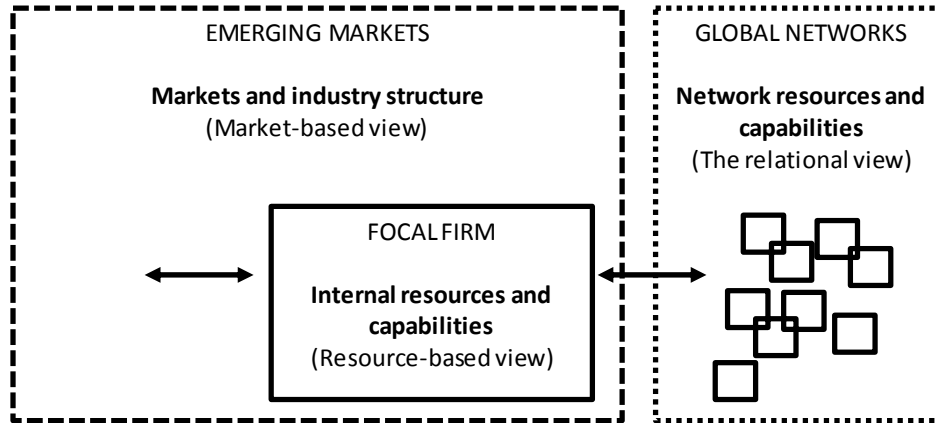


Figure 4. Theoretical foundation of the thesis

The MBV and RBV approaches have been widely recognised and are largely established in the academic literature. They also form the theoretical basis of the thesis. These selected theoretical approaches are often presented as oppositional in evaluations of the firm's competitive advantages; however, they also complement each other in many ways, especially when studying firms in rapidly changing environments such as in emerging markets. The relational view further develops the ideas of RBV by expanding the concept to discuss the benefits of networked firms and their combined resources and capabilities. Through networked business models and open approaches to product development, firms can improve their performance and gain new competitive advantages.

The management literature has discussed the benefits of implementing open management strategies for new product development (e.g. Cassiman and Veuglelers, 2006; Tsai, 2001; 2009; Stuart, 2000). Firms can be very agile in acquiring and incorporating external technologies to support their NPD process or in commercialising their own technologies. However, this is still a new strategy for the majority of companies in many emerging economies. Openness of technology and innovation management differ between industries and firms. Many industries still have a relatively closed approach to innovation, mainly due the nature of their products or the constraints set by the challenging business environment. The driving forces in open approaches can be, for example, globalisation, technology intensity, technology fusion, new business models and knowledge leveraging (Gassmann, 2006). Technology intensive industries face increasingly strong market competition, and their attempts to become more competitive require the development of internal capabilities through investments in R&D and innovation. Through this, they can have the capacity to acquire and commercialise technologies and be more involved with other companies (Amesse and Cohendet, 2001). Technology acquisition is one of the most effective methods to complement a firm's own R&D output and NPD process (Cassiman and Veuglelers, 2006). Companies have to be able to also commercialise their R&D and innovation outcomes on the markets. Otherwise, they would not be able to capture the value created in internal development and innovation processes (Chesbrough,

2003; Zahra and Nielsen, 2002). Figure 5 describes the conceptual framework and the most essential themes of this study.

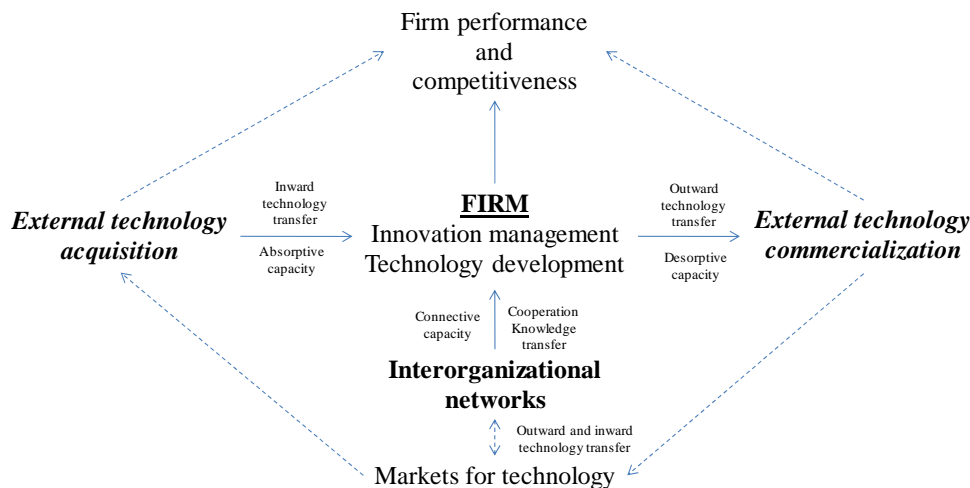


Figure 5. Conceptual framework (publication 2)

Approaches to product development and technology and innovation management have evolved and developed rapidly. Successful innovation outcomes require firms to be able to handle and apply a spectrum of technology management strategies (Trott and Hartmann, 2009). Today's technology development is rapid, is characterised by rising costs, and firms ought to tap into external technologies and inter-organisational networks that enable them to improve their innovation and new product development performance. Instead of heavy internal R&D and closed product development, firms are forced to become more open in their strategies. Some of the most important motivations for companies are shorter innovation cycles, rising costs of industrial research and development and lack of available resources (Gassmann and Enkel, 2004).

Open business models and management strategies, networking and technology and knowledge transfer are customary activities for many companies today and are proven to improve competitiveness (Chesbrough, 2003; Tsai, 2001; Stuart, 2000). However, this is not necessarily the case for firms in emerging markets (Fu et al., 2011). Figure 6 describes the rationale behind the research conducted for this thesis.

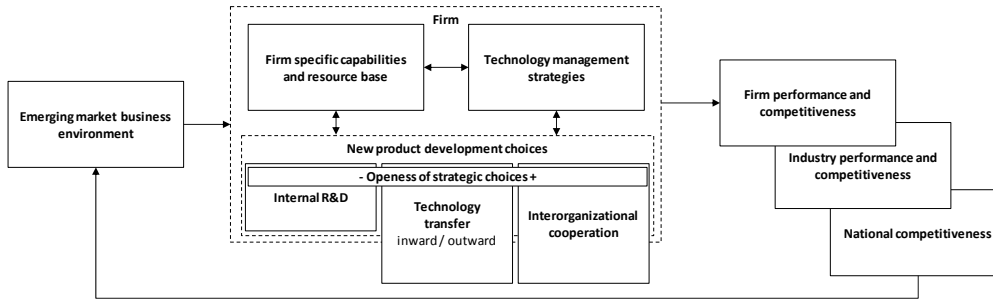


Figure 6. Rationale for technology transfer and open technology management strategies

The mechanism how the emerging market companies can catch up in competitiveness is based on the literature and previous research presented in this section of this dissertation. The historical economic structures and special characteristics of business environment create constraints for companies in rapidly developing and changing emerging markets which is also evident in the case of Russia (Desai and Goldberg, 2007; EBRD, 2012). These factors and constraints have negative impact on firm operation and competitiveness in emerging markets (e.g. Hoskisson et al., 2000; Peng, et al., 2009). However, firms can overcome these constraints by developing their capabilities through internal R&D investments and expanding their technology and resource base by exploiting external sources and cooperation (e.g. Dyer and Singh, 1998; Lavie, 2006; Chesbrough, 2003; Fu, et al., 2011). These strategic choices have positive impact on innovation and firm performance on firm level which ultimately affect industry and national development and competitiveness.

This study was formulated to first identify current developments in the competitiveness of the Russian manufacturing industry; second, to identify the best tools and methods to improve firm competitiveness in emerging markets; third, to study the inward and outward technology transfer operations in innovative Russian manufacturing firms and, fourth, to study technology management strategies in connection with home nation competitiveness. Altogether, these studies will answer the research questions and contribute to the current research.

3 Research design and methodology

3.1 Research approach and strategy

This section details the research approach and strategy. It describes the data used in the publications, the methods of analysis used and the main limitations of the studies. It also describes the ontological and epistemological basis of the research and presents the chosen research methodologies.

The epistemological orientation refers to what is, or should be, considered as acceptable knowledge. This thesis follows the doctrine of positivism in which phenomena confirmed by science can be recognised as knowledge. In this approach, the purpose of theory is to generate hypotheses that can be tested, offering explanations of laws to be assessed, through which knowledge is created. This standpoint also highlights that science must be conducted objectively and that the distinction should be made between scientific and normative statements (Saunders et al., 2011; Bryman and Bell, 2005). Regarding its ontological orientation, the thesis follows the position of objectivism, which stresses that social phenomena and their meanings have existence independent of social actors. The ontological orientation considers whether social entities can and should be considered objective entities or whether they should be considered social constructions emanating from the perceptions and actions of social actors (Saunders et al., 2011; Bryman and Bell, 2005).

This research employs a quantitative research strategy. This approach emphasises quantification in the data collection and analysis (Bryman and Bell, 2005) and follows a deductive approach and reasoning by testing current theories. When using quantitative research methods and data, reliability and validity are important in relation to the evaluation of the measurements of different concepts. Reliability requires measurement stability over time, internal reliability of indicators and their interconnections and inter-observer consistency in the recording of observations when more than one observer is involved. Validity refers to the issue of whether or not different indicators actually measure the central concept. There are different types of validity which assess the validity of a measure or a concept: face validity, concurrent validity, predictive validity, construct validity and convergent validity. Quantitative research is also concerned with other preoccupations involving measurement, causality, generalisation and replication (Bryman and Bell, 2005). The data analysis in this thesis has taken these issues and preoccupations into account and follows the guidelines and recommendations for conducting innovation surveys by the *Frascati Manual* and the *Oslo Manual* (OECD, 2015; OECD/Eurostat, 2005).

Secondary data sources are often used to overcome the challenges of data collection in emerging markets (Hoskisson et al., 2000; Meyer and Peng, 2005; Wright et al., 2005). Secondary data gathered by international organisations and domestic institutions have been important for this thesis' search for holistic answers to the research questions. The

data was used in the publications of the thesis to illustrate the developments and current state of firms and markets. While the data allowed access to a large and reliable data sample, secondary data does not always fit optimally with research topics, which may create challenges. Thus, the publications in this thesis also use primary data collected from Russian manufacturing companies. This primary data focused on the innovativeness of manufacturing firms in Russia and thus fit the research questions of the thesis. This unique data allowed access to and an investigation of this research topic on the firm level and to answer the research questions leading to the contribution of this thesis.

Publication 1 uses secondary statistical data to illustrate the development and current state of Russian manufacturing industry competitiveness. Publication 2 is conceptual in nature and reviews the relevant literature by linking the different topics studied in the thesis (i.e. firm competitiveness and technology management strategies). Publication 3 applies primary survey data and focuses on technology acquisitions in Russian manufacturing firms. Publication 4 discusses external technology commercialisation and technology markets in the Russian manufacturing industry and uses mixed-methods research by combining descriptive quantitative analysis based on the primary data and the case study. The case study is used to support the data analysis and further illustrate the research topic. Publication 5 uses a large secondary dataset and describes the application of different technology management strategies in firms located in countries of varying competitiveness levels. Table 4 shows the research design in the publications included in the thesis.

Table 4. Research design in publications

Publication	Research topic	Analysis methods and	Data source
Publication 1: Review of the competitiveness of Russian manufacturing industry	National level analysis of the development of the competitiveness of Russian manufacturing industry	Descriptive quantitative analysis	Secondary data from WIIW (data from years 2000–2008) and other secondary data sources
Publication 2: Building competitiveness of emerging market firms: The role of interfirm technology transfer	Conceptual paper on inter-firm technology transfer and its effects on firm performance and competitiveness	Literature review and conceptual development	Conceptual
Publication 3: External technology acquisition in Russian firms	Analysis of the exploitation of external technology acquisition and its benefits to the Russian manufacturing industry	Descriptive quantitative analysis <i>ANOVA</i> <i>Cross-tabulation</i>	Primary survey data of 206 Russian manufacturing firms

Publication 4: External technology commercialisation and markets for technology in Russian manufacturing industry	Analysis of exploitation of external technology commercialisation and viability of markets for technology in Russian manufacturing industry	Descriptive quantitative analysis and case study	Primary survey data of 206 Russian manufacturing firms Case study
Publication 5: Technology management strategies in emerging markets	Comparison between manufacturing firms on the openness of technology management strategies between host economies at different levels of competitiveness	Descriptive quantitative analysis <i>Multinomial logistic regression</i> <i>Correlations</i> <i>ANOVA</i>	EBRD data on 6,267 manufacturing firms from 30 countries

3.2 Sampling and data

The publications in this thesis employed three different data sources. The research is mainly quantitative and is based on longitudinal statistical data (publication 1) and cross-sectional data gathered from structured interviews and questionnaire surveys (publications 3, 4 and 5). The data sources and survey data allowed us to cover the research topic from different levels and perspectives, thus resulting in comprehensive knowledge on the research topic as a whole and enabling us to answer the research questions. The SPSS software was employed to analyse the data (publications 3, 4 and 5). The fourth paper also includes one case-study method (Yin, 2003, Eisenhardt, 1989) based on the detailed survey data and public company information to further illustrate the topic. The indicators used to measure the issues are described more in detail in the separate publication.

The first paper utilised longitudinal statistical data (2000–2008) from The Vienna Institute for International Economic Studies (WIIW). This main data source (WIIW) relies on the Russian Federal State Statistics Service and Eurostat statistics. The publication uses production, unit labour cost, labour productivity and exports and imports as primary indicators to evaluate the development of competitiveness of the Russian manufacturing industry. This publication also uses other statistical sources to present the state and development of the Russian economy, such as the World Bank, the World Economic Forum (WEF), UNCTAD and Eurostat.

The main data source for the third and fourth papers was a university survey data of 206 innovative Russian manufacturing companies, offering a highly valuable data sample to examine the innovativeness of Russian manufacturing companies. This unique data was gathered in a joint project between Lappeenranta University of Technology and Saint Petersburg State University Graduate School of Management. The survey was conducted

between December 2009 and February 2010, before this dissertation project, in nine regions in Russia (Saint Petersburg, Nizhny Novgorod, Rostov-on-Don, Saratov, Samara, Perm, Yekaterinburg, Novosibirsk and Krasnoyarsk). It was organised through structured face-to-face interviews with top management company representatives. The initial sample was 1,000 companies, from which 206 interviews were granted. The companies were randomly selected by employing the SPARK Business Database, Russia's largest company database, managed and updated by Interfax. The questionnaire consisted of 110 questions (some questions included two or more sub-questions). The main topics in the questionnaire were about company strategy, innovations, cooperation of companies in innovation process, internationalization and exports, and product markets. The publications 3 and 4 exploit especially the parts related to innovation by focusing product innovations, technology search and acquisition, technology commercialization, and innovation costs and output. The questions generally related to the previous three years of business activity. The average age of the companies in the sample was 27 years, with the founding year varying from 1720 to 2009. The sample consisted mainly of large companies: more than 44% of firms had more than 500 employees. The industrial distribution was as follows: electronics and optics equipment (18.5%), metallurgy (17.5%), machine building (13.6%), IT and telecommunications (10.2%), chemical industry (10.2%), electronic equipment (7.3%), oil industry (5.3%), rubber and plastic industry (3.9%), aircraft (3.9%) and other industries (9.6%).

The questionnaire structure was developed according to the recommendations for conducting innovation surveys in the *Frascati Manual* and the *Oslo Manual* (OECD, 2015; OECD/Eurostat, 2005). To ensure the reliability of the survey, we used structured interviews in the same manner as the survey method. Structured interviews are considered one of the best methods to guarantee the reliability and validity of research data (Lindlof and Taylor, 2002). The sampling method was based on the stratified sampling approach to improve the representativeness of the sample. This is because of the large variation between the companies and regions included in the overall population. To obtain more homogenous subgroups, a number of criteria (strata) were applied based on the region (e.g. regional GDP), industry and annual revenue of the company. A comparable approach to data collection was applied, for example, by the World Bank and the European Bank for Reconstruction and Development (EBRD) when conducting the Business Environment and Enterprise Performance Survey (BEEPS) and the Management, Organisation and Innovation Survey (MOI). Data from the Saint Petersburg area were collected by the research team while, the data collection in the other eight regions was outsourced to a third party. All interviews were recorded and transcribed to ensure the reliability of the responses.

The data source for the fifth paper was the fifth round of the BEEPS conducted in 2011–2014 by the EBRD and the World Bank. The survey offers firm-level data on a representative sample of an economy's private sector. BEEPS is conducted using face-to-face interviews with business owners and top managers. Typically, 1200–1800 interviews are conducted in larger economies, 360 in medium-sized economies and 150 for smaller economies. This data made it possible to analyse the operations and enterprise

management of manufacturing companies with the use of a large sample. Altogether, the survey analysed 15,883 enterprises in 30 countries from Eastern Europe and Central Asia, including 4,220 enterprises in 37 regions in Russia. In this study, we employ data only from manufacturing companies. These data comprise of 6,267 manufacturing companies from 30 countries. The survey includes an innovation module – the focus of the fifth publication – covering product, process, organisational and marketing innovation as well as management practices in manufacturing enterprises with at least 20 employees (50 employees in Russia). The publication 5 focused especially on the share of companies using internal R&D, external technology acquisition, and cooperation in new product development to assess the level of technology management strategies.

BEEPS follows the World Bank's established Enterprise Surveys Global Methodology and uses stratified random sampling whereby all population units are homogeneously grouped and simple random samples are selected from each group. This method allows the computation of estimates for each of the strata, with a specified level of precision, while population figures can also be estimated by properly weighting individual observations. The sampling weights account for the varying probabilities of selection across different strata. Under certain conditions, the precision of estimates under stratified random sampling will be higher than under simple random sampling (lower standard errors may result from the estimation procedure). The strata for BEEPS are firm size, sector and geographic region within a country. Firm size levels are 5–19 (small), 20–99 (medium) and 100+ employees (large-sized firms). In most economies, the majority of firms are small and medium-sized, hence BEEPS over-samples large firms since larger firms tend to be engines of job creation. Sector breakdown is usually manufacturing, retail and other services. For larger economies, such as Russia, Ukraine and Turkey, specific manufacturing sub-sectors are selected as additional strata on the basis of employment, value-added and total number of establishment figures (EBRD, 2015).

3.3 Analysis and limitations

There are many challenges regarding the reliability, sampling, collection and gathering of data in emerging markets (Hoskisson et al., 2000; Meyer and Peng, 2005; Wright et al., 2005). To ensure the reliability and validity of the research, this study combined large secondary and primary data sources. The data sources followed the guidelines and recommendations for conducting innovation surveys by the *Frascati Manual* and the *Oslo Manual* (OECD, 2015; OECD/Eurostat, 2005).

The study used both primary and secondary data, and the analysis in the five publications employed various methods of analysis such as descriptive statistics, ANOVA, cross-tabulations, correlations, multinomial logistic regression and the case-study method. The data used was mainly cross-sectional. The secondary data sources allowed the use of one statistical longitudinal industry level dataset and one very large firm-level dataset, thus allowing a more general analysis of the research topic. One limitation concerns the data analysis of the studies, which while mainly quantitative, remained largely descriptive. In

the case of the primary data, the small number of companies conducting observed strategies made it challenging to apply statistically more advanced analysis methods, which would have been possible with larger representative samples. Descriptive data analysis was supported by one brief case study in publication 4 as a way of adding reliability to the study.

4 Summary of the publications

This section summarises the publications included in the thesis. The thesis consists of five publications on different aspects of the research topic. The research themes of the papers are based on the research questions presented in the first section. Together, these studies answer the main research question: How can manufacturing firms in emerging markets catch up with competitiveness? Figure 7 illustrates how the different papers contribute to the different themes discussed in the thesis.

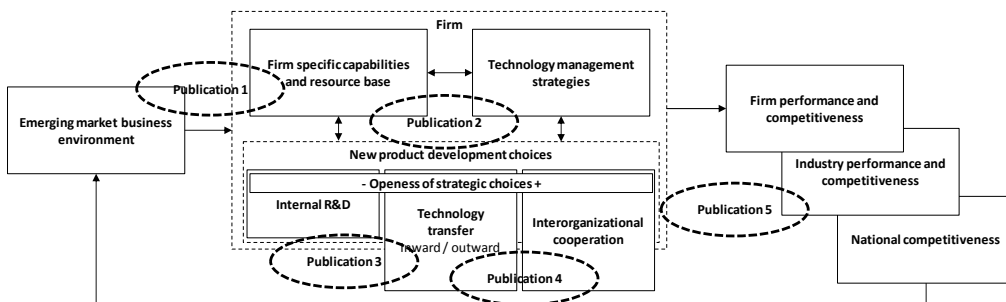


Figure 7. Research themes and publications

Table 5 shows the research aims, theory background, methods and data, main results and main contribution of the research papers. The following sections more closely present the publications and their main objective, findings and role in the thesis.

Table 5. Summary of the publications

Publication	Research aim	Theory background	Methods and data	Main results	Main contribution
Publication 1: Review of the competitiveness of Russian manufacturing industry	To study the development of competitiveness in the Russian manufacturing industry.	National and industrial competitiveness (Porter)	Analysis of longitudinal statistical data (secondary data from 2000 to 2008)	The Russian manufacturing industry generally faces major challenges in keeping up and catching up with competitiveness. However, some fields show some indication of the potential that Russian industries have.	Explains the current state and development of Russian manufacturing industry competitiveness.

<p>Publication 2: Building competitiveness of emerging market firms: The role of interfirm technology transfer</p>	<p>To study the role of technology management strategies and especially inter-firm cooperation and technology transfer in building firm competitiveness</p>	<p>Resource-based view; relational view</p>	<p>Conceptual; literature review</p>	<p>Technology management strategies play a critical role in building firm competitiveness and performance. This requires internal capabilities that ultimately allow technology transfer and increased inter-firm cooperation, which then lead to improved firm performance and catching up.</p>	<p>Highlights the decisive role of technology management, capability building, technology transfer and cooperation in building competitiveness, especially in emerging markets</p>
<p>Publication 3: External technology acquisition in Russian firms</p>	<p>To investigate technology transfer in the Russian manufacturing industry and how it affects the economic and innovation performance of firms</p>	<p>Resource-based view; technology management</p>	<p>Survey data from 206 Russian firms (primary data)</p>	<p>ETA has positive effects on the innovation performance of a firm. This however requires internal R&D and capabilities which allow firms to exploit more open technology management strategies. ETA seems to be an efficient method for improving firm competitiveness, product development and the</p>	<p>Reports the motivation, preconditions and outcomes of the implementation of ETA and open technology management strategies in the Russian manufacturing industry</p>

				modernisation of production.	
Publication 4: External technology commercialisation and markets for technology in Russian manufacturing industry	To study the commercialisation of technologies and markets for technologies in Russian manufacturing firms	Technology management	Survey data from 206 Russian firms (primary data)	Small share of firms recognise or commercialise their surplus technologies. Only few firms have the capabilities to exploit the possibilities that ETC can offer. The low level of ETC also leads to imbalances in supply and demand in Russian technology markets.	Illustrates the opportunities and challenges in firms in the commercialisation of technologies and recognises the demand and supply imbalance in Russian technology markets
Publication 5: Technology management strategies in emerging markets	To study the level of the business environment and host country competitiveness in relation to the management strategies of manufacturing firms	Technology management	Survey data from 6,267 manufacturing firms from Eastern-Europe and central Asia (secondary data)	Firms in low competitiveness economies are active in R&D and are exploiting open technology management strategies to catch up. A significant gap can be seen in the level of ETA and NPD cooperation between firms in the second most competitive group of countries compared to those in the most competitive countries.	Illustrates the role of national competitiveness and the business environment in the technology management strategies of manufacturing firms

4.1 Publication 1: Review of the competitiveness of Russian manufacturing industry

Torvinen, P. and Väättänen, J. (2013) 'Review of the competitiveness of Russian manufacturing industry'. *International Journal of Business Excellence*, vol. 6, no. 3, pp. 293–309.

Objective

The first paper analyses the development and challenges of Russian manufacturing industry competitiveness. The aim was to identify the most competitive fields in the Russian manufacturing industry. The paper analyses the development of competitiveness in Russian manufacturing at the industry and national levels. It uses longitudinal data from the years 2000 to 2008 to follow and analyse the development of indicators such as production, productivity, unit labour costs and exports to European Union markets. The analysis of the development of these indicators enabled us to further analyse how different industries have been able to manage their competitive position when markets become more globalised. The paper also highlights the role of the manufacturing industry in developing national competitiveness.

Main findings

Trade balances in manufacturing have faced increasing deficits even though exports and domestic production have increased. High-technology exports, including more value-added products, have also decreased dramatically. The Russian trade balance relies mainly on the high volume of low value-added products from natural resource-based industries. The results of the study show that the Russian manufacturing industry is in a difficult situation, characterised by increasing imports and global competition. Most firms in the Russian manufacturing industry are faced with problems regarding the improvement of their competitiveness. Productivity has improved in all industries, but unit labour costs have doubled, on average, compared to the productivity experienced during the entire period, which indicates that overall competitiveness has decreased. However, three fields were able to increase their competitiveness: machinery and equipment, electrical and optical equipment and leather and leather products industries. Despite being small in size, the electrical and optical equipment industry, in particular, grew rapidly and managed to increase its share in exports, which shows potential future development.

Role in the thesis

The publication illustrates the challenges faced by the manufacturing industry in emerging markets. It addresses the main research question and sub-question 1 of the thesis and tries to explain the current situation of the manufacturing industry and why there is a gap in competitiveness in emerging markets. It also explains the economic developments

4.2 Publication 2: Building competitiveness of emerging market firms: The role of interfirm technology transfer

and structures of the Russian manufacturing industry, which are also the focus of the other publications included in the dissertation.

4.2 Publication 2: Building competitiveness of emerging market firms: The role of interfirm technology transfer

Torvinen, P. and Väättänen, J. (2014) 'Building competitiveness of emerging market firms: The role of interfirm technology transfer', proceedings of the 40th Annual Conference of the European International Business Academy (EIBA), 11–13th December 2014, Uppsala, Sweden.

Objective

The second publication included is conceptual in nature. It reviews the relevant literature and focuses on the importance of technology transfer and involvement in competitive business networks for firm competitiveness in emerging market firms. The publication highlights the role of firms' technology management and of building the capabilities for successful technology transfer (commercialisation and acquisition). Technology transfer can be used as a tool to access competitive business networks, which should positively affect firm performance and competitiveness.

Main findings

Networking and inter-firm technology transfer together represent an efficient method for modernising production in industries lacking in competitiveness. Emerging market firms have obvious challenges regarding achieving parity in competitiveness compared to firms in developed markets and reach out from domestic markets. The business environment is one of the decisive factors in building competitiveness, and in emerging markets, it challenges companies to support innovation.

The prerequisite for improving competitiveness is the firm's ability to develop internal capabilities to exploit the opportunities offered by inter-firm cooperation and technology transfer. By passing this threshold, firms are able to connect more competitive networks beyond national borders. This requires them to have open strategies for technology and innovation.

Role in the thesis

This publication addresses the main research question and sub-question 2. It demonstrates the need for emerging market firms to improve their strategies and innovativeness to enable them to compete in domestic and international markets. It also shows that there is a research gap in the case of emerging markets with regards to understanding the challenges of the business environment and the role of technology management strategies in the competitiveness of firms.

4.3 Publication 3: External technology acquisition in Russian firms

Torvinen, P., Podmetina, D., Hinkkanen, J.J. and Väätänen, J. (2014) 'External technology acquisition in Russian firms', *International Journal of Procurement Management*, vol. 7, no. 3, pp. 257–278.

Objective

The third publication analyses the Russian manufacturing industry and how active firms are in acquiring external technologies to complement their R&D and innovation activities. The aim of the paper was to analyse the motivations behind external technology acquisition and its effects on the innovation and economic performance of the firm.

Main findings

The results show that technology, market turbulence and cooperation are that which motivate firms to acquire external technologies. There are also differences in the background and R&D intensity of firms for ETA. Sufficient levels of internal R&D are a precondition for implementing open technology strategies. The results show that higher levels of internal R&D generally lead to higher levels of ETA. However, the most R&D intense firms seem to use less external technologies and rely more on internal R&D. This may be due to the higher risks of open strategies in the case of innovative high-technology firms. The results also show that firms in emerging markets are still more domestically focused when acquiring technologies from outside and that ETA positively effects NPD performance and reduces the risk and time-to-market of product development.

Role in the thesis

The publication addresses the main research question and sub-question 3 and highlights the benefits of ETA for firms in emerging markets in becoming more competitive and improving NPD performance. It also indicates that access to new networks and knowledge is a key motivation in ETA.

4.4 Publication 4: External technology commercialisation and markets for technology in the Russian manufacturing industry

Torvinen, P. and Väätänen, J. (2015) 'External technology commercialisation and markets for technology in Russian manufacturing industry', *International Journal of Technology Marketing*, vol. 10, no. 1, pp. 4–24.

Objective

The fourth publication analyses the Russian manufacturing industry and how active firms are in commercialising their technologies. It also studies technology markets and

highlights the imbalance between the commercialisation and acquisition of technologies that create challenges to technology markets in matching supply with demand.

Main findings

The results of this publication show that ETC is used in a small number of firms and that not many firms recognise the positive aspect of commercialisation of internally developed surplus technologies. This leads to the assumption that there is a lack of capabilities in identifying opportunities for technology commercialisation. Many of these companies, however, are active in R&D and the acquisition and implementation of external technologies. The results show that ETC can lead to improved economic performance by providing additional returns for R&D outputs. It can also increase firms' transparency and cooperation. These companies seem to generally have open business models and to be active in technology transfer.

The domestic focus of firms in ETA and ETC creates a circle whereby low technology supply creates challenges for functioning technology markets. More active and functioning technology markets could lead to improved NPD performance and increased competitiveness in many industries. Active ETC could also help in new venture creation.

Role in the thesis

This publication addresses the main research question and sub-question 4. It highlights the potential benefits that ETC can offer for emerging market firms and industries. It shows that the level of ETC in Russian technology markets is low, which limits the technology supply. It also discusses how functioning technology markets, where supply and demand are more balanced, can enable an improvement in the competitiveness of firms and industries.

4.5 Publication 5: Technology management strategies in emerging markets

Torvinen, P. and Väättänen, J. (2015). 'Technology management strategies in emerging markets', proceedings of the XXVI International Society for Professional Innovation Management (ISPIM) Conference – Shaping the Frontiers of Innovation Management, 14–17 June 2015, Budapest, Hungary.

Objective

The fifth publication examines whether technology management strategies regarding internal R&D, ETA and NPD collaboration vary between manufacturing firms in countries at different stages of development and competitiveness.

Main findings

The results show that the level of R&D does not vary significantly between manufacturing companies at the different development stages. However, it appears that ETA and NPD collaboration are more dependent on the business environment and the development stage of the host economy. The results shows that the manufacturing firms in less competitive economies are active in exploiting open technology management strategies to catch up with competitiveness. The most significant gap is between firms in two of the most competitive groups of countries at the level of ETA and NPD collaboration. The results also indicate that open strategies are effective in catching up, but companies in the most developed environments still have to rely heavily on internal R&D. Lower levels of internal R&D in less developed countries can also be linked to the weak institutional environment in emerging markets, which does not encourage and support companies to innovate, thus pushing them to rely more on external technologies.

Role in the thesis

The publication addresses the main research question and sub-question 5. It compares the use of technology management strategies in manufacturing firms in countries at different levels of national competitiveness. It compares the share of internal R&D, and ETA and NPD cooperation.

5 Conclusions

5.1 Answering the research questions

The aim of this thesis was to study firm competitiveness in the Russian manufacturing industry and to draw upon methods regarding how firms can decrease the competitiveness gap compared to firms operating in more developed markets. The main research question was formulated as follows: *How can manufacturing firms in emerging markets catch up with competitiveness?* The empirical analysis in this thesis showed that firms can improve their competitiveness by employing different technology management strategies. Outbound and especially inbound technology transfer have proven to be two of the most viable tools enabling higher levels of firm competitiveness. This is also linked to the building of internal capabilities for improved NPD processes and higher levels of inter-firm cooperation. The topic is discussed in greater detail by answering the following sub-questions linked to the publications included in this thesis.

The first sub-question, linked primarily with publication 1, was: *How has the competitiveness of the Russian manufacturing industry developed, and is there a gap in competitiveness?* This research question was also one of the main motivations for the entire research project and the subsequent studies. The empirical evidence shows that the Russian manufacturing industry experiences challenges regarding keeping up with competitiveness due to rising wages, even when the general level of productivity has not been improving at the same pace. The manufacturing industry is still heavily reliant on large basic industries with relatively low value-added. At the same time, the share of high-technology exports has decreased dramatically. Notwithstanding, there are indications of positive developments in some industries. For example, the electrical and optical equipment industry has experienced strong growth and has been able to improve competitiveness by improving productivity. This empirical evidence suggests that there is a competitiveness gap and that the general level of competitiveness of the Russian manufacturing industry is on the decrease. The indicators suggest that there are positive developments in the case of more value-adding and innovative industries that have been able to improve their competitiveness.

The second sub-question – *How can companies in emerging markets increase their competitiveness through inter-organisational technology transfer?* – is mostly linked to publication 2, which conceptually discusses the linkages between technology transfer and firm competitiveness. Based on the existing literature, the publication highlights the role of firms' capability building as enabling the exploitation of more diverse technology management strategies. Emerging market firms are challenged by underdeveloped business environments that do not encourage inter-firm cooperation. Through internal R&D, firms are able to develop capabilities that allow them to apply technology management strategies involving external partners. With these capabilities, technology transfer can be seen as one of the most viable tools for emerging market companies to catch up with competitiveness. It enables companies to decrease R&D costs, enhance their NPD process and modernise

production. It can also provide additional revenues from technologies which firms would not otherwise profit. Technology transfer also enables closer inter-firm collaboration and involvement in more developed (international) networks, thus further improving access to external resources and knowledge.

The third sub-question – *How can ETA improve firm competitiveness?* – is mostly linked to publication 3 and uses survey data to analyse the use of external technology acquisition in innovative Russian manufacturing firms. Technology, market turbulence and cooperation propel companies towards acquiring external technologies. As a strategy, ETA is relatively well exploited (around 30% of the companies); however, most of the companies acquire less than 25% of their technologies from external sources. Domestic technology sources seem to be more common than foreign ones. Firms are in many ways benefiting from ETA in NPD processes. The results also indicate better innovation and economic performance against companies' objectives for using ETA as a strategy. The results further demonstrate that more high-technology oriented companies use ETA more frequently; however, high-technology companies turn towards a more closed approach and rely more heavily on internal R&D.

The fourth sub-question – *How can ETC and technology exchange improve firm competitiveness?* – is linked primarily to publication 4, which utilises survey and case study data to analyse the use of technology commercialisation as a strategy in innovative Russian manufacturing firms. Among the surveyed companies, only 6.3% reported selling their surplus technologies sometimes or often. The results indicate that if firms embrace ETC as an essential part of their strategy, they can increase their returns and spread of technologies. Companies conducting ETC also seem to be forerunners in many fields, such as inter-firm cooperation and technology development and acquisition, which indicates a high level of internal capabilities for new business and technology strategies. The study also shows that the Russian business environment does not support commercialisation, most likely due to IP protection issues, and that many companies choose to keep their developed technologies in-house. This creates an imbalance in technology markets, with firms preferring domestic (in this case, Russia) technology sources.

The fifth sub-question – *How does the business environment affect technology management strategies?* – is mainly linked to publication 5, which analyses technology management strategies from a sample of over 6,000 manufacturing firms. The results show that manufacturing firms in less competitive countries, compared to Russia, are more agile in their greater use of open strategies to catch up. Firms in countries belonging to the group, of which Russia also belongs, has the largest gap in ETA-focused strategies and strategies involving NPD cooperation when compared to the reference group of firms in innovation-driven economies. It indicates that in these economies, there is still a gap in the business environment regarding support for innovation in manufacturing firms. On a country level, the results are similar to those of the previous study on the firm level, which indicated that the innovative firms in most competitive locations are still heavily reliant on internal R&D-focused strategies.

Altogether, the results of the five publications illustrate the role of a challenging and still-developing business environment in emerging markets as well as firm-level challenges regarding catching up with competitiveness. Internal R&D continues to be important for companies to develop internal capabilities to exploit different technology management strategies. Technology transfer and inter-firm cooperation in new product development are vital and well-exploited tools with which companies in emerging markets can catch up. These strategies provide additional economic benefits and more efficient new product development processes. The most innovative companies in most competitive locations seem to continue to exploit strategies that mainly rely on internal R&D accompanied by technology acquisition and cooperation.

5.2 Theoretical contribution

This research assesses the firm competitiveness in emerging markets by contributing on two theoretical approaches. First is the market level where the constraints of the business environment create gap in competitiveness (theoretical background: enterprise and industry competitiveness, and market-based view). This study evaluates the current situation and development of competitiveness within Russian manufacturing industry (see publication 1) and how management strategies varies between manufacturing industries in countries in different levels of competitiveness (see publication 5). The second is the firm level where the interfirm cooperation and technology transfer enables companies to expand their resource base and catch up in the competitiveness (theoretical background: strategic management, resource-based view, and relational view) (see publications 2, 3, and 4). This study contributes primarily on the second theoretical approach by providing empirical evidence and describing the preconditions and implications of more open technology management strategies.

This thesis contributes to the strategic management and technology and innovation management literature by examining firms' strategies in an emerging market context. The previous literature notes that firms in emerging markets have to develop their strategies to be able to gain competitive advantages (Hoskisson et al., 2000; Wright et al., 2005; Wu and Pangarkar, 2006; London and Hart, 2004; Khanna et al., 2005). This study expands the current strategy literature in emerging markets by using empirical data from innovative manufacturing companies in Russia. The research has its foundations in the resource-based view, according to which a firm's resources determine its competitive advantages (Barney, 1991; Grant, 2002; Peteraf, 1993). This view is also developed by the relational view, which posits that the firm's resource base expands by exploiting inter-firm cooperation and networks (Dyear and Singh, 1998; Lavie, 2006). This research also assumes a strong background in the market-based view, specifically, that the market environment sets the constraints for industrial competitiveness and the development of firms' competitive advantage, which is especially evident in the emerging market context (Porter, 1980; Hoskisson et al., 2000; Peng et al., 2009).

The results add to the understanding of the capabilities and activities of innovative manufacturing firms in emerging markets in terms of opening up their innovation process, organising firm activities and exploiting new opportunities beyond firm boundaries (Chesbrough, 2003; Gassmann, 2006). The results of this thesis contribute towards understanding the level and preparedness of capability building in manufacturing firms in emerging markets. The changing business environment and increasing market competition require firms to develop capabilities for technology and innovation management (Eisenhardt and Martin, 2000). Technology transfer requires capability building, which is mainly enabled by internal R&D investments and processes. Inbound technology transfer (Granstrand, et al., 1992; Lambe and Spekman, 1997; Cassiman and Veugelers, 2006) and the development of absorptive capacity (Cohen and Levinthal, 1990; Zahra and George, 2002; Spithoven, et al., 2010) allow firms to seek technologies and new technological opportunities from markets and external partners to complement internal R&D efforts. The results of the thesis have proven this to be beneficial for emerging market firms in catching up and improving their R&D and NPD processes. This thesis has also examined the functioning of technology markets and the ability of emerging market firms to engage in outbound technology transfer activities (Arora, et al., 2001; Zahra and Nielsen, 2002). The results show that for manufacturing firms in emerging markets, these capabilities are less developed than outbound activities. Only a few firms are willing or able to successfully commercialise their technologies and exploit the benefits of this process.

This study also contributes to the literature on inter-firm cooperation and networks (Hagedoorn, 1990; Gulati, 1998; Stuart 2000; Tsai, 2001). For emerging market firms, network position and partner selection are critical (Zaheer and Bell, 2005; Hitt et al., 2000; Hitt et al., 2004) and also affect the international expansion of firms (Lue and Tung, 2007; Kumar et al., 2013). However, the results indicate that together with active internal R&D, successful technology transfer enables effective innovation and new product development processes, thus allowing firms in emerging markets to confront the constraints set by their challenging business environments, become more international and catch up and become more competitive. The empirical results of this thesis add valuable insights and new information to the current literature on emerging market companies, through the evidence from Russian manufacturing industry, by studying their technology management strategies, level of innovativeness, and ability to cooperate and exploit knowledge and technology transfer (e.g. Radosevic, 1999; Fu et al., 2011; Desai and Goldberg, 2011; Valdaytsev and Sergeyevev, 2011; Podmetina et al., 2011, Hinkkanen et al., 2013).

5.3 Managerial implications

This dissertation contributes towards enhancing the current understanding of technology management strategies and the development of firm competitiveness in emerging markets. The study also clarifies the level of openness and inter-firm cooperation of companies in new product development and innovation. The results rely primarily on

empirical evidence from innovative Russian manufacturing firms, but it can also be somewhat extended to analyse firms other than in emerging markets that are at a similar stage of industrial development.

According to Global Competitiveness Report Russian overall national competitiveness ranks all time high at the moment. However, lately there has been notable negative development in case of macroeconomic environment and previous positive development in business sophistication and innovation has stopped. (Schwab, 2015) This dissertation proves that Russian manufacturing is still heavily reliant on basic industries struggling to maintain competitiveness. However, there are some positive indications that, for example, the electronic and optical equipment industry has been able to improve on global competitiveness (see publication 1). The studies show that innovative manufacturing firms in Russia are already relatively open to acquiring external technologies and collaborating with external partners in new product development and that they possess the required capabilities to do this. The firms doing this are able to enhance their NPD process and decrease the R&D risks leading to improved market share, innovation and economic performance (see publication 3). However, very few of them still commercialise their internally developed technologies, which are not fit for their current product strategies. This creates imbalances in Russia's domestically-oriented technology markets. The firms commercializing their technologies are, however, able to improve their economic performance and gain revenues for R&D investments. Technology commercialization enables companies to become more networked and open providing new business opportunities. (see publication 4). The results also show that the innovation and technology management strategies in manufacturing companies between countries in different levels of competitiveness differ. (see publication 5). The firms in less competitive countries are actively reaching beyond the company borders and using open approaches to improve their innovation processes and catch up in competitiveness.

5.4 Limitations and suggestions for future research

This thesis has some limitations which should be discussed and taken into account in future research. The current research has also raised questions that can be tackled in future research.

The first notable limitation is the geographical perspective. Most of the empirical evidence came from Russia. The thesis largely discusses emerging markets; however, this generalisation might not apply to all emerging countries. Even though many emerging countries experience similar market growth and challenges, and that the broad ideas and conclusions might apply, market environments, industry structures, and cultures differ significantly. The vast emerging countries, like Russia, are diversified and have large regional and industry variation within the country (EBRD, 2012).

The second limitation relates to the data. This study mainly utilised cross-sectional primary and secondary data. The secondary data sources allowed the use of one longitudinal industry-level dataset and one very large firm-level dataset, which enabled

more general analysis of the research topic but lacked the closer firm-level analysis. In the future, primary longitudinal data (panel data) would allow one to make further conclusions about the development of firm strategies.

The third limitation concerns the data analysis of the studies, which was mainly quantitative but remained largely descriptive due to the small sample of companies exploiting strategies studied in this thesis, which limited the use of further quantitative data analysis methods. Descriptive data analysis was supported by one brief case study in publication 4 to add to the reliability of the study. Further qualitative research would allow more detailed studies about firms' management and strategies and the reasons behind strategic choices concerning operations beyond firm boundaries.

In addition, previous emerging markets research have called for further longitudinal and mixed-methods studies with a widened geographic focus. Current research is noted to be biased towards studies focusing only in China. There is also bias regarding the industrial sectors studied, and little distinction has been made between the manufacturing and service sectors (Hoskisson et al., 2000; Jormanainen and Koveshnikov, 2012; Wright, et al., 2005). This thesis partly answers to this call by expanding the literature on Russian markets and utilises expansive data to focus on the manufacturing industry.

The entire research process has also raised new questions and directions for future research. As industrial development is constantly challenging and changing market environments, it has become a great personal interest through my studies. To continue with this research interest, it would be most valuable for future studies to gather some new survey data, especially concerning the benefits of close inter-firm collaboration and technology exchange. It would also be interesting to gather some qualitative data to examine this issue further, especially studying the catching-up process and the challenges of emerging market firms to become more involved with firms and networks mainly operating in developed countries.

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Part II: Publications

Publication I

Torvinen, P. and Väättänen, J.

Review of the competitiveness of Russian manufacturing industry

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Review of the competitiveness of Russian manufacturing industry

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Abstract: This article examines the competitiveness of the Russian manufacturing industry. The study uses secondary data and follows the development of selected indicators in the Russian manufacturing industry. The selection of indicators is based on a literature review of measuring competitiveness. The main indicators are production, productivity, unit labour costs, and exports to European Union markets. The main data source is the industrial database of The Vienna Institute for International Economic Studies (WIIW). This data has been used to make calculations to identify the effects of selected indicators on the competitiveness of the manufacturing industry. The results of the study show that the Russian manufacturing industry is in a difficult situation. Most Russian industries face problems in improving their competitiveness and competing in domestic and international markets.

Keywords: Russia; competitiveness; industry; manufacturing.

Reference to this paper should be made as follows: Torvinen, P. and Väättänen, J. (2013) 'Review of the competitiveness of Russian manufacturing industry', *Int. J. Business Excellence*, Vol. 6, No. 3, pp.293–309.

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1 Introduction

The last 20 years, since the collapse of the Soviet Union, has been a time of economic development and learning to meet the demands of market economy in Russia. Since then the borders have opened to global trade, and Russian industries have faced the competition in the markets. Manufacturing is one of the key industries in increasing national competitiveness. The manufacturing industry competes against global markets both locally and globally. This makes it possible to draw conclusions about the international competitiveness of the manufacturing industry from the changes in economical and industrial data.

Competitiveness has been one of the most commonly discussed topics in economics in the last 20 years after Porter (1990) introduced his competitiveness framework. The discussion is still current today (Rugman et al., 2011; Carayannis and Wang, 2011). The general aim of any nation today is to upgrade national and industrial competitiveness and productivity to increase prosperity and the standard of living (Porter, 1990; Schwab, 2010). Developed nations, and especially developing economies, have considered this to be one of the main goals of economical development for the future. Russia has relied much on inherited endowments, such as extraction of natural resources. It has been noted on national level that the policies have to be developed and there has to be also other competitive industries in Russia in order to sustain the position in global competitiveness in the long run (Porter and Ketels, 2008).

National competitiveness is derived from industries and companies (Porter, 1990). Russian industries have acknowledged that they lag behind in competitiveness in the global scale (Yasin, 2010). Russian national competitiveness has stayed at the same level in global comparisons in recent years (Schwab, 2010). Despite the strong economical growth, the national competitiveness has not increased significantly. Nevertheless, Russia has a strong ambition to become an internationally competitive and innovation-driven economy.

The competitiveness of the Russian economy has been discussed in the literature. There is still room for further analysis and especially research from the Russian manufacturing industry which is clearly less explored. There are few recent articles which tackle the topics of this research. Waheeduzzaman (2011) has studied the G7 countries against big emerging markets and pointed out that the role of emerging markets in world economy is growing fast which should be recognised. Connolly (2008) has discussed about the structure of Russian exports and the balance between primary products and high-technology and how the nation could diversify the export base. Garanina (2009) has pointed out the rapid deterioration of trade balance in Russian manufactures. Porter and Ketels (2008) suggest that Russia is at crossroads. They perceive that Russia can continue on the same path where companies would remain generally domestically focused or choose the competitiveness approach as the driving principle for economic policies which would tackle the weaknesses of the Russian business environment. The study points out the strengths and weaknesses of the Russian economy and the areas of economy at micro and macro level that should be focused on to develop the nation's competitiveness in the future. Desai and Goldberg (2007, 2008) discuss Russia's competitiveness in general. They have focused their research on the developments and characteristics of the Russian economy and policies which affect the competitiveness of the nation and the innovation environment in Russia. Yasin et al. (2010) examined the state of Russian manufacturing in the beginning of the financial

crisis in 2008. A study by Avdasheva et al. (2010) also discusses the competitiveness and the state of the Russian manufacturing industry in the 21st century based on a survey made in Russian enterprises.

The objective of this article is to examine how the competitiveness of Russian manufacturing industry has developed and which are the most competitive industries. The study has been done by using statistical data from secondary sources. The evaluation of the competitiveness of the Russian manufacturing industry is based on data from the industrial database of The Vienna Institute for International Economic Studies (WIIW). The development in production, labour productivity, unit labour costs (ULCs), and Russian trade with the European Union (EU) are the main factors used to evaluate the industrial competitiveness. In the results, the most competitive and potential industries are also named.

The article is structured as follows: the first section introduces the competitiveness framework and literature base of the study. Next, the research data and methodology are described more closely. The following section evaluates the national competitiveness of Russia and compares it globally. This section is followed by the main findings and results of the research. The final section concludes the results and discusses the limitations of the study and addresses some future research directions.

2 A framework to measure industrial competitiveness

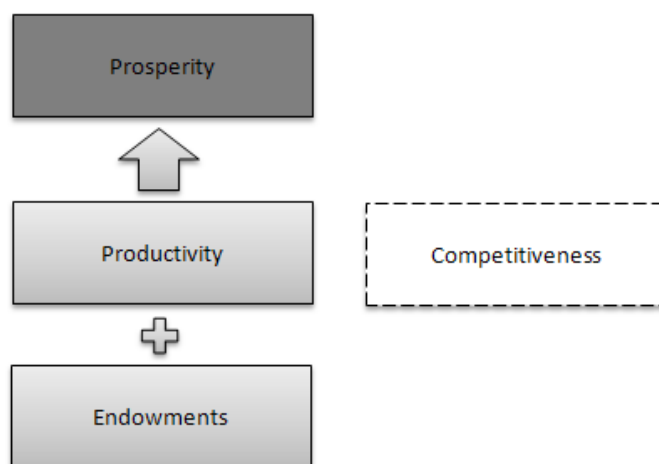
National and industrial competitiveness has been discussed and studied in literature extensively. There are different frameworks and indicators which are used to measure competitiveness in different levels (Chikán, 2008; Fagerberg et al., 2007). Research has been made on competitiveness in different nations and especially emerging markets has received a lot of attention lately (Pillania, 2009; Waheeduzzaman, 2011). Competitiveness of manufacturing industries has also been noticed to have strong effect and it has been examined in many cases (Brunner and Calí, 2006; Trasca, 2011; Saboniené, 2011).

The term competitiveness has varying definitions in the literature. Competitiveness can be defined as benchmarking the economic performance of nations or companies against their major competitors. Performance can be measured from the perspective of an enterprise benchmarking productivity, profitability, market share, or growth rate of sales (Dunning, 1995). OECD (2011) defines competitiveness as follows: “competitiveness is a measure of a country's advantage or disadvantage in selling its products in international markets”. OECD takes the ULCs in manufacturing and consumer prices into account in the countries compared. Porter's (1990) definition of competitiveness concentrates much on the productivity of the companies in a certain location and what kind of macroeconomic environment the location offers for the companies. Porter's view is shared in the definition of Harvard Business School's Institute for Strategy and Competitiveness and in the Global Competitiveness Report (GCR) (Schwab, 2010; HBS Institute for Strategy and Competitiveness, 2011).

Porter (1990) has created a competitiveness framework which is the most widely used concept to evaluate competitiveness on macro and micro economical levels. This approach is also the base for the annually published GCR, which evaluates the competitiveness of nations. Porter's diamond model, used on the microeconomic level,

has also been criticised and further developed by others. The criticism has created different approaches, especially to measuring the competitiveness of nations. Since the introduction of the framework, over 20 years ago, the concept has gained strong support but also some debate which has ultimately developed the model further (Rugman, 1991; Dunning, 1992, 1993; Cartwright, 1993; Bellak and Weiss, 1993; Rugman and D'Cruz, 1993; Krugman, 1994; Waverman, 1995; Jegers, 1995; Davies and Ellis, 2000; Boltho, 1996; Moon et al., 1998). The model has been, for example, criticised to focus too much on the home nation when the companies compete in the international markets but there is also evidence that the competitiveness is still most dependent on the home nation (Rugman et al., 2011). Ketels (2006) has also discussed and explained Porter's framework further for practitioners and researchers. The acceptance of Porter's base theories is still strong.

Figure 1 Defining competitiveness



Source: Porter et al. (2008, p.45)

Porter (1998) has stated that, ultimately, it is companies that compete, not nations. Firm-level competitiveness is linked to the competitiveness of industries, which, at the end, leads to national competitiveness. National and firm-level competitiveness are the most commonly discussed topics in the literature, but there is less research on industry-level competitiveness. In addition to Porter's productivity-based view, there are indicators which have been acknowledged to measure competitiveness on the micro level. Competitiveness is not measured only by productivity, but also by the cost of inputs in the process. ULC is one of the indicators which can be used to measure competitiveness. It combines labour cost and productivity into a single measure of labour cost per unit output (Van Ark, 2005). Mitschke (2008) has recognised indicators which indicate the international competitiveness of companies and industries. Productivity, ULCs in labour intensive industries (such as manufacturing industries), exports and export market shares, foreign direct investments (FDIs), innovations, (through patents and R&D expenditure), and sustainable growth are indicators which can be used to measure microeconomic competitiveness. Market demand and innovation are in important role to develop productivity and competitiveness of industries (Crespi and Pianta, 2008). Figure 1 presents the competitiveness framework by Porter, where increase in productivity and

competitiveness leads ultimately to prosperity. This framework and the studies reviewed form the base for the methodology used to measure competitiveness in this study.

3 Data and methodology

The present study is quantitative and it is based on statistical data from secondary sources. The following two sections examine the development of Russia's economy and the competitiveness of the Russian manufacturing industry. The main statistics used to present the state of the Russian economy are from the World Bank, the World Economic Forum (WEF), UNCTAD, and Eurostat.

The main data source for evaluating the competitiveness of the Russian manufacturing industry is the WIIW industrial data from the years 2000 to 2008 (WIIW, 2010). The WIIW data relies on the Russian Federal State Statistic Service and Eurostat statistics. The data has been used in calculations which reflect the development in competitiveness. The data describes the development of the Russian manufacturing industry in industrial production, employees, labour productivity, wages, ULCs, and trade between Russia and the EU. The data is based on two-digit level of NACE 1 classification. Table 1 demonstrates the contents of data used in this study.

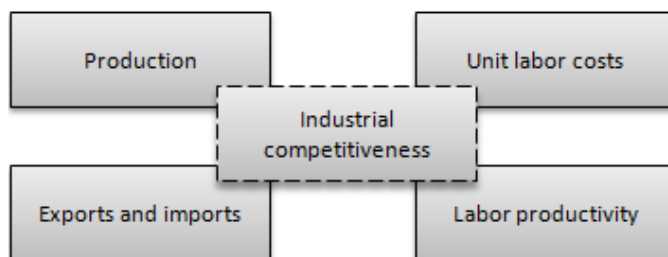
Table 1 Contents of the data

INDUSTRY	INDICATORS
NACE Rev. 1	2000–2008
CDE Total industry	Industrial production
C Mining and quarrying	Employees in industry
D Manufacturing	Average monthly wages
DA Food products, beverages and tobacco	Labor productivity in industry
DB Textiles and textile products	Unit labor costs in industry
DC Leather and leather products	Exports from Russia to EU
DD Wood and wood products	Imports from EU to Russia
DE Pulp, paper and paper products; publishing and printing	Trade balance (EU-Russia trade)
DF Coke, refined petroleum products and nuclear fuel	
DG Chemicals, chemical products and man-made fibres	
DH Rubber and plastic products	
DI Other non-metallic mineral products	
DJ Basic metals and fabricated metal products	
DK Machinery and equipment n.e.c.	
DL Electrical and optical equipment	
DM Transport equipment	
DN Manufacturing n.e.c.	
E Electricity, gas and water supply	

The developments of industries in Russian manufacturing are examined especially in production, labour productivity and ULC to expose the development in competitiveness. The trade with EU is also examined as a factor indicating the international

competitiveness of the Russian manufacturing industry. Figure 2 shows the indicators used to measure competitiveness in this study. These selected indicators reflect to the framework to measure competitiveness based on Porter's competitiveness theories and other studies measuring competitiveness.

Figure 2 The main indicators of industrial competitiveness used in the study



4 Russian competitiveness

Russia has faced a strong economic growth in recent years, but the competitiveness has not increased essentially. In 2009, the Russian GDP per capita was \$18,962 (adjusted with PPP). The Russian GDP has grown annually approximately by 5.5% in the 21st century and it is now higher than ever before. Compared to the other BRIC countries (Brazil, Russia, India, and China), Russia has clearly the highest living standard, which has, however, decreased due to the global economic downturn. The expenditure to R&D in Russia was 1.1% of the GDP in 2007. In the Russian case, this is a relatively small figure but it is in the line with the other BRIC countries. The GDP per person employed, indicating the labour productivity, has increased also by approximately 6% annually (The World Bank, 2011). The level of productivity is still far from the western standards, but the development has been positive. Among the BRIC countries, Russia ranks clearly number one also in this comparison.

The GCR is one of the most acknowledged publications to evaluate national competitiveness. Its foundation is in Porter's competitiveness framework, and it is based on hard data and executive surveys. According to the GCR, Russia's competitiveness ranking has stayed at the same level in recent years. Russia ranks 63rd of 139 countries in the GCR 2010–2011 comparison (Schwab, 2010). Russia is in an efficiency-driven stage of economic development. Table 2 shows a comparison of the BRIC countries and how they are positioned in the GCR 2010.

FDIs in Russia had good growth from the year 2000 till 2007. In 2007 the FDI inward stock decreased dramatically, but since then the FDIs have been increasing steadily (UNCTAD, 2010). Of the BRIC countries, China and Brazil have bypassed Russia in the FDI stock. Approximately 60% of the FDIs to Russia go to services, 25% to manufacturing, and 17% to mining and quarrying (Vinhas de Souza, 2008). The recent financial crisis has affected the level of Russian outward investments dramatically, but the investments started to increase already in 2009 (UNCTAD, 2010). Among the BRIC countries, Russia is the number one investor in global markets.

Russian trade, in general, is quite one-sided. In 2010, total 68.8% of total exports were oil and gas and 10.6% metals. 45.2% of imports were machinery and equipments.

(Economist Intelligent Unit, 2011). The EU is clearly the biggest and most important trade partner of Russia with the share of 45.8% of the trade. 74% of the EU imports from Russia are mineral fuels, lubricants and related materials, which is 30.8% of the total EU imports of these materials. 44% of the EU exports to Russia come from machinery and transport equipment and 20% from different manufactured articles and goods (European Commission Directorate-General for Trade, 2010).

Table 2 BRIC-countries in the GCR 2010

<i>Key indicators 2009</i>	<i>Russia</i>		<i>Brazil</i>		<i>China</i>		<i>India</i>	
Population (millions)	140.9		193.7		1,345.8		1,198.0	
GDP (US\$ billions)	1,229.2		1,574.0		4,909.0		1,236.0	
GDP per capita (US\$)	8,694		8,220		3,678		1,031	
GDP (PPP) as share (%) of world total	3.05		2.87		12.52		5.06	
<i>Stage of development</i>	2		2		2		1	
<i>Global Competitiveness Index</i>	<i>Rank</i>		<i>Score</i>		<i>Rank</i>		<i>Score</i>	
GCI 2010–2011 (out of 139)	63	4.2	58	4.3	27	4.8	51	4.3
GCI 2009–2010 (out of 133)	63	4.2	56	4.2	29	4.7	49	4.3
GCI 2008–2009 (out of 134)	51	4.3	64	4.1	30	4.7	50	4.3
Basic requirements	65	4.5	86	4.3	30	5.3	81	4.3
1st pillar: institutions	118	3.2	93	3.6	49	4.4	58	4.0
2nd pillar: infrastructure	47	4.5	62	4.0	50	4.4	86	3.5
3rd pillar: macroeconomic environment	79	4.5	111	4.0	4	6.1	73	4.5
4th pillar: health and primary education	53	5.9	87	5.5	37	6.2	104	5.2
Efficiency enhancers	53	4.2	44	4.4	29	4.6	38	4.4
5th pillar: higher education and training	50	4.6	58	4.3	60	4.2	85	3.9
6th pillar: goods market efficiency	123	3.6	114	3.7	43	4.4	71	4.1
7th pillar: labor market efficiency	57	4.5	96	4.1	38	4.7	92	4.2
8th pillar: financial market development	125	3.2	50	4.4	57	4.3	17	4.9
9th pillar: technological readiness	69	3.6	54	3.9	78	3.4	86	3.3
10th pillar: market size	8	5.7	10	5.6	2	6.7	4	6.1
Innovation and sophistication factors	80	3.4	38	4.0	31	4.1	42	4.0
11th pillar: business sophistication	101	3.5	31	4.5	41	4.3	44	4.3
12th pillar: innovation	57	3.2	42	3.5	26	3.9	39	3.6

Source: Schwab (2010)

FDIs and trade have a strong effect on emerging economies and Russia. Russia has had problems in creating own science-based innovations recently. FDIs are one of the factors that affect significantly to the development of innovations (Torkkeli et al., 2009). The innovation activities are affected by organisational structures with culture and the way how innovation activities are managed and developed (Banerjee et al., 2011). These structures are not always supporting innovation activities in Russian enterprises.

Manufacturing in emerging economies has grown strongly, especially in China. These industries have to compare their performance in global context (Liu and Takala 2010; Lima et al., 2011). Retail markets in Russia have faced strong growth in all the sectors (Karhu and Yla-Kojola, 2010). The market development creates a strong support for the

manufacturing companies in Russia to succeed, but only the most competitive will survive from the global competition.

According to the statistics, there is no indication that the Russian competitiveness would have increased remarkably. The development has been moderate, and the national-level competitiveness has not been able to match the pace of the other BRIC countries. This study supports the previous research as it examines the competitiveness of the Russian manufacturing industry. It addresses the long-term development in Russian manufacturing in the 21st century, which, besides the industries, has an effect on the competitiveness of the whole nation. It also points out the best performed and most potential industries for the future development of the Russian economy.

5 Results of the study

The Russian industry produces 33% of the nation's GDP. The growing service sector has decreased the role of industry in the Russian economy in recent years (European Commission Directorate-General for Trade, 2010). The number of employees has generally decreased, which, together with growth in production, indicates a positive change in labour productivity. The labour productivity in manufacturing has grown strongly, approximately by 10% annually. Between the years 2000–2008, the wages rose by 12% annually (deflated with CPI). The ULCs are still far from the European standards, but have grown on average approximately by 15% annually. The manufacturing production increased only by 66% and the export to the most developed EU countries (EU-15) increased by over 200% between the years 2000–2008; the imports, however, increased by over 300%. The labour productivity in Russian manufacturing has increased approximately by 100% but the ULCs have at the same time increased by over 200%, which has had a negative effect on the competitiveness of industries (WIIW, 2010). In this perspective, Russian industries have competitive advantage in ULCs compared to the EU, which could make Russia an attractive target country for European FDIs in high labour cost industries. The rapidly rising costs, however, increase the risk in Russia. In some industries, for example coke, refined petroleum products and nuclear fuel, work seems to be well compensated for, but the general level in ULCs is still low, which supports the industry's competitiveness. The overall development puts the Russian manufacturing industry in a difficult situation in maintaining the level of competitiveness. Table 3 describes the general development in Russian manufacturing between the years 2000 and 2008.

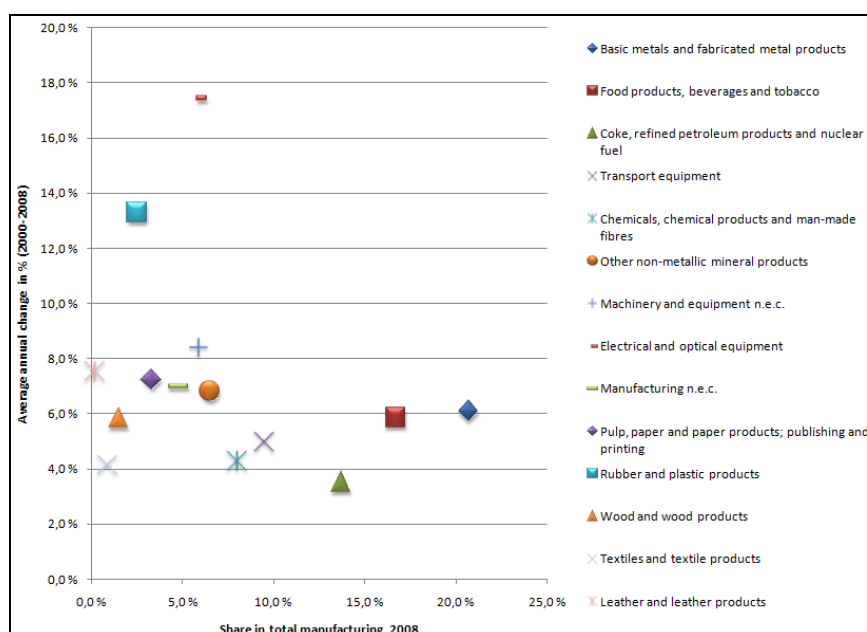
Table 3 Development of Russian manufacturing in 2000–2008

<i>Indicator</i>	<i>Change 2000–2008</i>
Production (reference prices 2002)	66%
Employees	–19%
Productivity	103%
Wages (deflated with CPI)	145%
ULC (national currency)	230%
Exports to EU-15 (EUR-based)	221%
Imports from EU-15 (EUR-based)	334%

Source: Adapted from WIIW (2010)

The Russian manufacturing industry has grown approximately by 7% annually in the 21st century. There are notable differences between some of the industries. The chemical and textile industries have, for example, had minor growth compared to the electrical and optical equipment industry, where the production grew by more than 200% between the years 2000–2008 (see Appendix). The industries with the most growth are, however, relatively small in size. The major industries – coke, refined petroleum products and nuclear fuel, food products, beverages and tobacco, and basic metals and fabricated metal product industries, have had relatively small growth. Figure 3 presents the share of the Russian manufacturing industries and their annual average growth between the years 2000 and 2008.

Figure 3 The share and growth of industries in manufacturing (see online version for colours)

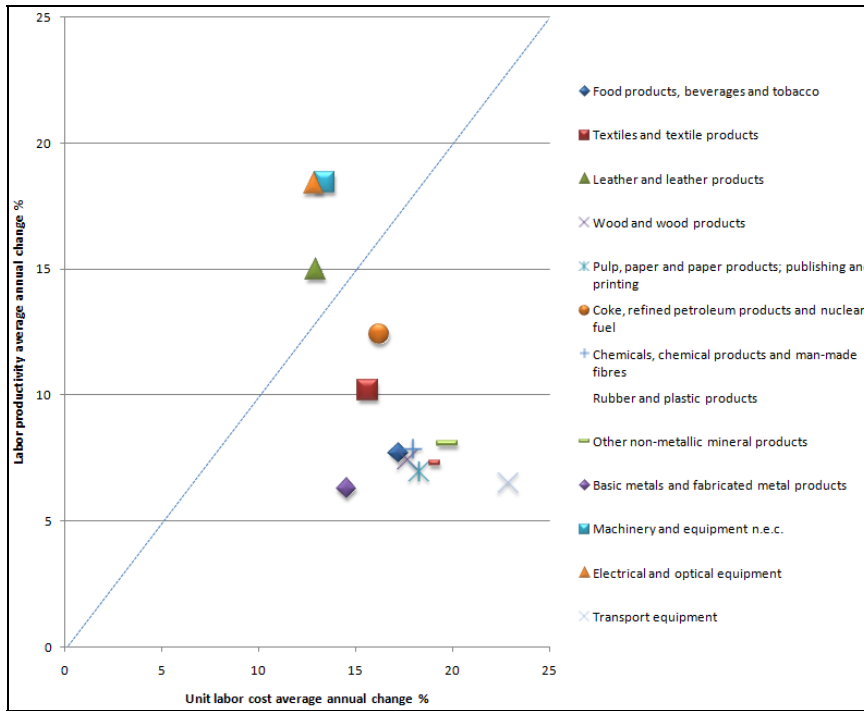


Source: Adapted from WIIW (2010)

The productivity of manufacturing has increased, but the increase in wages and ULCs has been stronger. In general, this is an indication of weakening competitiveness. The basic industries have the best productivity and they have the competitive edge. The ULCs have increased down the line and there have been only a few industries that have been able to increase their productivity more than the ULCs have increased. Machinery and equipment, electrical and optical equipment, and leather and leather products have been able to have such development between the years 2000 to 2008. This development has been important for these industries. The machinery and equipment and electrical and optical equipment industries also produce high technology products. These new industries are still small in size, but they have clearly potential and strength to develop in the difficult situation. The Russian industrial competitiveness is still in basic industries and based on natural resources. The smaller industries have potential, but they are still very small industries which have also a small share in exports. The change will definitely

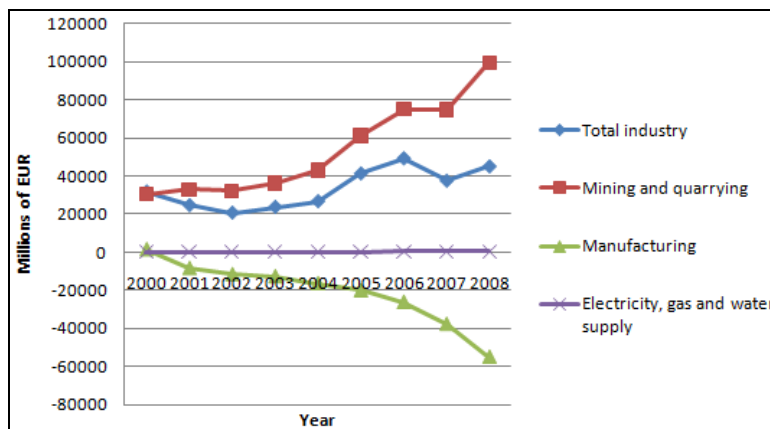
take quite a long time still for the developing Russian industries to become competitive in a scale which would affect substantially on the national and global level. Figure 4 presents the annual average development of labour productivity and ULCs in Russian manufacturing between the years 2000 and 2008.

Figure 4 Labour productivity and ULC average annual change % (see online version for colours)



Source: Adapted from WIIW (2010)

Figure 5 Russian trade balance with EU-27 (see online version for colours)



Source: WIIW (2010)

Russia is a very important trade partner to the EU, especially in primary products. Russia depends on the EU in import of machinery and high technology goods. The EU markets demand competitive products in exports from Russia and offer competitive products in imports to Russia, which measures competitiveness well. Russia's imports from the EU have increased dramatically in the last decade. The increased competition and imports have made the situation in Russian domestic manufacturing also difficult. Manufactures are increasingly imported from the EU. The demand of manufactures has increased significantly in recent years. This places the domestic industry in a position where it can grow or diminish depending on how competitive it can be compared to others. Figure 5 presents the trade balance of Russian industry with the EU-27 countries.

The Russian manufacturing industry relies still heavily on basic industries, which to great extent rely on natural resources. These industries are low value-adding industries that, however, provide a strong positive cash flow in trade through exports. The share of high technology export of manufactured exports has decreased quite dramatically. In 2008, only 6.5% of the manufactured exports were high technology, when the figure five years before was 20% (The World Bank, 2011). In general, Russia imports manufactures almost twice the worth of its exporting. The mining and quarrying industry provides Russia a strong positive trade balance (includes, e.g., the extraction of raw materials such as metals, crude oil, and natural gas). This leads to the positive trade balance in the total industry. The role of electricity, gas and water supply in trade is minimal compared to the other two industries. The manufacturing industry exports to competitive EU markets have increased, but the imports from these markets have increased even more. The increase in domestic production has been very moderate compared to the increase in imports. This indicates that the domestic industries are not able to meet the demands of the domestic markets. This is probably also the case in Russian manufacturing meeting the demands of international markets in general. Coke, refined petroleum products and nuclear fuel, basic metals and fabricated metal products, and wood and wood products are the only industries that produce a positive trade balance in manufacturing with the EU-15 countries. The Russian exports with the EU-27 in manufacturing increased by 97% between the years 2000–2008. At the same time the imports from the EU to Russia increased by 370%. The huge growth in imports indicates a significant growth in demand in Russian markets. The production in Russian manufacturing increased only by 66% at the same time, which proves that the domestic demand in Russia is increasingly met by foreign imports.

In manufacturing, the basic industries take the biggest share of exports. Coke, refined petroleum products and nuclear fuel have the largest share and they have been also one of the biggest growers. There are some big growers also among the other industries; these industries are still small, however, which makes the growth figures look good. Electrical and optical equipment is basically the only industry worth mentioning which has had good growth in exports to the EU-15 countries. Most of the industries have had just a minor growth in exports. There are only four industries which have more than a 10% share from production going to exports to the EU-15. These industries are coke, refined petroleum products and nuclear fuel, basic metals and fabricated metal products, wood and wood products, and leather and leather products. This indicates the competitiveness of these basic industries. These basic industries have also been able to increase their exports more than production in 2000–2008. In addition, the electrical and optical

equipment industry is the only one which has been able to increase its share in exports, but the size of the industry in exports is still quite small.

In general, all the industries have had a strong growth in imports in recent years. The most commonly imported products come from the machinery and equipment, transport equipment, electrical and optical equipment, and chemical industries. These industries are generally high technology industries. The transport equipment industry has had the most growth of all the industries. There are only three industries that were able to have a positive trade balance with the EU-15 countries in manufacturing in 2008, so that the worth of the exports were more than that of the imports. These industries are coke, refined petroleum products and nuclear fuel, basic metals and fabricated metal products, and wood and wood products. The huge increase in manufactured imports proves that the Russian markets have huge potential and they have strong demand for competitive products. This forms a very suitable platform for domestic production. Today's situation is, however, that the increasing imports are replacing the domestic production and the exports to developed markets have not increased substantially.

Most of the industries in Russian manufacturing seem to be in a difficult position. The industries have been able to increase their productivity, but the increase in labour costs has been overwhelming. The increase in exports has been generally relatively small, which indicates low competitiveness of Russian manufactures in the global markets. This is the case especially in technologically advanced fields of manufacturing industry. The overall increase in the production of Russian manufactures has been moderate. The huge increase in Russian consumption has increased the importing of manufactures from abroad, and the domestic industries seem to have difficulties to meet the increasing standards and demand.

This paper contributes to managerial issues and gives perspective what is happening in Russian manufacturing. The results can have implications also to policy-making which has agenda to influence the future of Russian manufacturing. The previous development of Russia's competitiveness does not indicate that there would be a notable change happening. Overall, the general development in competitiveness has been negative. Rising labour costs hinder the competitiveness because the industries are not able to increase their competitiveness at the same pace. There are some industries which do better than the others but still the overall development looks gloomy. Supporting the small and growing industries is important, but also the big traditional industries need attention. Attracting FDIs would help the situation in the long run. The general development suggests that there is definitely room for western FDIs with competitive production. The local markets are growing, and presence in Russia could work as an advantage. This would also put pressure for local companies to develop production, productivity, manufacturing technologies, and ultimately develop more competitive and innovative products.

6 Conclusions

The Russian GDP has developed significantly in recent years. The living standard in Russia is higher than it has ever been before, and productivity has increased; however, the Russian national competitiveness and the competitiveness of the manufacturing industry show few signals of increased competitiveness. The target of this study was to find out whether the main industries in Russian manufacturing have been able to increase

their competitiveness. The paper has discussed the general development in industries (production, labour productivity, ULCs) and taken the development and effects of foreign trade (exports and imports) into account.

The competitiveness of the Russian manufacturing industry has not been discussed extensively in the literature, and there has been room for further research. As a nation, Russia has a strong strive to change and become a more competitive knowledge-based economy. The manufacturing industry is in a vital role in developing the nation's competitiveness. This study has given a good overall view to the recent developments in the competitiveness of Russian manufacturing.

Russia has not been able to increase its national competitiveness in recent years, but it has not decreased either. There are issues that have not improved, which affects the nation's competitiveness. Russia is increasingly investing abroad and the companies are becoming more international. Russia is still an attractive market for foreign investors, which has positive effects on competitiveness as well. As a nation, Russia seems to have potential, but the development in increasing competitiveness has been poor.

The share of high-technology exports of manufactures from Russia has decreased substantially in the last five years, which indicates very poor development in producing competitive high value added products to the global markets. The wages and ULCs have increased more than productivity, which has had a negative effect on the competitiveness of Russian manufacturing industry. There are only a few industries which been able to increase their productivity and competitiveness. The general decline in competitiveness and the huge increase in manufactured imports prove that the situation in the whole manufacturing in Russia is not easy. The domestic production is outperformed by more competitive foreign production. The production and productivity in Russian manufacturing has increased in all the industries. Exports to developed economies have also increased substantially. The fast increasing labour costs have had a negative effect on competitiveness in all sectors. This has been the main source of negative development. The imports from developed European economies have increased, which indicates, to some extent, the inability of domestic production to match the demands, but even more it indicates the huge market potential that the Russian markets have for competitive products.

The basic, natural resource-based industries are generally the best performing industries. They control the exports and create surplus in trade. A majority of manufactures are imported from abroad, which indicates an inability of the industry to meet the market demands. There are a few notable industries that have shown good development in trade and other fields. The machinery and equipment and electrical and optical equipment industries have been able to raise their level of productivity more than the ULCs have risen. This is a clear indication of increased competitiveness. These industries are also among the few that have been able to increase their exports to the competitive EU markets considerably. The imports in the whole manufacturing have increased substantially, indicating increased demand but also toughening competition in the domestic markets.

The best performing industries have potential and they may turn up to be important for Russian competitiveness in the future if they are able to increase their competitiveness in international markets. As a nation, Russia has potential for becoming more competitive if it is able to create an attractive and supporting environment for creating new businesses and innovations. At the moment, the Russian manufacturing is in a difficult position. The

domestic production is growing slowly and foreign imports fill the Russian demand. The consumption in Russian markets has increased substantially, which offers great opportunities for industries. Meeting the demands of global markets is hard, but some Russian industries seem to be ready for the challenge.

This study has been done by using secondary sources of data. The study stayed only in the industrial level and covered the Russian manufacturing industry. It has tackled the general development and trends in the Russian manufacturing during the years 2000–2008. There is room for more in-depth data collection and analysis of Russian companies. This study presented a few industries which have had positive development regarding their competitiveness, but is this really the case? The large companies easily take a decisive role in statistics, especially in the case of Russia. How the Russian SMEs will handle the global competition and how strong they will be in the future are questions that are worth a further study.

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Appendix

Development of Russian manufacturing industry

	Total changes 2000–2008											
	Production 2008 (current prices MEUR)	Share of total industrial production 2008 (current prices)	Share of manufacturing production 2008 (current prices)	Production (reference prices 2002)	Employees	Productivity	Wages (deflated with CPI)	ULC (national currency)	Exports to EU-15 (EUR-based)	Imports from EU-15 (EUR-based)	Exports to EU-15 (absolute change MEUR)	Imports from EU-15 (absolute change MEUR)
<i>Total industry</i>	646857	100%	100%	47%	-16%	74%	137%	272%	383%	333%	65,678	66,242
<i>Mining and quarrying</i>	142199	22.0%	22.0%	39%	-38%	55%	104%	260%	581%	18%	47,084	54
<i>Electricity, gas and water supply</i>	70619	10.9%	10.9%	19%	-3%	23%	121%	390%	296%	-100%	323	0
<i>Manufacturing</i>	434039	67.1%	100%	66%	-19%	103%	145%	230%	221%	334%	18,271	66,188
Basic metals and fabricated metal products	89894	13.9%	20.7%	47%	-9%	62%	71%	188%	140%	310%	3,292	3,438
Food products, beverages and tobacco	72514	11.2%	16.7%	58%	-12%	80%	131%	251%	26%	127%	-35	2,563
Coke, refined petroleum products and nuclear fuel	59334	9.2%	13.7%	33%	-44%	140%	159%	197%	452%	497%	13,308	598
Transport equipment	41185	6.4%	9.5%	30%	-17%	57%	157%	347%	29%	983%	-24	13,551
Chemicals, chemical products and man-made fibres	34760	5.4%	8.0%	25%	-31%	80%	140%	264%	200%	311%	1,417	8,697
Other non-metallic mineral products	28418	4.4%	6.5%	62%	-12%	83%	174%	309%	25%	283%	3	1,194
Machinery and equipment n.e.c.	25782	4.0%	5.9%	89%	-46%	252%	209%	140%	84%	455%	143	16,061
Electrical and optical equipment	25233	3.9%	5.8%	207%	-12%	248%	200%	136%	175%	258%	171	10,088
Manufacturing n.e.c.	20738	3.2%	4.8%	64%	143%	-33%	121%	798%	19%	219%	-56	1,729
Pulp, paper and paper products; publishing and printing	14113	2.2%	3.3%	58%	-5%	65%	128%	277%	32%	153%	-79	1,562
Rubber and plastic products	10873	1.7%	2.5%	137%	38%	71%	134%	273%	899%	246%	100	1,861
Wood and wood products	6397	1.0%	1.5%	45%	-17%	75%	128%	257%	66%	289%	184	515
Textiles and textile products	3981	0.6%	0.9%	12%	-48%	114%	143%	210%	-67%	234%	-220	3,323
Leather and leather products	815	0.1%	0.2%	75%	-40%	190%	156%	142%	364%	201%	68	1,008

Source: Adapted from WIIW (2010)

