

THE LIFE CYCLE OF PARTNERSHIPS BETWEEN COMPANIES IN THE RUSSIAN ELECTRONICS INDUSTRY

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Abstract: Professional players on the Russian market in microelectronics form temporary partnerships so that they can design and develop microelectronic devices with a certain life cycle. This paper proves that the capacity of such partnerships to develop successfully and to achieve the goals they have set depends on the stages of their development, i.e. the stages of a partnership life cycle. The materialisation of these partnerships refers to all stages of the technological value chain of microelectronic devices, which allows each professional player on the Russian market in microelectronics to perform their functions. Each stage of the partnership life cycle relates to specific features and key success factors. By analysing the stages of partnerships life cycles, it is possible to predict and identify potential problems in terms of the materialisation and development of inter-organisational relationships.

Key words: life cycle, joint activity, partnership, interdependence, professional players on the Russian market in microelectronics.

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Introduction

The integration processes which Russian companies are going through refer to a variety of branches, including microelectronics, which is the most science-intensive and technologically complex branch of the electronic industry. The development of microelectronics today is determined by the operation of companies with a specialised manufacturing structure, since the different stages of the life cycle of a microelectronic device cannot all be materialised within a single company. Hence, a variety of companies operates on the market in microelectronics, each of them having their specific functions at a certain stage of a microelectronic device life cycle.

All professional players on the market in microelectronics need to maintain relationships with the other companies whose operation is related to the design and development of microelectronic devices so that that the technological value chain can be materialised. It is only through the joint activity of all parties involved in the technological chain and the combination of their resources, capacity and competences that microelectronic components can be designed and produced nowadays.

I.

The interaction between professional players on the market in microelectronics in Russia can be presented with two models²: the 'client – design centre – foundry' model of interaction (based on a signed contract) and the 'fabless –foundry' model of interaction. The choice of a model is determined by the availability of a client or consumer for the product, i.e. the product is either made to meet a government order (fig. 1), or its manufacturing is based on an analysis of market demand (fig. 2).

² See **Karpuhina**, N. N. Modeli razvitiya elektronnoy promyshlennosti // Rossiyskoe predprinimatel'stvo, 2013. No. 10 (232). p. 149-157.

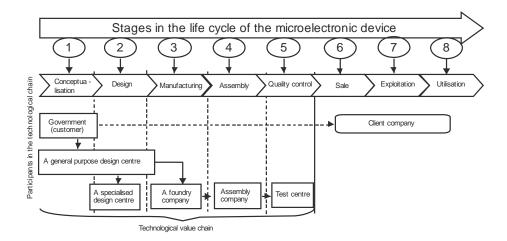
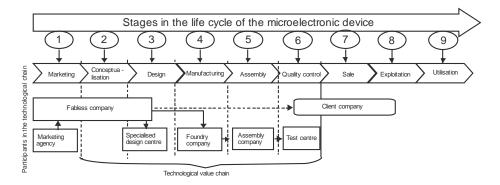
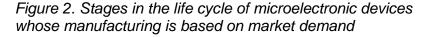


Figure 1. Stages in the life cycle of microelectronic devices whose manufacturing is based on a government contract





The interaction between the participants in the technological value chain is a coordinated activity that is essential to the life cycle of the microelectronic device. The technological value chain is implemented at the following stages in the life cycle of the microelectronic device: conceptualisation, design, manufacturing,

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assembly and quality control. Each participant in the technological value chain has specific functions, thus ensuring the implementation of one or more stages in the life cycle of the microelectronic device. The functions and responsibilities of all professional players on the market in microelectronics should be clearly defined when they implement the technological value chain (table 1).

Table 1.

Functions and necessary resources, facilities and competences of the participants in the technological chain of microelectronics companies

Participant in the	Particpant's functions	Participant's resources,
innovation chain		technologies, and facilities
General purpose design centre	The entire cycle of designing the device and its preparation for manufacturing	 modern computer equipment and specialised software; highly specialised skilled personnel.
Specialised design centre	Preparing the documents for the specialised units of the device	 modern computer equipment and specialised software; highly specialised skilled personnel.
Fabless company	The whole life cycle of the device without its manufacturing and testing	 modern computer equipment and specialised software; highly specialised skilled personnel.
Foundry company	Manufacturing the crystals of electronic components	 technological facilities for manufacturing the devices; materials; highly specialised skilled personnel.
Test centre	Testing the electronic components	 specialised equipment for testing the devices; highly specialised skilled personnel.
Company assembling the electronic components	Assembly of the electronic components (building)	 specialised equipment for assembling the devices; highly specialised skilled personnel.

General purpose design centres and fabless companies initiate the establishment of new technological value chains; implement the first stages in the life cycle of microelectronic devices (conceptualisation and design), and benefit the most. They are coordinators of the technological value chain and act as central units with which orders are placed and which are responsible to clients. The other participants are subordinate to them and act as competitors to each other, since it is the coordinator who decides whether a company will join the technological value chain or not³. Such inter-organisational relationships are characterised by comprehensiveness: symmetrical interdependence between partners; joint effort of partners to achieve common goals; a certain level of confidence between partner companies; in other words, they are based on collaboration⁴.

Professional players on the Russian market in microelectronics depend heavily on one another when forming the technological value chain at the stages of conceptualisation, design, development, assembly, and quality control^{5,6}, since the product which is the result of the operation of one partner will be used in the operation of another partner ^{7,8}. Each partner thus signs an agreement with the other participants in the chain to

³ See **Yuldasheva**, O. U., Chubatyuk A. A. Upravlenie tsepochkoy sprosa // Marketingovoe upravlenie v komertsii i logistike. Nauchnaya sessiya professorskoprepodavatel'skogo sostava, nauchnyh sotrudnikov i aspirantov po itogom NIR 2009. Mart-aprel' 2010 goda. Fakul'tet kometrsii I marketinga: Sbornik dokladov v dvuh chastyah / Pod red. I. D. Afanasenko. Ch. 2. SPb.: Izd-vo SPb GUEF, 2009. p. 9-14.

⁴ See **Larionova**, I. G. Formirovanie mezhfirmennyh setey v poligraficheskom komplekse regiona: avtoref. dis. na soisk. uchen. step. kand. ekon. Nauk. Krasnodar: Kubanskiy gosudarstvenyy universitet, 2015. p. 23.

⁵ See **Najafian** ,M. Colabi A.M. Inter-organizational Relationship and Innovation: A Review of Literature. Global Business and Management Research: An International Journal. № 6 (1). 2014. p. 52-70.

⁶ See **Hekansson**, H. Snehota I. Developing Relationships in Business Networks // London: Routledge.1995. p. 433

⁷ See **Mil'ner**, B. Z. Teoriya organizatsii: Uchebnik. 3-e izd. prerab. i dop. M. INFRA-M, 2002. p. 558

⁸ See **Thompson**, James D. Organization in Action: Social Science Bases of Administrative Theory, Transaction Publishers. 2011. p. 192

implement joint activities and hence becomes involved in interorganisational relationships.

At the same time, fabless companies, foundry companies, test centres and assembly companies can be involved in different partnership networks nowadays⁹.

Partnerships between professionals on the Russian market in microelectronics are formed on a timely basis to design and develop a microelectronic device and meet a government order or execute the project of a fabless company. Such partnerships may be defined as a process ensuring the implementation of specific functions and management impacts to accomplish certain commercial results¹⁰.

In this case, partnerships between professionals on the Russian market in microelectronics will be a form of developing their business¹¹. If we equate profit to the synergetic effect of interaction between companies involved in the partnership and the conditions under which they operate when the technological value chain is formed, then the system in which such interaction occurs might be called a business system¹².

The term 'business system' will be used to refer to the set of business processes which implemented by professionals on the Russian market in microelectronics who get involved into temporary inter-organisational partnerships to establish a technological value

⁹ See **Kulikova**, N. N. Upravlenie partnerskimi vzaimootnosheniyami v elektronnoy promishlennosti // Ekonomika i predprinimatel'stvo. No. 11. 2015. p. 542-545.

¹⁰ See **Bek,** M. A., N. N. Bek, E. V. Buzulukova i dr. Metodologiya issledovaniya setevyh form organizatsii biznesa: kollekt. monogr. / pod nauch. red. M. Yu. Shereshevoy; Nats. issled. un-t 'Vysshaya shkola ekonomiki'. M.: Izd. dom Vysshey shkoly ekonomiki, 2014. p.446

¹¹ See **Koval'skaya**, M. I. Korporativnyy menedzhment na zheleznodorozhnom transporte. Uchebnoe posobie dlya studentov spetsial'nostey 'Menedzhment organizatsii' i 'Upravlenie personalom' / Pod red. V. A. Kozyreva. – M.:MIIT, 2008. p. 231.

¹² See **Efremov**, V. S. Biznes-sitemy postindustrial'nogo obshtestva // Menedzment v Rossii i za rubezhom. No. 5.1999.

http://www.cfin.ru/press/management/1999-5/01.shtml (last access 28.04.2016).

chain which meets the requirements of a particular client and is based on aligned interests and coordinated activities.

Business systems may and should be approached as systems of relationships. The parties involved in a business system must determine the 'price' of their commitment to the partnership. A company will thus be involved in a partnership only when an agreement on that 'pricing' has been achieved¹³.

As business systems, partnerships between professional players on the Russian market in microelectronics have life cycles that reflect multiple consequential changes over time, from the moment when a business system occurs until the moment of its disappearance, as well as its condition at a random point of time in the overall existence of the system. The attributes of the life cycle of a partnership as a system include its duration in time, as well as the presence of a few consecutive and mutually related stages¹⁴.

Inter-organisational relationships must be materialised at all stages in the life cycle of the microelectronic device; we can therefore claim that partnerships between professional players on the Russian market in microelectronics also have life cycles when microelectronic devices are designed and developed. The life cycle of a partnership is thus determined by the sequence in the technological value chain.

Ш.

The life cycle of partnerships between professional players on the Russian market in microelectronics is considerably longer than the total time of contractual agreements and the conventional

¹³ http://www.cfin.ru/press/management/1999-5/01.shtml (last access

^{28.04.2016).} ¹⁴ **Dresvyannikov**, V. A. Osobennosti zhiznennyh tsiklov razlichnyh ekonomicheskih sistem // Menedzment v Rossii i za rubezhom. - 2008. - No.6. URL: http://dis.ru/library/557/26780/ (last access 29.04.2016).

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stages of design and development of microelectronic devices¹⁵. It is possible to identify four stages in the life cycle of partnerships between professional players on the Russian market in microelectronics (fig. 3): partnership preparation, partnership implementation, partnership maintenance, and partnership termination.

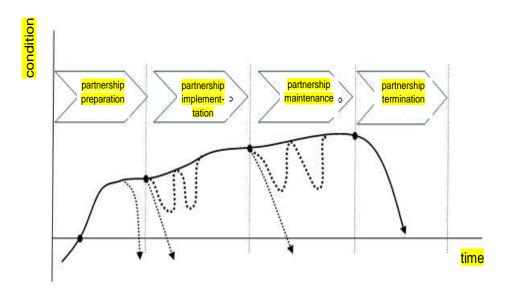


Figure 3. Life cycle of partnerships between professional players on the Russian market in microelectronics

Below is a description of the stages in the life cycle of a partnership between professional players on the Russian market in microelectronics (table 2).

¹⁵ **Solov'ev**, M. M. Kontseptsiya i mehanizmy realizatsii gossudarstvennochastnogo partnerstva / M. M. Solov'ev, M. G. Zhalkubaeva // Materialy doklada na Mezhdunarodnoy konferentsii MLSD'2, 1-3 oktobrya 2008 – M., IPU RAN. – 2008.

Table 2.Characteristics of the stages in the life cycle of partnershipsbetween professionals on the microelectronics market

Stages in a	Features of the stage
partnership life	
cycle	
Partnership preparation	 The general-purpose design centre or the fabless company creates awareness that the design and development of a microelectronic device require inter-organisational relationships with companies that have certain resources, capacity and competences. Clearly defined objectives of the partnership and requirements for all participants so that potential partners can be identified and assessed.
Partnership implementation	 The coordinator of the technological value chain (the general-purpose design centre or the fabless company) is in search of companies that meet the specific requirements, implements interaction with potential partners, ideas are exchanged and joint agreements are made. The specific capacity and needs of all potential partners are assessed in terms of the partnership goals and the desired features of partners. Consideration of the benefits that the partnership will bring to each partner and whether these benefits will be sufficient to attract and retain the partners. Designing the structure of the partnership and making the necessary arrangements to start the project related to the design and development of the microelectronic device by determining timeframes and partners' roles, responsibilities, and incentives. The partnership is formalised through contractual agreements to establish a roadmap for managing the inter-organisational relationships between partners.
Partnership maintenance	 Developing mechanisms for coordination of inter-organisational relationships (alignment, synchronisation, control and standardisation) to ensure the smooth implementation of the design and development of the microelectronic device and meet a government order or implement the project of a fabless company. Formal relationships and coordination of current activities are essential at the early stages in the life cycle of a microelectronic device. Execution of contractual obligations; joint coordinated activities to accomplish the goals of the partnership; each partner benefits from the other participants. Analysis and evaluation of the work done at different stages of the life cycle of the microelectronic device; coordination of changes which need to be introduced on the basis of the evaluation made.
Partnership termination	 Partnerships between professionals on the Russian market in microelectronics are structures that exist for a certain period of time only. All stages of the microelectronic device's life cycle must be concluded within the set deadline. The procedure for the termination of a partnership must be described in the contractual agreements so that all parties will be aware of their responsibilities and the actions they will need to take. Signing a joint activity agreement with clients, contractors and subcontractors.

The key success factors for each stage in the partnership life cycle are identified below¹⁶:

Alignment of all partners' interests and objectives; good coordination of their activity;

Jointly set realistic goals and expectations;

Collaboration at each stage in the life cycle related to the design and development of the microelectronic device;

- Flexibility, especially in terms of problem resolution and change.

A good awareness of the life cycle of a partnership helps manage and evaluate the partnership relationships between companies for microelectronics and establish new partnership relationships in future.

This paper next highlights the specific features of the implementation of a partnership life cycle on the Russian market in microelectronics when designing and developing a microelectronic device.

Clients may determine for themselves the list of subcontractors, which will reduce the scope of general-purpose design centres. Obviously, this may affect the implementation of the other stages in the partnership life cycle. In addition, the life cycle of a partnership may develop unevenly, increasing the time span of some stages or terminating the partnership at a certain stage before reaching the point at which the microelectronic device should be delivered to the consumer.

The partnership preparation stage may not be followed by the next stages due to lack of clear awareness of the target market, for example, or an unclear technical assignment for the design of the microelectronic device and the preparation for its manufacturing.

¹⁶ See **Bek**, M. A., N. N. Bek, E. V. Buzulukova i dr. Metodologiya issledovaniya setevyh form organizatsii biznesa: kollekt. monogr. / pod nauch. red. M. Yu. Shereshevoy; Nats. issled. un-t 'Vysshaya shkola ekonomiki'. M.: Izd. dom Vysshey shkoly ekonomiki, 2014. p. 446.

The partnership implementation stage may develop unevenly, or it might stop without going to the next stage. Discussing the terms with potential subcontractors may take a longer time or it may be discontinued when no agreement may be reached due to technical reasons; dissatisfaction with financial conditions; time constraints; prolonged coordination of functional and technological requirements, etc.

The partnership maintenance stage may also develop unevenly if partners are unable to adapt to the dynamics of interaction, design the necessary mechanisms for control of the implementation of functional tasks or cooperate to avoid conflicts. Such circumstances may delay the implementation of the life cycle stage.

Conclusion

In order to design and develop a microelectronic device, it is essential that all professional players on the Russian market in microelectronics, especially general-purpose design centres and fabless companies that are involved in conceptualisation and design, will be aware of the current condition of their partnership lifecycle. Another key factor is the ability to predict an ideal structure for the partnership, as well as the dynamics of its development, so that its preparation, implementation, maintenance and termination will be conducted efficiently. Each stage in the partnership life cycle must include evaluation of results and partnership relationships. Such an evaluation should also be made in terms of the initial goals and objectives of the partnership.

Formal evaluation is necessary when external events result in certain changes. Informal evaluation is necessary to ensure communication between partners and operational management of partnership relationships. We should also note that even the best partnership relationships would benefit from regular formal evaluation and monitoring. The most common reasons for an evaluation of partnership relationships are summarised below¹⁷:

Agreed timeframes for reviews;

A sudden external event which affects the stages of design and development;

- The unilateral unplanned actions of one partner;

- If the results achieved with the design and development of the microelectronic device substantially differ from the targets.

A similar approach to the life cycle of partnerships helps predict and identify the majority of problems according to the size and development of partnerships as a business system: find the most adequate solutions at each stage in the life cycle, continue to the next stage in the life cycle according to schedule and avoid dramatic fluctuations, and accomplish the goals set for each stage.

Partnership management is necessary for the successful implementation of all stages in the life cycle that relate to the design and manufacturing of a microelectronic device. Awareness of a partnership life cycle is the basis for analysis and further improvement of currently existing and potential future interorganisational relationships among companies on the Russian market in microelectronics.

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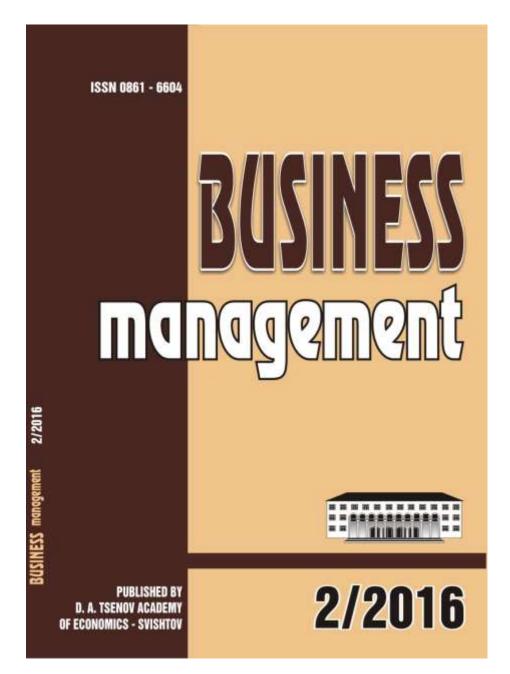
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