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Public Business Services of Technology Parks in Rural Areas

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Public Business Services of Technology Parks in Rural Areas

Executive Summary

The aim of this study is to describe the public business services of technology parks for technology intensive SMEs in rural areas. This study is part of a project funded by the European Regional Development Fund. The technology parks in rural areas are facing context specific challenges as they provide services for their customers. Research problem of this study can be condensed into the following research questions: How are the public business services organised by technology parks in the rural area of Oulu South? What kind of business services do technology parks provide for early-stage technology intensive companies in sparsely populated areas? The research questions are analysed by analysing and comparing the supply of services of the three subregional technology parks. As a result of this multiple case study, the services for early-stage technology intensive SMEs and the practises of the rural context are clarified.

Keywords: technology parks, public business services, small- and medium -sized enterprises (SMEs) technology intensive SMEs, stage models, growth, rural context

Introduction

Public business services are often perceived as a multifaceted system from the customers' viewpoint in Finland. Services are provided by national organisations, as well as, by regional agencies such as science and technology parks and centres, regional development agencies, and by universities and other organisations. This multiple case study explores how the public business services of technology parks are organised in rural area and describes what kind of business services are provided for early-stage technology intensive companies.

The region of Oulu South is situated in the southern part of Northern Ostrobothnia. Oulu South is not a governmental unit or area. It was formed to increase inter-municipal co-operation and to gain the critical mass for national and international competition. The region consists of three subregions and 14 municipalities with about 90 000 inhabitants. Oulu South is one of the main rural areas in Finland. Oulu South is characterised as an entrepreneurial and industrialised countryside, which offers one of the lowest employment rates in northern Finland. The demographic challenge is emigration from the area. On the other hand, the proportion of young people seems to remain high because of high birth rate. There are about 4600 active companies in Oulu South; the majority of them (95%) are micro-sized companies¹.

In the recent literature, SME's are considered to be an important and integral part of every country's economy; the fastest growing sector of many economies, more flexible and adaptable in terms of structure and having a faster speed of response than larger organisations.² SMEs are often associated with a higher economic growth of nations^{3,4,5}. The impact of SMEs on employment is significant⁶. On the other hand, compared to large enterprises, SMEs typically have fewer financial resources, lower technical expertise, and more limited management skills⁷. A large SME sector as such does not directly cause economic growth, but is indeed a key characteristic of successful economies. A successful SME sector can be considered a vital part of the growth and development in sparsely populated regions. The 'early stages' of firms is a critical period for their survival and success. A significant portion of firms fail during their early years of existence. Serving this group of companies well is an important challenge for public business services. The stage-framework utilized in this study is based on recent extensive meta-analysis of empirically-based stage models⁸.

The technology parks in rural area are facing context specific challenges as they provide services for their customers. Research problem of this study can be condensed into the following research questions: How are the public business services organised by technology parks in the rural area of Oulu South? What kind of business services do technology parks provide for early-stage technology intensive companies in sparsely populated areas? These questions are studied by analysing the supply of services of the three subregional technology parks.

The case study was selected as a strategy to answer the main research questions; the power of case study is in clarifying the complicated processes and in obtaining new knowledge when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used⁹. The empirical evidence was collected in the end of 2011 from three subregions of Oulu South. Interviews were conducted using similar research process and questionnaires. The data and the case study evidence was further analysed and synthesized. By investigating the three cases, this study explored how the public business services of technology parks are organised in rural area and describes what kind of business services are provided for early-stage technology intensive companies.

¹ Statistics Finland 2011

² Tagliavini M, Ravarini A & Antonelli A (2001) An evaluation model for electronic commerce activities within SMEs. *Information Technology and Management* 2(2): 211-230.

³ Beck T, Demircuc-Kunt A & Levine R (2005) SMEs, growth, and poverty: cross-country evidence. *Journal of Economic Growth* 10(3): 199-229.

⁴ Reynolds PD (1997) New and small firms in expanding markets. *Small Business Economics* 9(1): 79-84.

⁵ Robson PJA & Bennett RJ (2000) SME Growth: The Relationship with Business Advice and External Collaboration. *Small Business Economics* 15(3): 193-208.

⁶ Ayyagari M, Beck T & Demircuc-Kunt A (2007) Small and medium enterprises across the globe. *Small Business Economics* 29(4): 415-434.

⁷ Blili S & Raymond L (1993) Information technology: threats and opportunities for small and medium-sized enterprises. *Int J Inf Manage* 13(6): 439-448.

⁸ Muhos M (2011) Early stages of technology intensive companies. Oulu, University of Oulu. (doctoral dissertation)

⁹ Yin RK (1989) Case study research: Design and methods. Beverly Hills, Sage Publications.

Theoretical background

Entrepreneurship drives the economy of most nations. In Finland the national strategy is to enhance SMEs. Entrepreneurship is critical to rural development. Rural small businesses face issues in geo-demographic, socio-cultural and economic aspects. It can be argued that the basic entrepreneurial processes in rural areas are not different to those in urban areas. Yet, rurality may offer an innovative milieu in which enterprises may either flourish or become inhibited. There are numerous ways to support SMEs and foster economic development including dedicated government and regional agencies, specialized SME support financiers, science parks, business stimulation and incubator programs, networking programs, and various kinds of technology development, dissemination initiatives and entrepreneurship education.¹⁰

It is known¹¹ that innovations are often born practice-based in various innovation surroundings. That kind of innovation operations can be promoted by improvement of local innovation system. The global viewpoint to innovation ecosystems was recently opened¹². However, the central actors of local innovation system are companies, educational institutions, science and technology base (including universities, research institutes, and private R&D units), specialised private, semi-public, and public business services (including financing, consultancy, technology transfer and incubation services) and interest groups (e.g. trade and entrepreneurial associations, chambers of commerce), and local authorities.¹³

In the decade of 2010, enhancing innovations and regional development are common in rural areas, too. Regional innovation actions can be described as a model of bulbous, in which the core is a commercial innovation, a product or a service. It is surrounded by the innovation operations or processes of the company. The third circle is the regional innovation system covered by the innovation policy or the leadership of innovation surroundings. The public regional development organisations act on the two outermost levels promoting the innovation possibilities and other preconditions of the enterprises, as well as, renewing the regional innovation system and developing its management and leadership.¹⁴

Many models have been formed in order to clarify the early stages of technology intensive companies during past decades. An extensive review of the research focusing on the stages of development was recently provided^{15,16}. A four-stage framework¹⁷ a synthesis of recent empirically based models¹⁸ was found applicable for a self-assessment of the early stages in technology intensive companies¹⁹. One central aim was to form a framework that could help intermediaries to provide more accurate support for the new technology intensive companies. In this analysis, the early-stage technology intensive firm is an independently owned firm, which is not more than 25 years old²⁰. The four stages of self-evaluation framework can be condensed into a following table 1.

Table 1: Self-evaluation framework of early stages of a technology intensive company

¹⁰ Ahonen M & Kokko E (2006) Pre-incubation in rural and sparsely populated area. Framework for creating the model for pilot testing. Proceedings of 14th Nordic Conference on Small Business Research in Stockholm. Stockholm, NCSB 11-16 May 2006.

¹¹ Harmaakorpi V & Melkas H (2008) Innovaatiopolitiikkaa järjestelmien välimaastossa. Helsinki, Kuntaliitto.

¹² Launonen M & Viitanen J (2011) The Global Best Practise for Manageing Innovation Ecosystems and Hubs. Helsinki, Hubconcepts.

¹³ Kolehmainen J (2003) Territorial agglomeration as a local innovation environment: the case of a Digital media agglomeration in Tampere, Finland. Massachussetts, MIT IPC.

¹⁴ Siltanen K & Kolehmainen J (2011) Innovaatioiden ja osaamisen alueet. Johtamiskorkeakoulu, Tampereen yliopisto. Koheesio- ja kilpailukykyohjelman verkostojulkaisu 8/2011. Seinäjoki, Innovaatio ja osaaminen -verkosto. Frami Oy.

¹⁵ Muhos M, Kess P, Phusavat K & Sanpanich S (2010) Business growth models: review of past 60 years. International Journal of Management and Enterprise Development 8(3): 296-315.

¹⁶ Muhos M (2011) Early stages of technology intensive companies. Oulu, University of Oulu.

¹⁷ Muhos M (2011) Early stages of technology intensive companies. Oulu, University of Oulu.

¹⁸ See. e.g. Garengo P & Bernardi G (2007) Organizational capability in SMEs: Performance measurement as a key system in supporting company development. International Journal of Productivity and Performance Management 56(5-6): 518-532., Hanks SH & Chandler G (1994) Patterns of Functional Specialization in Emerging High Tech Firms. J Small Bus Manage 32(2)., Kaulio MA (2003) Initial conditions or process of development? Critical incidents in the early stages of new ventures. R&D Management 33(2): 165-175., Kazanjian RK & Drazin R (1990) A stage-contingent model of design and growth for technology based new ventures. Journal of Business Venturing 5(3): 137-150., Smith KG, Mitchell TR & Summer CE (1985) Top Level Management Priorities in Different Stages of the Organizational Life Cycle. The Academy of Management Journal 28(4): 799-820., Stam E (2007) Why Butterflies Don't Leave: Locational Behavior of Entrepreneurial Firms. Economic Geography 83(1): 27.

¹⁹ Muhos M, Iskanius P, Kess P, Phusavat K & Sanpanich S (2009) Framework for Sequential Analysis of New High-Tech Businesses. The eChallenges e-2009 Conference, 21-23 October 2009, Istanbul, Turkey : 1-14

²⁰ Storey DJ & Tether BS (1998) New technology-based firms in the European union: an introduction. Research Policy 26(9): 933-946.

Stage 1: Conception and development	Stage 2: Commercialisation	Stage 3: Expansion	Stage 4: Stability/ renewal
<p>Newly established firm is owner-dependent. The objective is product and/or technology development and establishment of an early customer base. The main activities relate to the business idea, identification of a market, and resource mobilisation. Development of a working prototype is started. The management is informal, flexible and creative, communication is face-to-face, and the decisions are made by the owner. Organisation functions as a product development team. The cash flow falls into the red because there is not much to sell yet.</p>	<p>The stage begins with the early reference customers. The objective is creation of a business and commercialisation of the product. The stage is characterised by early manufacturing and marketing, and initial technical challenges. The company learns to make the product and to produce it. Management style is participative and coordinative. The nucleus of the administrative system is dominated by the owner and/or a small amount of partners. Resource generation and survival are key issues. The amount of negative cash flow decreases.</p>	<p>At this stage, manufacturing and technical feasibility and market acceptance lead to high growth and constant change. The main objective is to manage the company toward growth and increasing market share by marketing and manufacturing the product efficiently and in high volume. The company needs to produce, sell, and distribute the product at an increasing volume while taking care of efficiency and effectiveness through structures and processes. New customers and new market channels require constant attention. Personnel problems result from high growth. The owner and/or entrepreneurial team are central, though a sense of hierarchy increases. Budgets are moderately utilised for communication. More specialised functions are considered and added. Positive cash flow increases rapidly.</p>	<p>The company faces a lowering growth rate and intense competition in a maturing product-market. Effort is needed for launching a second generation of the product and for effectiveness and efficiency issues. Identification of new markets is essential for company renewal. However, cost control and productivity become the main concerns. Growth and reasonable market share are maintained by the resulting product generations and profitability improvements. The owner is usually supported by or replaced by a professional manager or a management team and professional management systems are added. Strategies, rules, regulations and procedures are standardised and formalised. Employees become specialised, non-risk takers. Specialised functions are added. The stage is characterised by a decreasing growth of cash flow.</p>

The above described framework functions as a reference framework in this study. The framework is utilised to reflect and analyse the services provided by technology parks of sparsely populated area.

Method

This is a holistic multiple case study²¹. The research process of this study is presented in the following figure:

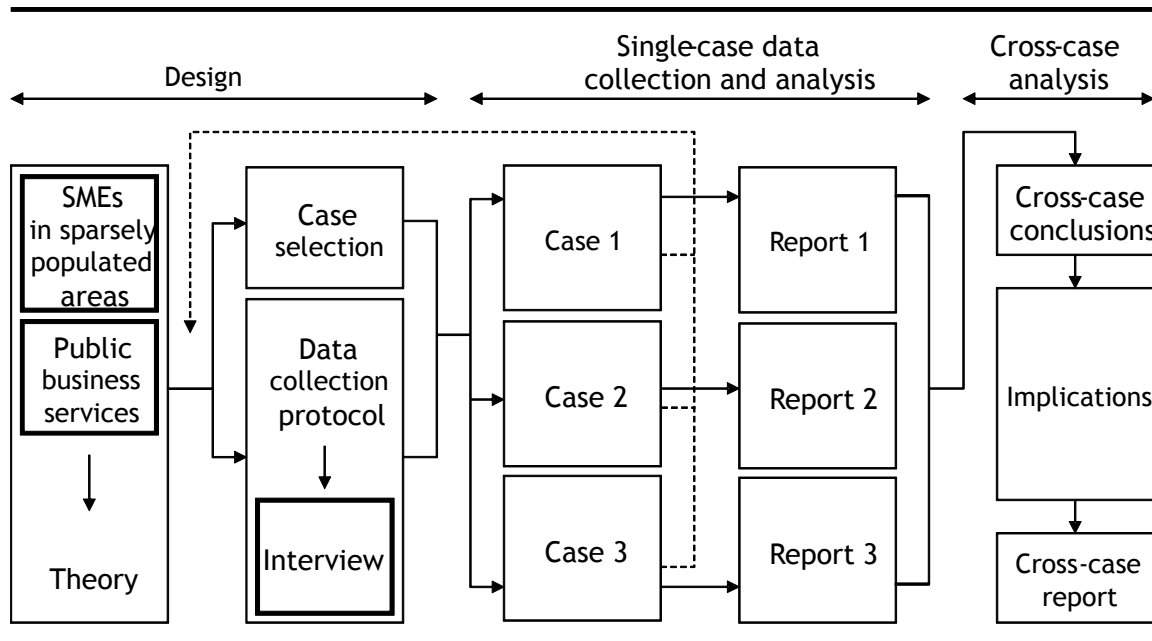


Fig 1. Research process

The unit of analysis in this study is a public business service organisation located in sparsely populated area. In this study, the empirical data was gathered via semi-structured interviews and public archive related to the case technology parks in three sub regions of Oulu South. The interviews with key informants were conducted face-to-face during fieldwork. The questionnaire consisted of seven sections presented in appendix 1. During the interview the interviewer summarised the explanation provided by the interviewees in order to avoid a biased or incomplete interpretation. The case study evidence was saved to the database. The case study evidence was collected by a researcher trained for data collection procedures and theoretical background of this study. The data collection process took place in fourth quarter of 2011. The interviews were recorded and lettered. In an inclusive and iterative process the data was analysed and the main findings were summarised. The subregions, business service organisations and interviewees are presented in a following table 2.

²¹ See e.g. Saunders M, Lewis P & Thornhill A (2007) Research methods for business students. London, Financial Times/Prentice Hall., Yin RK (1989) Case study research: Design and methods. Beverly Hills, Sage Publications.

Table 2. The interviewees and the organisations

Interviewee	Position	Organisation	Subregion
A	Development manager	YTEK	Ylivieska subregion
B	Chief Executive Officer	YTEK	Ylivieska subregion
C	Business development manager	Ylivieska subregion	Ylivieska subregion
D	Chief Executive Officer	NIHAK	Nivala-Haapajärvi subregion
E	Business development manager	NIHAK	Nivala-Haapajärvi subregion
F	Project manager	NIHAK	Nivala-Haapajärvi subregion
G	Chief Executive Officer	Haapavesi Technology Park	Haapavesi-Siikalatva subregion
H	Executive director	Siikalatva Development Center	Haapavesi-Siikalatva subregion

Results

Case Nivala-Haapajärvi subregion

Nivala-Haapajärvi subregion has arranged its business development services via the development company NIHAK which is operating as a limited company. The NIHAK is a municipal producer and its duty is to develop the region together with its member municipalities and partners by using means of programme based regional development. The aim of the business development services is to develop several kinds of business activity, excluding the primary production in agriculture and forestry, which leans on other actors' responsibility.

Table 3. The service description of Case Nivala-Haapajärvi subregion

	Nivala-Haapajärvi subregion
Organisation of services	NIHAK
Municipalities	Haapajärvi, Kärsämäki, Nivala, Pyhäjärvi and Reisjärvi
Inhabitants	30333
Amount of enterprises	1600
Employees working with entrepreneurs	10

The roles of the personnel is divided in the way where the personnel has both a horizontal responsibility (e.g. the incubation services and the services of the growing enterprises), and a vertical (local) municipal business development consultation responsibility. In every member municipality there is a business development manager and an agency, where the entrepreneur receives a start package on business development services with the principle of a "single window" system. The business development managers respond to the business development services in their "own" municipality, but co-operate with each other as a network given their expertise for the benefit of the subregion.

The main content of the service is recognizing and understanding the process and the life-cycle stage in the business activity and then offering the right service. The client receives information from the business development services e.g. about start-up grants, business development assistance

and loans along with securities for loans. Moreover, e.g. acquisition and other ownership change related services are offered.

In addition to producing the services itself, the development company is an agent for services of the cooperation partners (TE-Office, Leader-activity group, ProAgria, ELY-Centre, Finnvera and Tekes etc.) and provides e.g. manufacturing studios, premises, international services etc. The NIHAK is regarded in the interviews as an immediate interface between the enterprises, society and the public economy. Several actors take part in the cooperation coordinated by the NIHAK. The development company's personnel need to have wide enough know-how and readiness concerning also the services of the cooperation partners, so that the role as an intermediary organisation is working. The NIHAK business development managers act also in these service concepts as an intermediary and a consultant, when they search for a suitable service concept for the client enterprise.

The proactivity of the services is pointed out. The business development managers contact the enterprises in the region annually. In the development discussions they orient to understand the enterprise's situation and receive sufficient knowledge for providing information of the specific services fit to the company.

Services for technology intensive enterprises presented in phases

Services for enterprises in *the conception and development phase* include general enterprise consultation, enterprise start-up consultation and grants. In addition, business idea development, survey of grant opportunities, evaluating the profitability, different kinds of plans (e.g. a business activity plan), financial statements, financial planning and applying for financing, are offered. There is also the incubation service, which is directed especially to commencing enterprises and young enterprises, as well as, for those who start up and develop new business activities and have opportunities for expanding. Innovation services, like protection of innovations and building up development services, suit to the enterprises in this phase. Additionally, the NIHAK offers with its partners training in enterprising, manufacturing studios, premises and internationalisation services.

Services directed into *the commercialisation phase* are the incubation, where the enterprise is developed in cooperation, and utilizing consultants. Targeted training is also available. Several times a general business development consultation with the right questions to the entrepreneur, gives the necessary help for the enterprise. As an intermediary organisation the NIHAK has also recommended e.g. the marketing and sales programme offered by the ELY-Centre.

The NIHAK role as an intermediary organisation is emphasized when the enterprise being served is in *the expansion phase*. The expertise of the own organisation is utilized for instance in budget calculation. Typical services offered in this phase are financial planning and applying for financing. Several kinds of sticking points become current; the manufacturing is e.g. not able to respond to the sales growth. Problems may appear with the production management, quality management systems, financing, working capital, increase in staff and recruitment. To recognize the acute sticking points and bottlenecks, the enterprise may need outside expertise that the NIHAK can offer. All internationalisation services, e.g. the shared export secretary service, can also be seen as expansion phase services.

On grounds of the interviews *the stability and renewal phase* is interesting also because some of the enterprises are content with the stability and are not trying to reach growth. The business activity is getting stabilized and in the absence of growth desires, any significant needs for utilizing business development services does not appear any more. As far as the enterprise anyway has desires and needs for a renewal, a stage of expansion with new investment planning may often come up. Possibly there is a need for an expert from outside as well. In this phase the change of ownership may become current in the enterprise's development. If the entrepreneur is interested to abandon the enterprise, the NIHAK can cooperate in implementing the acquisition. NIHAK can negotiate with the purchasing candidates from outside. Also family business succession is promoted.

Case Haapavesi-Siikalatva subregion

The establishment of Haapavesi-Siikalatva subregional joint authority brought together regional development and business services of municipalities in 1996. Nowadays, joint authority, Siikalatva Development Center produces business services for municipalities of Siikalatva and Pyhäntä, and via regional development projects also for Haapavesi municipality. However, Haapavesi produces its general business services locally.

Table 4. The service description of Case Haapavesi-Siikalatva subregion

	Haapavesi-Siikalatva subregion
Organisation of services	Siikalatva Development Center, Municipality of Haapavesi
Municipalities	Haapavesi, Siikalatva, Pyhäntä
Inhabitants	15031
Amount of enterprises	800
Employees working with entrepreneurs	7 (varies according to the projects)

Siikalatva Development Center is mainly responsible of business development of the subregion. Essential part of the services is project-based. Siikalatva Development Center offers all business services starting from entrepreneur considering establishment of business to the businesses operating on regular basis. The vital part of the development includes e.g. formation of business development strategy, launching and coordinating projects according to the strategy, production of business consulting services and development of entrepreneurial training. Siikalatva Development Center has a business agent and it additionally coordinates about ten EU-funded projects, which are aimed at providing added value to the companies. The project managers take part in production of business services.

The main content of the services include flexible facilities and location, high-level advice and consultation, training, research and development services, and services provided through advantages of national and EU-level policies. A typical customer of the Siikalatva Development Center is a start-up company. More and more often a new entrepreneurially oriented customer is aiming to the service business. For the running businesses, the most essential questions concern funding of investments, liquidity, financial support related to expansion, and marketing. The Siikalatva Development Center does not offer direct funding.

In addition to the direct services, companies are linked to the services provided by the network. Often the network can provide the services needed if the service cannot be directly offered during the first contact. Lately the need for services supporting ownership changes and generation changes has increased. Subregion has variable non-industry-specific training projects, which aim to serve "broad audience" including variable industries and size categories.

Services for technology intensive enterprises presented in phases

Guidance services applying to an enterprise's needs in *the conception and development phase* are: valuation on a business idea, drawing up business activity plans, financial planning and possibly arranging it. This clearing up of different financing alternatives along with contacting with financiers and the entrepreneur describes the character of the business development services also as an important intermediary organisation. Among other things, the Tekes expertise is brought to the enterprises' operation area through several projects. The enterprise incubation, physically independent of localities, and coordinated from the Technology Village in Haapavesi, offers help for those who are thinking over an enterprise activity and to a commencing entrepreneur in the enterprise's start-up stage. The incubation attempts to lower the threshold enterprising, to help in planning and controlling the risks, looking for customers and arranging the financing.

In *the commercialisation phase* the enterprises obtain basic services, guidance and necessary help from the enterprise services. Financial assistance can be considered e.g. for participating in the fair. Through the education project training, which concentrate on elevating the personnel's expertise level, is offered. The project is implemented both in Haapavesi-Siikalatva and Nivala-

Haapajärvi subregions, target group being entrepreneurs and their staff. As an intermediary organisation, the business development services have received messages from entrepreneurs in the region that the public support ends in that stage when the enterprise starts to commercialise its products. As the financiers' supply decreases, the situation can also be seen in the business development services, where services open to entrepreneurs in this phase are less. Nevertheless, for instance export representative services can be offered, when the commercialisation starts to expand towards an international activity. Also for the time being, export representative services, as purchased service, are offered for example to Central Europe.

Basic services, guidance along with help for financial and development challenges for enterprises in *the expansion phase* are provided by the business development services. The growth is considered from an intermediary organisation's point of view as such a word that the financiers favour. The subregion is systematically attempting to look for enterprises in the expansion phase, which are capable to expand and which are expansion orientated. In many development projects administrated by subregions, services for the enterprises are also available. For instance, the subregion has a project for an outside financing of capital with terms, which is directed especially to the enterprises in the expansion phase. Additionally, the business development services tend to respond to the new educational needs that often arise in the enterprises of the expansion phase. Solutions for sticking points related to expertise are looked for in the enterprises through education and training.

In the *stability and renewal phase* the basic services offered to the enterprises are similar to the services in other phases. The services attempt to respond to the enterprise's needs, which in this phase are related to investments, family business succession or business acquisition. In the interviews these basic services are considered fine and sufficient regarding the demand.

Case Ylivieska subregion

Ylivieska subregion does not have a single development company; the municipalities implement the services more or less independently. However, multidimensional subregional collaboration is broadly used in public business service production. Some of the municipalities buy the services from subregional association. The starting point is to ensure capability to provide variable services through the entire lifecycle of the company.

Table 5. The service description of Case Ylivieska subregion

	Ylivieska subregion
Organisation of services	YTEK, Ylivieska subregion, municipalities (Sievi, Oulainen, Kalajoki)
Municipalities	Ylivieska, Kalajoki, Oulainen, Sievi, Alavieska, Merijärvi
Inhabitants	44062
Amount of enterprises	2300
Employees working with entrepreneurs	10 (varies according to the projects)

The public business services are provided in Ylivieska subregion by a network of organisations developing services together by collaboration and concrete resource sharing. The network seeks to build shared interfaces towards the customers. The aim of the subregional services is to provide extensive support for companies, entrepreneurs and potential entrepreneurs.

In Ylivieska the business services are provided by YTEK Oy, which is a company owned by town of Ylivieska. YTEK offers for its customers advisory services and facility solutions. Everyone in YTEK personnel is involved in the basic advisory services. Later on, as the current state and the goals of a company are known, the special fields of know-how are used for more surgical service. Based on the interviews the most important capability is the capability to recognize the main problems of the company by listening the entrepreneur. The problems are analysed together and based on the analysis, the next developmental steps agreed.

Majority of the services are provided through Innoveturi, which is a consortium project administered by subregion and implemented by YTEK. The Innoveturi functions as an umbrella for several business development projects. The results of the projects are productised by Innoveturi and provided by subregional business services. The goal of productisation is to clarify the service portfolio so that personnel can guide a customer after the first contact to the right service/specialist. The subregional specialists are located in Ylivieska, Kalajoki and Oulainen. The intention is to minimize ad-hoc services and develop more surgical services according to the lifecycle of the company. The services are currently organised according to general lifecycle model divided into star-up services, know-how and networking services, growth and internationalisation services, and change of ownership services.

Services for technology intensive enterprises presented in phases

An enterprise in *the conception and development phase* obtains from the business consultants around the subregion covering information about the enterprise's start-up phase and the total planning of financing. The partial character as intermediary organisations of the business development services in both the subregional and the municipal level appears already in the enterprise's start-up phase, when the financial opportunities are surveyed. Support and help are offered also by training in the development of the models of action along with strengthening of the business activity. The guidance service helps the entrepreneur to estimate the business idea, business activity plan and survey of the financial possibilities. The consultation may also be necessary when choosing the enterprise form and the business name, and possibly with issues on licenses, making the basic reports, insurances and arranging the bookkeeping. Important is also that the entrepreneur gets the chance to discuss with specialists about the enterprise's matters confidentially. Via the Innoveturi "Innovation Locomotive" it is possible for the commencing entrepreneur to participate in the incubation activity, which attempts with the help of a development plan to develop the business activity expertise and to go to the "First Step Service". This service is a productized service package for every commencing enterprise, which turns to this service circle. The service attempts to help the commencing enterprise to determine the essential expertise and specific features for building up prosperity. It is a service subject to a charge including a lot of expert service for enterprise planning and enterprise start-up in the initial phase.

To the services in *the commercialisation phase* belongs the public consultation of economic life for the different actors in the region. Through the projects, the experts can also be put out to tender in educating, training and sparring enterprises in the region. Essential issues in the training during this phase of development are sales and marketing expertise.

In *the expansion phase* issues about financing arise to an essential role. Typical intermediary organisation services are the public enterprise consultation along with issues on planning, calculation and applying related to financing, uniting the entrepreneur and the financier. Training and other education provided through the projects may relate to the increase of leadership expertise and to the internationalisation of the enterprises, e.g. by supporting their participating in the fair. The service network experts in the region help the enterprise to find a suitable way to implement development and internationalisation projects directed to entrepreneurs, especially by building up an export network.

In addition to the public enterprise consultation, a necessary specialist help can be directed to the enterprises in *the stability and renewal phase*. Educational themes are e.g. financing and strategic planning. There are situations in the enterprise's and entrepreneur's life cycle, such as family business succession, entrepreneur's retirement or purchase offers, when a business acquisition is current. In situations related to the family business succession, services provided by the Innoveturi "Innovation Locomotive" are workshops, enterprise group services and local training.

Discussion

This multiple case study explores how the public business services of technology parks are organised in rural area and describes what kind of business services are provided for early-stage technology intensive companies. In this study the services provided in three case subregions of Oulu South are projected through reference stage framework from the viewpoint of the public business services. The answers to the research questions are provided here.

RQ1: How are the public business services organised by technology parks in the rural area of Oulu South?

On the general level, Oulu South has developed collaboration through a contract-based network. Inside the subregion area exists a division of labour. Several actors from the section of the regional business development take part in network including educational establishments, state, which provides services either via the Employment and Economic Development Office (TE-Office) or the Centre for Economic Development, Transport and the Environment (ELY-Centre) along with the services provided by the municipalities, which are mainly produced by the municipal development companies or regional companies.

The detailed description of how the public business services are organised by technology parks in the rural area of Oulu South is presented in empirical part of the study. The main findings are condensed in the following table 6.

Table 6. Key characteristics of organising public business services in rural area

Key characteristics	Clarification
Various administrative solutions	Even though the municipalities share the common interest of fostering the vitality of business and industry in their region, the solutions of organising and administrating public business services are various due to the historical background of the collaboration in the region.
Important personal relationships	The relationship between business service managers and entrepreneurs is very essential. Confronting the entrepreneurs in personal level builds trust. Responding to the needs of enterprises in a short time limit, keeping contact at least in annual bases and tailoring the services clarify the entrepreneur-centred base for the public business services.
Tailoring the services and productisation	Most of the services are semi-structured, which offers the possibility to respond to the specific needs of each client. Besides the direct services of the agencies, the services of the partner and network organisations are offered. Especially, for the internal needs of the network and partner organisations the productisation of the services is important. To be able to tailor the services or to use the services of the network, the business service managers have to know the existing services possibilities.
Intermediary actor	The organisation offering public business services in rural areas is acting on the interface. Producing and disseminating information to the entrepreneurs, staff of enterprises and collaborating organisations is essential. The role of the agencies assimilates to the regional development tasks such as promoting the innovation possibilities and other preconditions of the enterprises.

On the grounds of the interviews it can be mentioned that it is almost always about a transition, when an operating entrepreneur with business activity is a client at the business development services. In the positive or negative transitional stages the entrepreneur turns to utilize the public business development services. Plans for extensions, projects, investments and budgeting related to the plans along with grant applications are typical measures of the services directed to the enterprises in positive transition. One important function of the business service organisation is to act as a companion in discussions and to spar the entrepreneur, who wants to discuss and to deliberate about the enterprise's activity together with an outside specialist.

RQ2: What kind of business services and development activities do technology parks provide for early-stage technology intensive companies in sparsely populated areas?

The business services and development activities provided by technology parks for early-stage technology intensive companies are condensed to the following table 7.

Table 7. Business services and development activities provided by technology parks for early-stage technology intensive companies

	Stage 1: Conception and development	Stage 2: Commercialisation	Stage 3: Expansion	Stage 4: Stability/ renewal
Case 1 Nivala-Haapajärvi subregion	<ul style="list-style-type: none"> - Business plan - Establishing the business - Planning and seeking financing - Developing the business idea - Assessing profitability - Constructing development projects - Business incubation 	<ul style="list-style-type: none"> - Planning and seeking financing - Surveying the business situation and development needs - Building development projects - Training 	<ul style="list-style-type: none"> - Planning and seeking financing -Export specialist services -Trade fair and contact services - Building development projects - Studios as development environments 	<ul style="list-style-type: none"> - Planning and seeking financing - Monitoring the business situation and development needs -Building development projects - Services at changes of ownership and generation change
Case 2 Haapavesi- Siikalatva subregion	<ul style="list-style-type: none"> - Business plan - Establishing the business - Planning and seeking financing - Developing and evaluating the business idea - Business incubation 	<ul style="list-style-type: none"> - Planning and seeking financing - Courses and coaching - Monitoring the business situation and development needs 	<ul style="list-style-type: none"> - Planning and seeking financing - Supported expert services - Courses and coaching - Monitoring the business situation and development needs 	<ul style="list-style-type: none"> - Planning and seeking financing - Monitoring the business situation and development needs - Services at changes of ownership and generation change
Case 3 Ylivieska subregion	<ul style="list-style-type: none"> - Business plan - Establishing the business - Planning and seeking financing - Developing and evaluating the business idea - Business incubation and First Step service 	<ul style="list-style-type: none"> - Planning and seeking financing - Courses and coaching - Monitoring the business situation and development needs 	<ul style="list-style-type: none"> - Planning and seeking financing - Courses and coaching - Generating export networks - Monitoring the business situation and development needs 	<ul style="list-style-type: none"> - Courses and coaching - Supported expert services - Monitoring the business situation and development needs - Services at changes of ownership and generation change

General business consulting and the actions of the intermediary organisations are included in the all cells of the above presented table. The support actions of the public business services are not always productized, but are tailored based on the customers' needs. The third party solutions are offered in case the service portfolio does not meet the specific needs of a customer. These can be offered through the partner networks.

Some challenges were pointed out such as internationalisation, attracting the private financing, and supporting the SMEs in participating to the region specific large scale building projects (e.g. nuclear power plant and international underground physics research centre). Generally speaking the service providers did not recognize major gaps between services and the needs of companies. They seem to have effectively utilized their networks and external expertise in cases of specific needs. On the other hand, some of them highlighted the need for building more extensive knowledge base to be able to provide more accurate support for their customers.

This study provides support for the managers of public business services considering or currently using stage framework as framework for providing more accurate services for technology intensive companies. A very general level stage concept had been already used as a framework for providing services (especially in Ylivieska subregion). To develop this approach further in the subregions, more accurate support could be provided by implementing more industry specific frameworks. In earlier study, for the public sector considering using such framework for supporting young technology intensive companies in their early development, two viewpoints were highlighted²². *First*, stage frameworks can help to prepare for some of the central activities of the early stages. As a company progresses through the early stages, the configurations framework may help to predict the key managerial focus areas and to allocate resources in a more focused manner. Moreover, the stage framework is useful in reflecting the on-going realities in the company - the assessment of the current stage and the related potential key challenges may be useful in the midst of overwhelming operative tasks. *Second*, however, each business is unique, and should be treated like that. The reality is rarely, if ever, totally parallel with such a reference framework. Framework provides neither case specific details nor the contradictory aspects. Therefore, when using such framework in developing the services, the limitations of the framework and the business context of the region should be carefully studied.

A construct validity of this case study is based on a research plan that has worked as a road map through the study. The case study used multiple sources of evidence such as interviews, web, public archive, and other material provided by the public business services. The chain of evidence was preliminarily defined in a research plan to strengthen construct validity. The internal validity of the study relies on the research design. In theoretical part, the theoretical background was presented and in empirical part the data was shown to enable analysis. The test of external validity shows that the findings of the study cannot be widely generalised because of the uniqueness of the case. The research findings depend on the point in time when data is collected. Evaluation of the reliability highlights the following points. Reproducing the same case study in the same environment later would change some of the findings. A case itself has a significant role when the case study research method is used. In addition, researchers' own paradigm or point of view may affect the findings.

This study has some limitations. This study is limited to the interviews of public business service organisations in three subregions of Oulu South located in Northern Finland. Therefore, some of the findings may be region- or country-specific. Moreover, the viewpoint of an interviewee may be biased especially as he/she is asked to evaluate their own services from the customer viewpoint. As this study represents the viewpoint of service providers, the customer viewpoint remains uncovered. The next natural and essential step in this research is opening the customer viewpoint. Moreover, the data collected during this study included the best practises of the public business services in rural environment. This viewpoint will be opened in the future studies. In the future studies it would also be interesting to open more cases with similar backgrounds. The results of this study represent the viewpoint of public business service organisations functioning in sparsely populated areas. Their viewpoint might differ from a viewpoint of similar organisations in different business environments because of context specific variables. It would be interesting to compare the results of similar analysis made in public business services located in other European countries or in US.

²² Muhos M (2011) Early stages of technology intensive companies. Oulu, University of Oulu.

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Appendix 1. The main thematic sections of the interview

Section	Theme
1	Clarification of the purpose of the interview
2	Basic information of the organisation and the interviewee
3	General description of the services provided by the organisation and the customers
4	Orientation to the stage framework
5	Stage-specific description of the services provided for the technology intensive companies on their early stages
6	Evaluation of the services provided
7	Description of the success cases and best practices