EXPLORATION OF NETWORK-BASED DIGITAL BUSINESS ECOSYSTEMS AND THE MODELS WITHIN

HAMK
HÄMEEN AMMATTIKORKEAKOULU
HÄME UNIVERSITY OF APPLIED SCIENCES

Bachelor's thesis

International Business

Valkeakoski, autumn 2016

Jani Kuusniemi

Author	Jani Kuusniemi	**Year** 2016
Subject of Bachelor's thesis	Exploration of network-based digital business ecosystems and the models within	

ABSTRACT

This thesis is commissioned by Merja Helin, the Head of International Business Degree Programme in Häme University of Applied Sciences. The subject digital business ecosystems and models is related to her research work.

The aim of this thesis is to explain various digital business models, explain what are digital business ecosystems, and what are the meanings of the concepts related to the topic. Network-approach is used in order to border the theory.

This thesis was written as a learning project, where the author studies the literature related to the topic, and reports the findings. As a result, this thesis contains diverse information about digital business ecosystems and models, and uses various examples to explain the theory.

Keywords Digital, Business, Ecosystems, Models

Pages 29 p.

HAMK
HÄMEEN AMMATTIKORKEAKOULU
HÄME UNIVERSITY OF APPLIED SCIENCES

VALKEAKOSKI
International Business
International Management

TIIVISTELMÄ

Tämän opinnäytetyön toimeksiantaja on Merja Helin, International Business -koulutusohjelman päällikkö Hämeen ammattikorkeakoulussa. Opinnäytetyön aihe, digitaaliset bisnesekosysteemit ja liiketoimintamallit, liittyy hänen tutkimustyöhönsä.

Opinnäytetyön tarkoituksena oli selvittää erilaisia digitaalisia liiketoimintamalleja, selittää mitä digitaaliset bisnesekosysteemit ovat, ja selventää aiheeseen liittyviä konsepteja. Teorian rajoittamiseksi aihetta tarkastellaan verkosto -lähestymistapaa käyttäen.

Tämä opinnäytetyö kirjoitettiin oppimisprojektina, jossa kirjoittaja tutkii aiheeseen liittyvää kirjallisuutta, ja raportoi löydöksiään. Lopputulemana tämä opinnäytetyö sisältää monipuolista informaatiota digitaalisista bisnesekosysteemeistä ja liiketoimintamalleista, sekä hyödyntää useita esimerkkejä selittääkseen teoriaa.

Avainsanat digitaalinen, bisnes, ekosysteemi, liiketoimintamalli

Sivut 29 s.

CONTENTS

1 INTRODUCTION

After the emergence of the Internet for the masses, a continuously growing amount of businesses make an effort to have a successful business model that opens up the digital business world and the vast opportunities within. The field of digital business is experiencing a constant transformation, as new technological advancements and innovations take place. (Marchand, Wade, 2014: 1) (Ahmed, Gurumurthy, Khetan, 2016)

The timespan between reforms can be difficult to predict. One way of trying to secure a position in digital business markets is creating interdependence via digital business ecosystems. Ecosystems consisting of various models provide a network, which directs consumers to deal with a specified digital business partner. (Ahmed, Gurumurthy, Khetan, 2016)

The driving force for digital business ecosystems is the growing demand arising from the growing pool of customers. Solutions and services need to be more intuitive, real-time and integrated in all fields of business. In order to secure good customer experiences, the ecosystems "address a continuum of needs along the customer journey". (Evans, 2016)

The competition in the various markets in the digital world is fierce, but the opportunities are good for scaling a successful business. The emergence of such players as Netflix, Spotify and Google has proved that companies solely operating around producing digital business goods and services have grown to such extent in a relatively short amount of time, which would have not been possible physically. (Weill, Woerner, 2013: 1-2)

In this thesis, the author examines different network-based digital business ecosystems, their structures and digital business models within these ecosystems. The main purpose is to explain the various concepts and provide a clear image of the current situation. Network-approach is utilized in terms of a business network, and the connections and interdependences regarding digital ecosystems. (Vissak: 2)

2 DIGITAL BUSINESS MODELS

Digital business models are challenging traditional business models in their physical form (e.g. bookstores and banking services), and erasing the people as intermediaries (e.g. insurance agents) for customers' delight. New business models are being continuously created as technology advances, and opens business opportunities, which did not previously exist. (Weill, Woerner, 2015: 71)

Digital business models are transparent to everyone. A model can crash quickly due to the easiness and usually lower cost of switching for the customer. Comparing services and prices is easy via search engines, intermediaries (e.g. Supersaver), social media, and sites focusing on reviews and ratings (e.g. TripAdvisor). (Weill, Woerner, 2015: 72)

2.1 Noren's Listing

In 2012 Eric Noren made a listing of different digital business models, which he reflected to physical business models, and explained the similarities that they share. Every business model on the list falls in to one of the following categories, which describe the qualities they have: Owners, Creators, Builders or Sellers.

Noren recognizes that he did not include every possible business model on his list, partly because some business models cannot be fitted under just one category. These include services and business-to-business organizations. Noren does not see distributors as a unique business model, instead he refers to them as service providers. Non-profit organizations are excluded, since they do not intend to maximize profits. (Noren, 2012)

2.1.1 Owners

The term Landlord-model is used when the owner of an asset charges others for temporary use of that asset to make profits. The use is usually exclusive. An example of the Landlord-model could be Google providing advertising space on their search result page. The advertisements will be shown when somebody makes a search using keywords connected with the advertisement. (Noren, 2012)

2.1.2 Creators

The Research & Development Shop- model focuses on processes in which ideas are turned into invention. It is a systematized process, and the businesses should be also able to scale their operations. An example could be a company operating in design, such as IDEO, from where a company can order a font that is specialized for their needs. (Noren, 2012)

The Artist/Writer- model is usually an individual working on creating something unique on a web-platform. Examples of this business-model could be a freelance journalist making articles or videos for online newspapers or video streaming sites, or an online blogger who gets paid for the views of journals, or advertisements on the blog, or both. (Noren, 2012)

The Content producer is the third business model from the Creators-group. This model is focusing on producing content or material for information or explaining purposes. An example could be somebody working for an online subtitling firm. (Noren, 2012)

2.1.3 Builders

The Manufacturer-model is not a very typical digital business model, as it is about assembly and building, with the opportunity for scaled production. A current example could be companies, which have created software that creates a healthier diet and an exercise program for the customer based on a questionnaire. In the nearby future, the Manufacturer-model might gain popularity as 3D-printing is getting more advanced, although the printing aspect means that the business model is not 100% digital anymore. (Noren, 2012)

2.1.4 Sellers

The Broker-model has two digital business traits, virtual and intellectual property. An example of virtual property brokers are companies that sell the use of web domain names, such as GoDaddy. An intellectual property broker example could be LinkedIn, which facilitates networking opportunities. (Noren, 2012)

(Figure 1) "A collection of networking websites to illustrate the amount of competition and need for specialization in the area of business."

The Trader-model also has virtual and intellectual property traits. Data selling companies such as Oracle are an example of virtual property. Intellectual property traders are, for example, companies working around domain name insertion. (Noren, 2012)

The Traditional wholesaler/retailer profits by selling products and services directly to consumers at a mark-up from the actual cost. An example of utilizing both digital and traditional aspects of the model is the Finnish Verkkokauppa.com, which has its main operations online, but also has three retail stores. Verkkokauppa.com also has some products of its own. (Noren, 2012)

The Non-traditional retailer has elements which go further to maximize customer lifetime value. It can be divided to three different models: Freemium, Long tail, and Bait & hook. The freemium businesses offer a free sample of something of value to encourage later purchase. An example of a freemium digital business could be Dropbox. The long tail model users put in effort to have a sizeable catalogue which the customers can use or purchase items from (e.g. Amazon). The Bait & hook technique is used especially in various applications and games. Something is first given for free or for a low price to later create "refill"-purchases. (Noren, 2012)

The All you can eat-model or Subscription-model is familiar from streaming services such as Netflix or Spotify. For a standard fee the customer gets access to an unlimited product or service for a fixed period of time. (Noren, 2012)

2.2   Chaffey's 8 Model Options

In 2011 Dave Chaffey (CEO of SmartInsights.com, author of various books relating to business strategy and marketing) put together a list, which included 8 different options for creating online revenue. The options which he listed are heavily based on advertising and increasing visits on a website, and are thereby mainly meant for publishers and media site owners. (Chaffey, 2011)

Revenue from subscription access to content is a model, where a variety of documents are accessible for a fixed period of time in change for a fee. An example purely based on documents is EBSCO, who provide a large database for research purposes. This model is similar to the All you can eat-model in Noren's listing. (Chaffey, 2011)

Revenue from Pay per view- access to content (document, video or music) which can be downloaded, is a model, in which a payment gives single access to the content. This is possible via applications like WordPress, where one can publish a document, which can then be downloaded for a defined fee. (Chaffey, 2011)

Revenue from CPM (CP= Cost per thousand, M= Mille; Cost per thousand views) display advertising on site, is a model, in which advertisers are charged according to how many times the ad is shown to visitors. The ads may be served by the site owner or a third-party ad network service. (Chaffey, 2011)

Revenue from CPC (Cost per click) advertising on site, is a model where advertisers are charged based on how many times their advertisements are clicked. These are typically text advertisements delivered in different networks or third-party websites. (Chaffey, 2011)

Revenue from sponsorship of site sections or content types, is a model where a company pays to advertise in certain site or section, for example, in the website of a big newspaper or other media site. Typically, the fee is standardized, varying with the popularity of the section in question. (Chaffey, 2011)

Affiliate revenue is a commission-based model, where the advertiser gets paid a fee for directing customers to merchants. This arrangement is also called Cost per acquisition (CPA). (Chaffey, 2011)

Subscriber data-access for e-mail marketing is an option for companies who have agreements from their customers that the company itself, or a third party can send them a newsletter. The company can then acquire the advertisers a fee for advertising in their newsletter. (Chaffey, 2011)

Access to customers for online research is a model used by companies making surveys. They utilize all the aforementioned techniques, and generate the best combination to maximize revenue. (Chaffey, 2011)

3 DIGITAL BUSINESS ECOSYSTEMS

The first approach to a business ecosystem was made by Moore in 1993. He viewed that a firm is not just an operator on a single industry, but rather touches other industries as well, and thereby creates an ecosystem. The members' capabilities evolve with new innovations. (Nachira et al., 2007: 61) (Moore, 1993: 75-86)

Digital ecosystem is a technical infrastructure based on software technology that transports, finds, and connects services and information via Internet links enabling networked transactions and distribution of digital goods within the infrastructure. (Nachira et al., 2007: 5)

(Figure 2) "Digital ecosystem requirements."

Business ecosystem is an economic community which is supported by interacting organizations and individuals. The operators in an ecosystem choose to join it on their own choice, and couple with partners which are most suitable for their interests. The economic community serves customers, who are also a part of the ecosystem, by providing them with goods and services. (Nachira et al., 2007: 5) (Boley, Chang, 2007: 2)

Ecosystem is a biological metaphor used to highlight the interdependence of all actors of the business environment. When it is used in the context of digital business ecosystem, it means a model based on theoretical computer science implications between biological behaviour and the behaviour of the software. (Nachira et al., 2007: 5)

Companies are constantly on the look for gaining a competitive edge. It can come from superior technology, knowledge and innovation of workforce, or factors concerning intellectual property. If a competitive edge is shared within a digital business ecosystem, it can strengthen the market position of the whole ecosystem, and bring additional benefit to the original source of the competitive edge. (Scott, 2016)
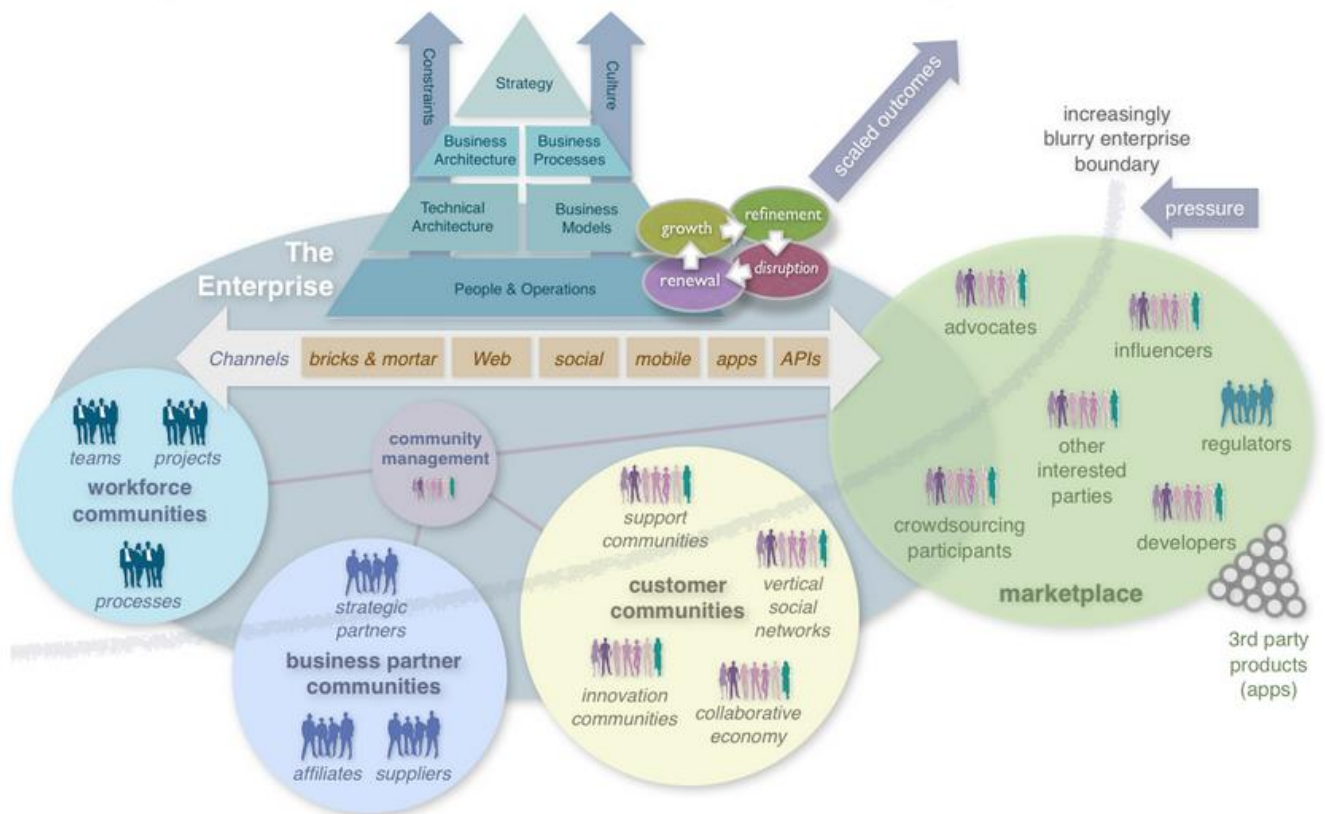
(Figure 3): "An illustration of an enterprise being a part of a digital business ecosystem, and the vast connections."

3.1 Biological Ecosystems- Approach

"An ecosystem is a loosely coupled, domain clustered environment inhabited by species, each proactive and responsive regarding its own benefit while conserving the environment." (Boley, Chang, 2007: 1)

The future of information systems can potentially arise from mimicking nature. Digital ecosystems are artificial systems harnessing dynamics that can be found in complex and diverse adaptations of living organisms. The advantages digital ecosystems pose are efficiency and scalability, just like some of their biological counterparts. Concepts can be applied from the ecological world to the digital, to create techniques with biological influence. (Nachira et al., 2007: 49) (Briscoe, 2009: 23, 26)

The biggest fundamental differences between biological and digital ecosystems are that biological ecosystems are a natural phenomenon, which are crucial to our survival. Digital ecosystems on the other hand are engineered to serve the specified purposes of humans, such as solving problems with high efficiency. A difference lies also in the performance measurements. Natural ecosystems are measured in terms of stability, complexity and diversity, where as digital ecosystems are measured relative to the designed performing function. Also, instead of containing biological organisms, digital ecosystems are made of fragments of knowledge. (Nachira et al., 2007: 13, 49)

An ecosystem consists of an environment and a set of entities or agents in that environment, which interact and reproduce, simultaneously balancing each other to maintain a healthy situation. Entities consist of individuals that consist of organs. Each individual can be considered as a separate ecosystem, and organs have specified tasks, thus an ecosystem works in multiple layers. The agents in a digital ecosystem act like biological individuals in the sense that they reproduce, vary, interact, move and die. These properties contribute to the dynamics of the ecosystem. In some cases, specific agents may be dominant in the ecosystem. The purpose of the system may lead to different approaches in encoding the individual properties to the digital ecosystem. (Boley, Chang, 2007: 1) (Nachira et al., 2007: 49-50)

A term that describes the act of science imitating or taking inspiration out of nature is biomimicry. In computer science, it is also known as nature inspired computing or natural computation. This terminology indicates the popularity of using nature as a source of influence when designing high-end technology. (Briscoe, 2009: 23)

Genetic algorithms use natural selection to evolve solutions, such as replication, recombination and mutation. Digital ecosystems are likely to incorporate genetic algorithms to evolve solutions, and they could also include features which would give resemblance to natural ecosystems (e.g. a network environment or self-organization). The solutions should be efficient in a computational sense, and bring real-world usefulness demanded by users to solve meaningful problems. (Nachira et al., 2007: 49-51)

3.1.1   Evolution

Organizations are defined by their technology, structure, products or services, mission and vision, and individuals. These elements determine whether the organization survives in its environment, or diminishes under surrounding pressure. (Nachira et al., 2007: 62-63)

Adapting the evolutionary theory to work as a metaphor in a business-concept can, however, be quite tricky. Organizations are created from scratch, or merged as a result of an agreement of two or more parties. Organizations do not inherit a gene structure, the driver in evolution, and one of the only parts of biological ecosystems organizations fail to mimic.
(Nachira et al., 2007: 62-63)

Although measuring evolution in this context has been viewed nearly impossible, an evolutionary model was proposed by Nelson and Winter in 1982. They suggested that genes could be compared to organizational routines, which can be seen as a unit of knowledge. (Nelson, Winter, 1982) (Nachira et al., 2007: 62-63)

As technology is transforming continuously to meet new demands, it is possible that it eventually starts to evolve itself. Artificial intelligence is already operating a large part of digital business ecosystems, and the capabilities of operating systems can reach levels where human influence starts to decrease. Evolutionary computing has been used for years already to solve problems. (Briscoe, Sadedin, De Wilde, 2011: 4, 18-19)

3.2   Social Ecosystems- Approach

Social ecosystems tend to overlap very freely when it comes to, for example, group formation (e.g. friends & family, work, hobbies). Digital ecosystems can overlap in a similar way, but with increased efficiency, as the limiting aspect of geographical distance does not exist. (Boley, Chang, 2007: 4-5)

Social ecosystems share natural languages created through thousands of years. In digital ecosystems, the languages are artificial, and the systems can process and understand countless languages, unlike us humans, as we are quite restricted on the amount of linguistic data we can process. (Boley, Chang, 2007: 4-5)

Laws, regulations and norms, the lack of them, or not following them are causing problems in social ecosystems. Digital ecosystems are coded to recognize specific laws, regulations and norms, and can adapt immediately to new agents in the ecosystem and legislative and regulative changes. (Boley, Chang, 2007: 4-5)

Similarly, with social ecosystems, the actors in digital ecosystems adapt to their surroundings to find needed resources in their environment. Where in social ecosystems those resources can be, for example food and shelter, when in digital ecosystems they can be connections and intellectual property rights. (Briscoe, 2011: 3-4)

3.3   Knowledge Ecosystems- Approach

A knowledge ecosystem is a system of agents in the same space, which work together to enable the existence of knowledge. Knowledge ecosystems are a foundation for interaction between entities, and work to improve innovation and decision-making. They preserve information, which is valuable for the ecosystem, and abandon obsolete or outdated information. An example of knowledge ecosystems are secret societies that operate discreetly for a common goal. (Briscoe, 2011: 4-5)

The core technology of knowledge ecosystems is such that can outdo human capabilities. Back in history knowledge ecosystems used engravings, scripts and books, but nowadays all information can be conveniently stored in a digital form. Knowledge ecosystems need connections both within and outside the ecosystem to preserve, filter and seek new information. (Briscoe, 2011: 4-5)
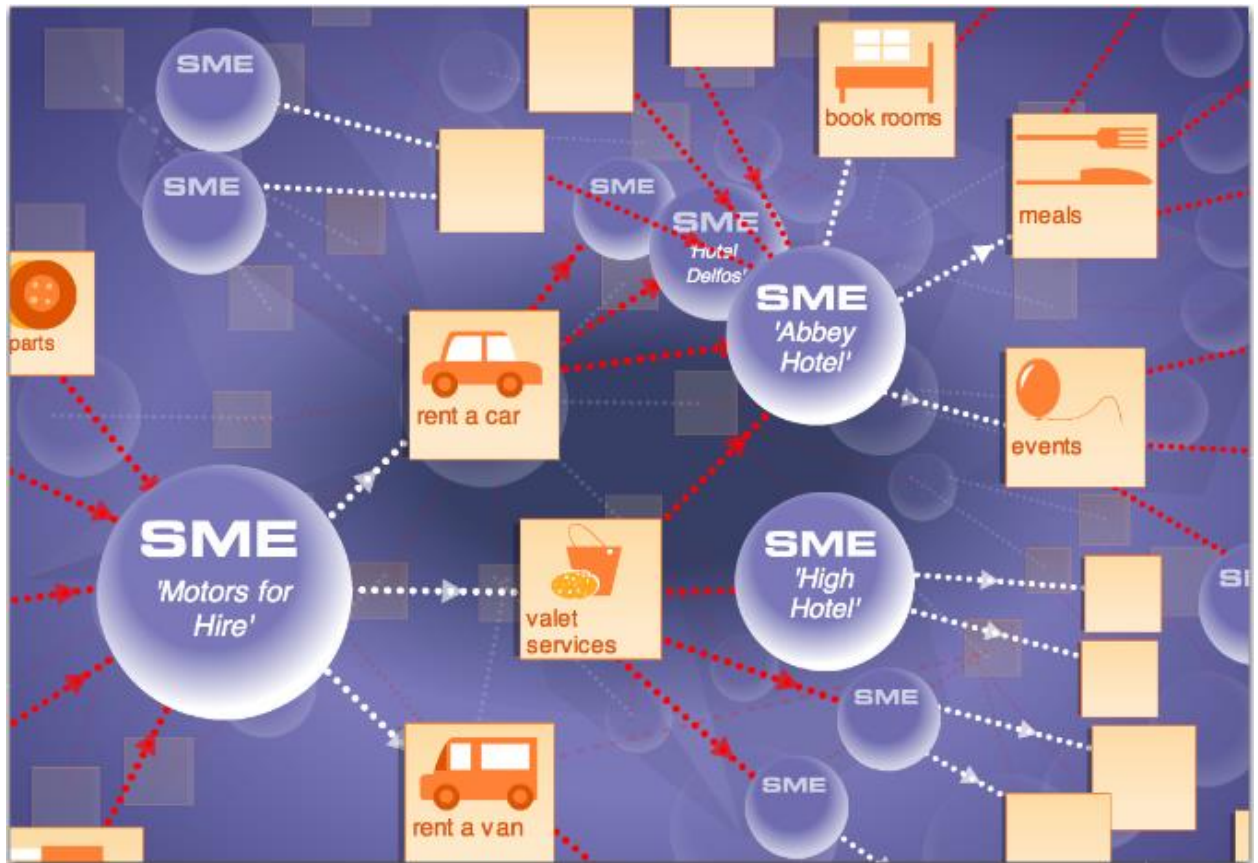
3.4   Networks

The foundation of digital business ecosystems lays in networks. Internet enabled the underlying and pre-existing networks to connect in a new way. Computing environments went through a fast evolution creating distributed architectures and shared resources. Faster communications enhanced the economical change from manufacturing-oriented to service-oriented, where knowledge production and distributed value-chains are in a key position. (Nachira et al., 2007: 6)
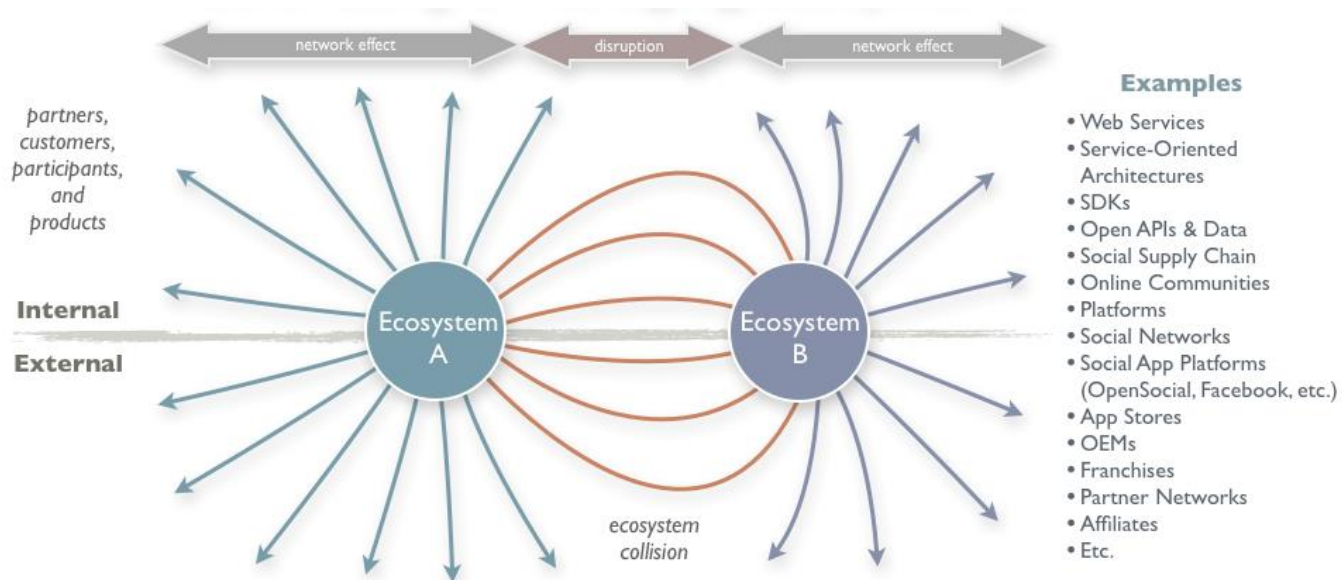
(Figure 4) "Networks connect ecosystems"

Networks can be divided into hard networks and soft networks. Hard networks are small groups of businesses established to achieve concrete business objectives, and are likely to require formal agreements considering sharing profits or resources. Soft networks are larger, and are more likely to have open memberships. They focus on generic issues and provide general services, which are likely depending on membership fees. (Nachira et al., 2007: 68-69)

(Figure 5) "A demonstration how a digital business ecosystem creates
links between various businesses."

3.4.1 ICT-networks

Distance is becoming more and more irrelevant in conducting business, as
it has for the past decades. Future ICT-networks (Information and Commu-
nications Technology) have a large scope of features to be added and further
developed. It is one of the most rapidly developing areas of technology due
to constant demand from the public, as ICT has become an everyday com-
modity to a large part of world's population, as well as because of research
funded by some of the richest operators in the world, since nearly all modern
companies and government-lead projects utilize ICT in countless activities,
such as innovation and internationalization.

The ability to build and share knowledge was the foundation of the ICT-
concept some decades back in time, which nowadays is expected of the sim-
plest little devices and gadgets. However, there is still a lot of new ground
to be covered in that field, as there is in all of technology, since scientific
advancement does not seem to be slowing down. (Nachira et al., 2007: 73)

Various sorts of support activities for groups and collaboration have been invented, which has lowered the importance of proximity, and enhanced internationalization of companies. For example, electronic meeting platforms such as Skype and WebEx have been in an important role among other solutions. The ability to have visual contact with the other party enhances trust and improves authentication. (Nachira et al., 2007: 74)

ICT-networks can also be used to track suitable expertise. LinkedIn is an example of such a platform that also includes the social networking aspect. New market opportunities and emerging trends can be discovered via various research methods centered in market intelligence, which analyse and interpret data. (Nachira et al., 2007: 75)

ICT-networks are an important tool to seek help and strengthen the knowledge of experts. Forums can be very specified and have a great number of specialists of an area to provide tips and solutions, and share experiences to generate a functioning community. The reliability of forums may differ drastically from "anyone can write and access anonymously" to "authentication and expertise (and in some cases a subscription fee) is needed to access". (Nachira et al., 2007: 75)

ICT-networks allow acquiring information from multiple sources rapidly and simultaneously. Assimilating knowledge can also be simplified via ICT. When it comes to new ways of thinking or innovation, transforming knowledge using ICT-networks supports experimentation and problem-solving. ICT is as well used to exploit knowledge, for example to identify new solutions. (Nachira et al., 2007: 75)

ICT can assist companies with task assignment and guide in appointing tasks to the right people, and control that intelligence is shared to the right partners. These actions enhance synchronization of activities within the organization, and are aimed at reaching better synergy. (Nachira et al., 2007: 75)

Other assistance tools provided for management operations by ICT-networks may include for example monitoring partners, resource allocation, and systems to keep managers informed. (Nachira et al., 2007: 75)

3.4.2   Social Networks

Social networks provide individual operators in the ecosystem with the same platform for communication. Nowadays social networks are often referred to as social media, which for many brings to mind applications such as Facebook, Twitter and WhatsApp. The traditional concept of having social, professional and business networks outside of social media is probably not diminishing, instead modern social media makes communications easier on both individual and organizational levels. (Nachira et al., 2007: 6)

The social media concept is becoming more and more popular on an organizational level. Not only are companies more active in a marketing sense, but they are launching their own platforms for interaction within the organization. There are also specialized services provided for organizations who want a custom platform suitable for their needs. (Nachira et al., 2007: 6)

Specialized platforms can be easy to combine with other similar structures, to give certain access to other parties due to merging of two companies or a temporary agreement. They can also be used for sending information and creating new contacts, which enhances diversity in innovation. (Nachira et al., 2007: 6)

3.4.3   Knowledge Networks

The whole current global economy is based on knowledge production. Knowledge networks are groups of individuals and teams who come together to achieve innovation and share a body of knowledge. The focus is usually put on developing, distributing and applying knowledge. (Nachira et al., 2007: 6, 93) (Pugh, Prusak, 2013)

Knowledge networks have been around since the first human civilizations began commerce. To achieve a common goal, the participants must share social and operational norms. Usually the driving force in knowledge ecosystems is common interest and shared purpose. (Pugh, Prusak, 2013)

3.5   Architecture

Digital business ecosystems feature unique technological architecture, and important interorganizational business architecture. To being able to respond to the changes of the environment, and taking advantage of the opportunities of technology, both individual businesses and groups of firms have been productive in establishing digital platforms for combining technologies and service delivery. Platforms enable businesses to focus on one part of a system at a time, and assemble those parts into various configurations. As business models have gone through digitization, the capabilities of businesses have become more modular, connectable, and shareable. (El Sawy, Pereira, 2013: 19-20)

In prior decades, a formal alliance or a joint venture might had been needed to make one firm's technology compatible with another's. Nowadays its relatively easy to acquire a software, or other technology that does the same even better and faster. Digital business ecosystems make it possible to combine capabilities across boundaries into innovative new services and solutions to create value. (El Sawy, Pereira, 2013: 19-20)

Digital ecosystems are usually designed in a way that they support a desired behaviour and make it harder, or in the best case impossible for an unwanted behaviour to occur. Other qualities which have to be considered are the scalability of the ecosystem and its capability to evolve, differentiate and self-organize. (Nachira et al., 2007: 10-13)

The three main elements of a digital business ecosystem are agents, habitats and populations. Agents are the actors interacting, evolving and adapting within the ecosystem. Habitats are the nodes in the ecosystem, which allow agents to interact. Populations are groups of agents, which together provide solutions in the ecosystem. (Briscoe, Sadedin, De Wilde, 2011: 14-18)

3.5.1 Structural Services

Structural services are the features which enable the digital business ecosystem to work in practice. The main features structurally are network, modelling and security. (Heistracher et. al., 2004: 4-5)

A P2P-network (peer to peer) is essential for establishing a digital business ecosystem. In a P2P- network all the members are acting as both server and client towards the other members of the network. This network model eliminates single points of control, which means a part of the system can control the connections between the rest of the ecosystem. Similarly, it eliminates the chance of a single point of failure, which means that there is a part in the ecosystem, which would collapse the operations of the whole system if it fails. P2P-networks also make it easier for actors to share resources and distribute information, which enhances the overall performance and stability of the ecosystem. (Heistracher et. al., 2004: 4-5) (Nachira et al., 2007: 109) (Stanley, Briscoe, 2010: 2)
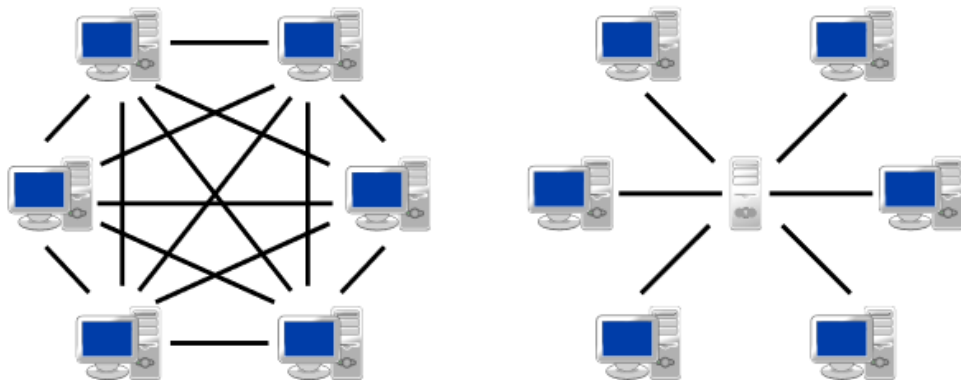
(Figure 6) "P2P-network compared to a centralized service -structure."

Modelling gives the ecosystem guidelines on how it can operate, rather than setting a concrete model on what the ecosystem should look like. Modelling does not usually restrict the size of the ecosystem, since the ability to scale the operations is one of the most important principles of digital business ecosystems. (Heistracher et. al., 2004: 4-5)

Security is an important part of a digital business ecosystem. All the agents should protect their own intellectual property and information, and the information of their business partners and customers. The level of security should be monitored, since new digital threats are emerging continuously. (Heistracher et. al., 2004: 4-5)

3.5.2 Support Services

Support services are operations within the ecosystem, which ease the development effort of participants. Such services are for example making online payments, signing documents using an online signature, or asking security questions in case of authentication problems. Offering support services works as a trust-builder, and in many cases, contributes as increased security. A service like online payment has become a standard, and it would be considered risky for most companies not to offer that option. (Heistracher et. al., 2004: 4-5)

3.5.3 Basic Services

Basic services are integrated services within the digital business ecosystem, which can be seen as evidently necessary. Such services can include reservation systems for hotels, booking tickets from airline companies, or selling stocks in online stock markets. Nowadays basic services such as the aforementioned are seen more like a norm, and lacking a proper digital system for offered services can affect the reputation of the company. (Heistracher et. al., 2004: 4-5)

3.6 Dimensions

The governance of a digital business ecosystem can be divided in to six dimensions. The following descriptions are to give a loose framework to describe the characteristics of the dimensions. (Nachira et al., 2007: 81)

Characteristic of digital ecosystems	Dimension of digital ecosystem governance
Shared values, common vision, participation and membership expressed in constitutional documents such as manifesto, bill of rights, code of practice	Constitution and balance of interests
Transparency, inclusion, due process, policy, procedure and accountability	Culture of communication
Alliance forming and regional coordination, allowing for diverse governance models and diverse membership	Credibility, attunement and trust
Distributed template, lightweight organisation and synchronisation for aligning codebase infrastructure development; association and alliance forming	Organisation and synchronisation
Knowledge and technology licensing, regulatory framework for digital ecosystems e-business interactions and legal definitions relevant to DBE entity	Licensing and regulation
Choice of software development methodologies, technological directions and infrastructural standards; association and alliance forming	Technological dimension

(Figure 7) "The dimensions and characteristics of digital ecosystems."

3.7 Trust

For an ecosystem to function ideally, the agents need to be able to trust other agents and the functionality of the ecosystem. Trust in the ecosystem-context can include, for example, keeping to agreements, ethical behaviour, and following proper safety-measures. (Nachira et al., 2007: 99-101)

Some companies might be completely dependent on other operators in the ecosystem, which is a situation where trust is needed. Trust is a big factor also when it comes to the relationships between businesses and their customers, especially in situations where the payment is made beforehand, or if the customer is presenting confidential information. (Nachira et al., 2007: 99-101)

4 EXAMPLE: GOOGLE

4.1 Condensed History

Google started off as an experimental search engine project of two students in 1997. Aim of the project was to create a tool for organizing information found in the web, which already at the time was considered to be quite ambitious. During the year 1998, Google started forming more into a business by gaining funding, establishing an official workspace and getting recognition from professional releases. (Google, 2016)

During 1999 and 2000 the first translations of Google were launched in 15 different languages. In late 2000, Google launched its first major program, AdWords. AdWords is an advertising tool, where the advertiser pays for visibility in the Google search engine by determining key-search words. A link to the advertiser's website will show up in the results of the search depending on the match between the words used in the search and the keywords set by the advertiser. (Google, 2016)

During 2001 and 2002 Google launched Google Groups, Google Images and Google News. Google Groups was, at the time, a renewed social media platform with advanced searching and browsing features. Google Images was a search option added to the original Google search engine, which allowed users to search images. Google News gathers news articles from thousands of sources, and can be customised to suit users wishes. Froogle (later renamed Google Shopping) was launched in late 2002. It is an online shopping platform, which expanded Google's digital business sphere. (Google, 2016)

During 2003 Google acquired Pyra Labs who created Blogger, at a time when blogs started to gain more popularity. Google AdSense, a content-targeted advertising service was launched to enable publishers to access Google's network of advertisers. Google Print (later renamed Google Books) started hosting an online library, which shows anything from small excerpts to whole texts depending on copyright agreements. Google Books has a marketing program for authors and publishers to promote their books. (Google, 2016)

In 2004 Orkut was launched, and it became a very popular social network for a period of time, especially in India and Brazil. However, Orkut was shut down in 2014. Gmail was also launched in 2004 as Google's own email-service. It was invitation only -based until 2007, when it was made available for everyone. Later it has become one of the most used e-mail platforms. Picasa, a program for displaying and organizing photos was acquired later in 2004. Google Scholar was launched as a free service providing scholarly literature. (Google, 2016)

During 2005 map services Google Maps and Google Earth became available to the public. Google Maps provides driving directions and local information, whereas Google Earth allows users to explore the Earth virtually using satellite images. Google also acquired Urchin, in which Google Analytics was based on. Google Analytics measures the impact of websites and marketing campaigns. (Google, 2016)

In 2006 the company launched Google Finance, Google Calendar, Google Docs, Sheets and Slides, and Google Translate. Google Finance is a program which helps people find financial information more easily, including interactive charts and articles from Google News. Google Calendar is an online calendar, which can be shared with others. Google Docs, Sheets and Slides is the company's own web-based office suite. Google Translate is one of the most popular free online translation programs, nowadays supporting more than 70 languages. Google also bought YouTube, which grew to be the world's most popular video-sharing platform. (Google, 2016)

During 2007 Google added Street View to Google Maps and Google Earth, and launched Android. Street View allows one to view a panorama in cities and rural areas all over the world. Android is an open platform for mobile devices, which has become the most largely installed operating system in history. (Google, 2016)

In 2008 Google acquired DoubleClick, a digital marketing company providing ad management technology. Google Chrome is launched as Google's own internet browser, and it has since become the most popular browser in the world. (Google, 2016)

In 2009 the company announced Google Ventures, which is a venture capital fund to support innovation, and promote new technology companies. DoubleClick Ad Exchange was introduced as a real-time marketplace, where advertising space can be bought and sold. (Google, 2016)

During 2010 Google introduced Nexus and TrueView. Nexus is a line of smartphones designed in cooperation with several different manufacturers, and it utilizes Android. TrueView was an add-on to YouTube ads. It is trying to ensure that the ads reach their preferred audience, and that the viewers see the ads most relevant to them. (Google, 2016)

In 2011 Google Wallet and the Google+ project were launched. Google Wallet was designed to simplify the check-out experience in e-commerce. The Google+ project is a social network, which is interconnected with other Google's programs such as YouTube and Gmail. (Google, 2016)

In 2012 Google Play, Google Drive and Google Fiber were introduced. Google Play is a digital content store for devices using Android. Google Drive is a centralized program for previously released Google services such as Google Docs. Google Fiber is the company's effort to offer an ultra-high speed internet access. (Google, 2016)

In 2013 Google acquired Waze, a social navigation application program to enhance their map services. The prototype of Google Glass, an optical display shaped like eyeglasses that is head-mounted, was launched. (Google, 2016)

In 2014 the company launched the Android One -line of smartphones, which is especially targeted for consumers in developing countries. In late 2015, Alphabet Inc. became the parent company of Google. (Google, 2016)

Google can be considered as one of the most successful digital companies, which managed to grow by utilizing ecosystemic connections. The company started as a search engine, and over the years made partnerships, incorporated other companies, made new innovations and eventually started hosting its own microecosystems. (Google, 2016)

4.2   Analysis

Google has made strong efforts in various forms of digital business, mainly in advertising and applications. AdWords solely creates over 80% of the company's annual revenue. They have also moved more towards creating a physical presence as well with smartphones and Google Glass. (Jahandarpour, 2016)

The company has gained recognition with their ecological choices and ambitions, as well as with creating educating services, supporting innovation, and donations. Google has also been continuously named among the best employers in the world. (Google, 2016)

Originally the company was centered on the success of the search engine. As they started adding features to the search engine, and gaining more capital, new innovative solutions were launched. Google's image was still shaped mainly by the search engine. In recent years, the services and programs which clustered from the success of the search engine have started to develop their own microecosystems, for example Google Play and YouTube. (Jahandarpour, 2016)

Google Play is a platform for downloading digital content for Android devices. The content can be both free and chargeable. The variety of content includes music, movies, e-books, games and other applications. Google Play takes a standard fee, after which content can be delivered through the platform. The developers/artists/creators of the content make money either out of the pricing of the content, or by advertisements shown in the content (usually in games and applications).

YouTube is the world's largest video-sharing platform. YouTube creates revenue by advertisements shown before and during videos. YouTube has a creator-program, where content producers get paid according to subscriptions of their channel and views on their videos.

Google is adding physical devices to support their digital programs in ways, where it is providing services and assistance to people at work, on the go and at home. The company has gained an important status in the daily lives of millions of people worldwide, and it is continuing to grow. Google can arguably be called the largest digital business ecosystem in the world.

5 SUMMARY & CONCLUSION

Digital business ecosystems are constantly going through changes, and stagnancy is not an option for businesses operating in the digital markets. New relationships and partnerships, and the interdependencies that come with them open new opportunities for operators of any size. Innovation and new technology gives the upper hand to companies and ecosystems with more capital, but by making right choices when it comes to choosing the digital business model and the suitable partners, smaller businesses can succeed as well. Having the right architecture is the key to success with digital business ecosystems, as it can proactively defend the ecosystem from threats, and suggest desirable actions.

One could say that there are as many digital business models as there are businesses. Using the exactly same approach is basically impossible, as environments, partners, customers and knowhow vary.

Digital business ecosystems have increasingly lowered the need for physical proximity, and transformed the whole business world. Digitization has also improved the availability of services in many parts of the world. When a part or a product was needed in a secluded area, the process could have previously taken multiple weeks or even months. Nowadays as internet can be accessed almost everywhere in the world, the ordering process for such things is considerably shorter.

The digital business -movement is growing as technology comes up with new solutions. What is to be seen in the future is how intelligent can digital ecosystems evolve to be.

SOURCES

Ahmed, M, Gurumurthy, R, Khetan, G, 2016. Where do you fit in the new digital ecosystem?. Deloitte University Press, [Online]. Available at: https://dupress.deloitte.com/dup-us-en/topics/emerging-technologies/new-digital-ecosystem-technology-media-telecom-industry.html [Accessed 29 October 2016].

Boley, H, Chang, E, 2007. *Digital Ecosystems: Principles and Semantics*, [Online]. 1-6. Available at: http://nparc.cisti-icist.nrc-cnrc.gc.ca/eng/view/accepted/?id=0f8b8353-a687-4015-b0cd-89839addc3e3 [Accessed 25 October 2016].

Briscoe, G, 2009. *Digital Ecosystems*, [Online]. 1-206. Available at: http://arxiv.org/pdf/0909.3423.pdf [Accessed 25 October 2016].

Briscoe, G, 2011. *Complex Adaptive Digital Ecosystems*, [Online]. 1-8. Available at: http://arxiv.org/pdf/1105.1564.pdf [Accessed 25 October 2016].

Briscoe, G, De Wilde, P, 2009. *Computing of Applied Digital Ecosystems*, [Online]. 1-8. Available at: http://arxiv.org/pdf/0910.0674.pdf [Accessed 25 October 2016].

Briscoe, G, Sadedin, S, De Wilde, P, 2011. *Digital Ecosystems: Ecosystem-Oriented Architectures*, [Online]. 1-39. Available at: http://arxiv.org/pdf/1112.0204.pdf [Accessed 25 October 2016].

Chaffey, D. 2011. *Smart Insights*. [ONLINE] Available at: http://www.smartinsights.com/digital-marketing-strategy/online-business-revenue-models/online-revenue-model-options-internet-business/. [Accessed 24 October 2016].

El Sawy, O, Pereira, F, 2013. Digital Business Models: Review and Synthesis. *Business Modelling in the Dynamic Digital Space*, [Online]. 1, 13-20. Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=10&ved=0ahUKEwjD3-uu1r3MAhWHEiwKHTt7B14QFgh-nMAk&url=http%3A%2F%2Fwww.springer.com%2Fcda%2Fcontent%2Fdocument%2Fcda_downloaddocument%2F9783642317644-c2.pdf%3FSGWID%3D0-0-45-1344851-p174540940&usg=AFQjCNFj8xvqaiqj6af2Dkcb9q5GXpc_tg&sig2=8sDjGVpIpDb79yIcRq0d9g&cad=rja [Accessed 24 October 2016].

Evans, N, 2016. Digital business ecosystems and platforms: 5 new rules for innovators, [Online]. Available at: http://www.computerworld.com/article/3045385/it-management/digital-business-ecosystems-and-platforms-5-new-rules-for-innovators.html [Accessed 14 October 2016].

Google. *Our history in depth*. [ONLINE] Available at: https://www.google.com/about/company/history/. [Accessed 24 October 2016].

Heistracher, T, et al., 2004. *Pervasive Service Architecture for a Digital Business Ecosystem*, [Online]. 1, 1-10. Available at: https://arxiv.org/ftp/cs/papers/0408/0408047.pdf [Accessed 26 October 2016].

Jahandarpour, E, 2016. The Secret Behind Google's Success. *Entrepreneurship Life*, [Online]. Available at: http://www.entrepreneurshiplife.com/secret-behind-googles-success/ [Accessed 29 October 2016].

Marchand, D, Wade, M, 2014. Digital Business Transformation: Where Is Your Company On The Journey. *Perspectives for Managers*, [Online]. 187, 1-4. Available at: http://search.proquest.com.ezproxy.hamk.fi/docview/1564227843?accountid=27301 [Accessed 2 May 2016].

Moore, J, 1993. Predators and Prey: A New Ecology of Competition. *Harvard Business Review May-June 1993*, [Online]. Reprint 93309, 75-86. Available at: http://blogs.harvard.edu/jim/files/2010/04/Predators-and-Prey.pdf [Accessed 26 October 2016].

Nachira, F, et al., 2007. *Digital Ecosystems*, [Online]. 1-214. Available at: http://www.digital-ecosystems.org/book/2006-4156_PROOF-DCS.pdf [Accessed 25 October 2016].

Nelson, R, Winter, S, 1982. *An Evolutionary Theory of Economic Change*, [Online]. 1. Available at: http://inctpped.ie.ufrj.br/spiderweb/pdf_2/Dosi_1_An_evolutionary-theory-of_economic_change..pdf [Accessed 25 October 2016].

Noren, E. 2012. *Digital Business Models*. [ONLINE] Available at: http://www.digitalbusinessmodelguru.com/2012/12/15-business-models-complete-list.html. [Accessed 24 October 2016].

Pugh, K, Prusak, L, 2013. Designing Effective Knowledge Networks. MIT Sloan Management Review, [Online]. Fall 2013. Available at: http://sloanreview.mit.edu/article/designing-effective-knowledge-networks/ [Accessed 29 October 2016].

Scott, G. 2016. *Digitalist Magazine*. [ONLINE] Available at: http://www.digitalistmag.com/digital-economy/2016/04/25/digital-business-case-for-new-business-models-04164114. [Accessed 24 October 2016].

Stanley, J, Briscoe, G, 2010. *The ABC of Digital Business Ecosystems*, [Online]. 1, 1-24. Available at: https://arxiv.org/ftp/arxiv/papers/1005/1005.1899.pdf [Accessed 25 October 2016].

Weill, P, Woerner, S, 2013. Optimizing Your Digital Business Model. *MIT Sloan Management Review*, [Online]. 54.3, 71-78. Available at: http://search.proquest.com.ezproxy.hamk.fi/docview/1323892551?accountid=27301 [Accessed 2 May 2016].

Weill, P, Woerner, S, 2015. Thriving in an Increasingly Digital Ecosystem. *MIT Sloan Management Review*, [Online]. 56.4, 27-34. Available at: http://search.proquest.com.ezproxy.hamk.fi/docview/1694712973?accountid=27301 [Accessed 27 October 2016].

Vissak, T. *The importance and limitations of the network approach to internationalization*, [Online]. 1, 1-19. Available at: http://www.academia.edu/722820/THE_IMPORTANCE_AND_LIMITATIONS_OF_THE_NETWORK_APPROACH_TO_INTERNATIONALIZATION [Accessed 24 October 2016].

Figures:

Figure 1: Cavazza, F, (2015), Social Media Landscape 2015 [ONLINE]. Available at: http://www.socialmediamodellen.nl/wp-content/uploads/2011/12/Social-media-landscape-2015-fredcavazza-socialmediamodel.png [Accessed 30 October 2016].

Figure 2: Deloitte University Press, (2016), The digital ecosystem [ONLINE]. Available at: https://dupress.deloitte.com/content/dam/dup-us-en/articles/new-digital-ecosystem-technology-media-telecom-industry/ER_2904_Fig.1.jpg [Accessed 30 October 2016].

Figure 3: Hinchcliffe, D, (2014), Ecosystem View of the Next Generation Enterprise [ONLINE]. Available at: https://dionhinchcliffe.files.wordpress.com/2014/05/ecosystem_view_of_the_next_generation_enterprise_2014_workforce_community_customer_partner_market_social_business.png [Accessed 30 October 2016].

Figure 4: Hinchcliffe, D, (2012), Cultivating & Managing Ecosystems [ONLINE]. Available at: https://dionhinchcliffe.files.wordpress.com/2012/02/digital_business_ecosystems_and_competition.png [Accessed 30 October 2016].

Figure 5: Briscoe, G, Sadedin, S, De Wilde, P, (2011), Business ecosystem [ONLINE]. Available at: https://arxiv.org/pdf/1112.0204.pdf [Accessed 30 October 2016].

Figure 6: Stanley, J, Briscoe, G, (2010), Networking models [ONLINE]. Available at: https://arxiv.org/ftp/arxiv/papers/1005/1005.1899.pdf [Accessed 30 October 2016].

Figure 7: Nachira et al., (2007), Characteristic of Digital Ecosystems / Dimension of Digital Ecosystem Governance [ONLINE]. Available at: http://www.digital-ecosystems.org/book/2006-4156_PROOF-DCS.pdf [Accessed 30 October 2016].