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Irmeli Pietilä

The Game of Developing a Game

Hobbyist Game Developers as Playful Entrepreneurs in the Apple App Store

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ABSTRACT

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Over the past decades entrepreneurship research has gone through a paradigm shift where the focus is no longer on the traits of the individual. Instead there seems to be a consensus that the opportunity process is central to entrepreneurship. Whether the opportunities are discovered or created still remains open. There is also a need to better understand how perceived uncertainty affects the willingness to take action, particularly in the new electronic marketplaces. This monograph sets out to investigate how hobbyist game developers pursue opportunities and take entrepreneurial action in the Apple App Store. The report describes and analyzes the path from being a gamer, Homo Ludens, to becoming a game developer and a playful entrepreneur, who not only creates a product but also creates an organization.

The study is an interpretative case study with an abductive approach. The stories of five hobbyist game developers and five of their team members were collected in online interviews. These verbal histories were audio recorded and analyzed using an application of Greimas's actantial model in each case and a thematic narrative analysis across the cases. Also timelines and profile cards were utilized. Secondary sources like forum discussions, online videos, and podcasts were used to enhance trustworthiness and rigor.

The key findings of the study show that uncertainty is not always an impediment to entrepreneurial action. It can also drive action when the entrepreneur enjoys suspense and only commits what she can afford to loose. Effectuation is not only a set of learnable heuristics but also a set of transferable heuristics. This means that effectuation can be learned in a kindred domain like gaming, and also that effectuation principles can be applied broadly not only in entrepreneurship education but in education in general.

The main practical implication of the study is that in the App Economy it is important for the developer to be embedded in online communities and to find direct ways to communicate with her customers. The study also suggests that principles of play and effectuation should be more widely applied in education.

Keywords: entrepreneurship, effectuation, game, hobbyist, play

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This is a story of five hobbyist game developers. Like them, I also am a hobbyist, and entrepreneurship research is not part of my profession. During the thesis process I have therefore needed a lot of encouraging nudges from different people and organizations, and I want to express my warmest thanks to all of them!

Two things happened in 2008: my employer Haaga-Helia University of Applied Sciences launched a doctoral program in co-operation with the University of Jyväskylä, and Apple opened its App Store for third party developers. I immediately grasped the former opportunity, but it took me almost 2 years to realize that even the latter was an opportunity for me. I thank Haaga-Helia for the doctoral program; without it I would probably never have taken up this challenging hobby. I am also thankful for the leave of absence I could take to carry out the research. Financially the sabbatical was made possible through the adult education subsidy granted by The Education Fund (Koulutusrahasto). As a happy Finnish taxpayer I therefore express gratitude to my home country for the support it offers for life-long learning. Throughout the process I have been fortunate to be able to attend international doctoral schools and conferences. This would not have been possible without the generosity of The Foundation for Economic Education (Liikesivistysrahasto), the dependable fairy godmother of economic research in Finland. Thank you!

In the beginning of the process I got stuck for almost 2 years, because I could not come up with a research problem. I thank my son Elias for offering inspiration to target this research on hobbyist game developers in the Apple App Store.

When the topic was clear my supervisor, Professor Matti Koiranen, suggested that I should sort my thoughts by writing. However, it takes me a lot of walking and talking before I am ready for writing! Matti, I am very grateful for the patience with which you listened to me. I especially remember the first time when I shared with you my incoherent thoughts on hobbyist game development, and how you said after carefully listening to my rambling: "It sounds like you should read Homo Ludens". That small comment gave me direction for the years to come. I thank my other supervisor, Adjunct Professor Tarja Römer-Paakkanen, for flooding the doctoral students' mailing list with international calls for paper and invitations to doctoral schools. That widened my horizons. A special thank you for helping me to write the first doctoral paper for RENT. I never would have dared to take that step without your support.

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I thank my sister Pirjo and my friend Heli who literally walked me through this process and my colleagues Merja and David who were patient with me when my mind was preoccupied.

I was fortunate to spend my childhood surrounded by play and game, and for that I thank my father Jorma, one of the most playful men I know.

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And then there is my husband Kari. I want to thank you for sharing the ups and the downs of my everyday life during this journey. This thesis seems to have turned into an up after all!

Espoo, August 2015
Irmeli Pietilä

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ABBREVIATIONS

3G/4G	Third and fourth generation mobile technologies provide fast mobile broadband connections.
ADA	The Apple Design Awards is an annual competition arranged by Apple Inc. It recognizes apps that raise the bar in design, technology, and innovation.
API	Application Programming Interface specifies how software components should interact with each other.
App	An application is a piece of software designed to run on a mobile device. In this study more specifically an iOS application for iPhone, iPod Touch, iPad or iPad Mini.
Box2D	Box2D is a free open source 2D physics engine
CSS	Cascading Style Sheet is used to create a uniform look across several pages of a Web site.
DPE	Design-precedes-execution
f2p	Free-to-play game is free upfront, but in-app purchase can be used to speed up the time it takes to advance in the.
iOS	iOS is the mobile operating system used in iPhone, iPodTouch, iPad and iPad Mini.
IRC	Internet Relay Chat is a protocol for live interactive Internet chat or synchronous conferencing.
HTML	HyperText Markup Language is the authoring language used to create documents on the World Wide Web.
Lisp	Lisp is a high level programming language used e.g. in artificial intelligence. The name LISP derives from "LISt Processing".
Lua	Lua is a lightweight multi-paradigm programming language, which is used for scripting in Corona SDK.
MP3	MP3 is an encoding format for digital audio. It effectively compresses the audio files so that they take up little storage space.

Objective-C	Objective-C is an object-oriented programming language that is used in the iOS operating system.
OGL	Open Graphics Library is a cross-language, multi-platform application programming interface (API) for rendering computer graphics.
PSED	Panel Study on Entrepreneurial Dynamics is a research program designed to enhance the scientific understanding of how people start businesses.
SDK	Software Development Kit for developing applications in iOS
Wifi	Wifi is a technology, which allows an electronic device to exchange data or connect to the Internet wirelessly using radio waves.

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1 INTRODUCTION

1.1 Background and motive

This monograph sets out to investigate how hobbyist game developers (to be defined later) pursue opportunities and take entrepreneurial action. There is a need to better understand the process, which takes place in the electronic marketplaces and originates without any specific aim to found a company. This report describes and analyzes the path from being a gamer, Homo Ludens, to becoming a game developer and a playful entrepreneur, who not only creates a product but also creates an organization. The context of this study is hobbyist game development in the Apple App Store (to be defined later), but it also offers new insights into the phenomenon of user entrepreneurship in other digital arenas.

On July 11, 2008 Apple Inc. opened its App Store for third party developers. The Apple App Store was a technological innovation, which profoundly rocked the existing channels of delivering software, and at the same time revolutionized who can develop applications (apps), and who plays games. After Apple all major manufactures of handheld devices have followed suit. Game development in particular has benefited from these new arenas with games accounting for 75% of consumer spending on apps in the fourth quarter of 2013. Independent game developers who started their businesses on iOS and Android produced two thirds of game applications and thus overwhelmed established gaming companies who extended to iOS and Android from other platforms. (App Annie 2014a, 13; Farago 2012a.)

In the mobile marketplaces applications can generate revenue, even when they are free upfront. Gartner, an information technology research and advisory firm, estimated that total revenue from mobile app stores would reach $26 billion in 2013, and almost 91% of all the applications downloaded would be free upfront (Gartner 2013). Paradoxically these free applications can be very profitable: 48 out of the 50 top grossing applications in the US iTunes App Store were free upfront in June 2014 (US iTunes App Store Top Grossing Apps 06.20.2014). It is therefore worth taking a closer look at an ecosystem that offers independ-

ent game developers a low entrance barrier to global markets and innovative business models like revenue from free applications.

The Apple App Store could be studied from a number of perspectives. I have chosen to focus on the actions of hobbyist game developers, who start developing games just because they can, without the explicit goal of becoming entrepreneurs (Krueger & Brazeal 1994, 91). What starts as playing around and having fun with friends, may take more organized entrepreneurial forms later on, as the players learn the trade by participating in the mobile store. I had the opportunity to observe closely the actions of one hobbyist game developer and his team when they developed games for the Apple App Store. I noticed that they did not follow any systematic process of making plans, executing them, and evaluating the outcomes in a businesslike manner. Gradually, my non-academic interest in the Apple App Store game development scene grew into academic curiosity. Every new era has its nascent entrepreneurs, who tinker with their products in their garages. This time the garage is virtual. I want to know how the actions of hobbyist game developers can be interpreted with existing entrepreneurship theory and to find out where new understanding is needed. I do not attempt, however, to find any absolute truths about hobbyist game development. My aim is to share one interpretation of what takes place at the grassroots of what to me looks like a truly groundbreaking era in the game business.

In this study a hobbyist game developer (targeting the Apple App Store) is defined as a person who is not employed by a company to develop her/his game for iOS. She is in charge of the game production and can perform multiple tasks, such as game design, programming, graphic design, creating sound effects, or composing music. Her input is central in the process, but she can have team members or sub-contractors to carry out certain tasks. The term developer thus has a broader meaning than in other software development contexts where it usually only refers to programming. The definition is based on threads on the Touch Arcade[1] forum (03.30.2010, 04.04.2010), where developers themselves discuss how they would define an indie developer. However, instead of "indie game developer" I choose to use the term "hobbyist game developer". I make this choice because indie game developer could be too easily confused with "independent game studio".

1.2 Stream of thought and research gap

Opportunity, uncertainty, and action are all central concepts in entrepreneurship literature. However, the way in which they are perceived varies from scholar to scholar. In this study the stream of thought in entrepreneurship flows from uncertainty (Knight 1964; Einhorn & Hogarth 1986) and the origins of an opportunity (Schumpeter 1934; Kirzner 1997) to individual-opportunity nexus

[1] http://toucharcade.com is a forum for iOS related discussions.

(Shane & Venkatereman 2000; Shane et al. 2003; Shane 2004) and touches lightly on psychological characteristics (Bandura 1986; McClelland 1967). It is rooted in bricolage (Baker et al. 2003; Baker & Nelson 2005), effectuation (Sarasvathy 2001, 2008), user entrepreneurship (Shah & Tripsas 2007), action theory (McMullen & Shepherd 2006; Shepherd et al. 2007; Alvarez & Barney 2007), and venture creation (Gartner 1985, 1989, 1990; Gartner et al. 2004).

A linear approach (Shane 2004), where opportunities are discovered through a combination of alertness and prior knowledge and where a business plan is made and alternatives are rationally evaluated, is ill-fit to interpret the actions of hobbyist game developers, who seem to develop games in the Apple App Store in an improvisational manner just for fun. Bricolage (Baker et al. 2003, 2005) and effectuation (e.g. Sarasvathy 2001, 2008) offer less linear views, but effectuation is said to be an approach used by expert entrepreneurs, where expertise is associated with "deep personal ability and knowledge derived from extensive practice and experience based on immersion in the relevant domain" (Dew et al. 2009, 289). Hobbyist game developers are novices as entrepreneurs, but many of them qualify as expert gamers. Can similar expertise be learned in different settings? Dew et al. (2009, 290) agree that expertise has a generic component, which applies in different domains, but continue that each domain has a set of domain-specific heuristics, and experience in one domain does not transfer into expertise in another.

McMullen and Shepherd (2006) argue that entrepreneurs realize opportunities in two stages. They first discover third-person opportunities under radical uncertainty. They then evaluate whether these opportunities are feasible and desirable not just for someone, but for themselves. If the answer is yes, they take entrepreneurial action under a reduced action-specific uncertainty. Do hobbyist game developers follow the same routine, or do they perhaps start with first-person opportunities? Moreover, does their process qualify as entrepreneurial if they make a product that is downloaded in the millions but that does not generate direct revenue or if the game is highly profitable, but the developer does not commit to venture creation (Moroz & Hindle 2012)?

The way the hobbyist game developers carry out their projects resembles playing a game. To compliment entrepreneurship literature, I therefore look into theories of play and game (Huizinga 1955; Caillois 2001; Juul 2003; Järvinen 2008 Sotamaa 2009). Huizinga is convinced that human culture evolves in play and as play. This takes place in the Magic Circle, which is temporarily and spatially separated from the ordinary life. (Huizinga 1955, 10.) Caillois (2001) proposes four game categories and in each category a continuum that ranges from free play to play governed by rules. He calls the two ends of this continuum Paidia and Ludus. Developing a game gives the developer satisfaction, but can it also give profit, or would that automatically push the activity outside the realm of play? Both Huizinga and Caillois agree that play is sacred and cannot be stained by economic activity. Many recent game scholars criticize this view. Although the idea of a separate sphere of unproductive joy is tempting, they argue that in reality the spatial and temporal boundaries of play can be loose or non-existent (Juul 2008, 59; Sotamaa 2009, 43; Rodriguez 2006, 16).

The existing literature on entrepreneurship predominantly assumes a rational, profit driven process from opportunity discovery through opportunity evaluation to opportunity exploitation. There is a need for studies addressing the more playful actions of nascent entrepreneurs in the emerging mobile arenas. In this study I combine theories of entrepreneurship and play to interpret the actions of hobbyist game developers targeting the Apple App Store. The study contributes to effectuation theory by suggesting that effectual heuristics are transferable; that is, they can be learned not only through entrepreneurship but also through gaming. What is more, once they are learned, they can be applied in several fields. The findings suggest that uncertainty is not an impediment to action when the entrepreneur enjoys suspense and builds her endeavor on affordable loss. The study also answers Shah and Tripsas' call for study on the emergent and collective process of user entrepreneurship in digital product domains (Shah & Tripsas 2007, 136).

1.3 Research task and boundaries

The aim of this study is to build understanding of the process of game development and venture creation in the Apple App Store. The focus is on the actions of hobbyist game developers, who start their endeavor without the specific aim of becoming an entrepreneur.

The central research question is:

How do hobbyist game developers pursue entrepreneurial opportunities and take entrepreneurial action in the Apple App Store?

Sub questions are:

1. Who are the hobbyist game developers targeting the Apple App Store (in this study)?

2. How does the Apple App Store as an environment enhance playful entrepreneurship?

3. How is effectuation expressed in the actions of hobbyist game developers?

4. How is play expressed in the actions of hobbyist game developers?

5. What is the hobbyist game developers' venture creation process like?

The cognitive interest in this research is to understand and interpret the actions of hobbyist developers. The approach is social constructionist, and the reasoning is carried out in an abductive manner where literature and empirical data are in dialogue. The chosen research method is qualitative case study. Data is

collected in the form of developer narratives and from secondary sources, such as forum discussions on Touch Arcade, blogs, YouTube videos, and the Experimental Game Dev Podcast Show[2]. The findings are analyzed through the lenses of effectuation and play using thematic and structural narrative analyses.

The study covers a time span from July 2008 to July 2013. The technical development of the devices is not in focus. The morality of gaming, or entrepreneurship is not discussed, but the reader should be aware that I personally perceive both play and entrepreneurship as positive forces. While working on this thesis I became aware that there are questions related to e.g. taxation and business legislation that vary from country to country in regard to the Apple App Store entrepreneurship. Nevertheless, these issues and their effect on the hobbyist developers' actions are not covered in this study. No attempt is made to find a relationship between the actions of the hobbyist developers and the successfulness of their products or ventures.

1.4 Key concepts and App Store related vocabulary

Entrepreneurship and innovation

Bricolage
Bricolage is making do by applying combinations of the resources at hand to new problems and opportunities (Baker and Nelson 2005, 333).

Effectual logic
Effectual logic is defined as follows: to the extent we can control the future, we do not need to predict it (Sarasvathy 2003, 208).

Effectuation
Effectuation processes take a set of means as given and focus on selecting between the possible effects that can be created with that set of means (Sarasvathy 2001, 245).

Entrepreneur
An entrepreneur is a person who turns ideas into entrepreneurial action by creating new products, processes, or ventures. (See below the definitions of entrepreneurial action and entrepreneurship).

Entrepreneurial action
Entrepreneurial action can be conceptualized as the creation of new products or processes (Schumpeter, 1934), entry into new markets (Lumpkin & Dess, 1996), or the creation of new ventures (Gartner, 1985, in McMullen & Shepherd 2006, 132).

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[2] http://www.indiegamepod.com

Entrepreneurial opportunities
Entrepreneurial opportunity is a situation in which a person can create a new means-ends framework for recombining resources that the entrepreneur *believes* will yield a profit (Shane 2004,18).

- How is this applicable in the Apple App Store where applications are often free up-front?

Entrepreneurship
Entrepreneurship is a process in which opportunities for value generation are discovered and created. It occurs over time and leads into entrepreneurial action, which takes place individually or in teams. As a result new organizations may be created, but entrepreneurship does not necessarily call for the creation of new organizations (based on Gartner et al. 1994; Shane 2004; McMullen & Shepherd 2006; Sarasvathy 2008).

Hobbyist game developer (targeting the Apple App Store)
A hobbyist game developer is a person who is not employed by a company to develop her/his game for iOS. She is in charge of the game production and can perform multiple tasks, such as programming, graphic design, sound effects, or composing music. Her input is central in the process, but she can have team members or sub-contractors to carry out certain tasks. (The definition in this study).

Innovation
Innovation is the implementation of a new or significantly improved product (good or service), process, new marketing method, or a new organizational method in business practices, a workplace organization, or external relations. (OECD definition).

Lead user
Lead users face needs that will be general in a marketplace - but face them months or years before the bulk of that marketplace encounters them. They are positioned to benefit significantly by obtaining a solution to those needs (von Hippel 1986, 796).

User entrepreneurship
User entrepreneurship is the commercialization of a new product and/or service by an individual or group of individuals who are also users of that product and/or service (Shah & Tripsas 2007, 124).

Play and game

Game
A game is a rule-based system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels emotionally attached to the outcome, and it is optional whether a game has real-life consequences (Juul 2003).

Gamification
Gamification is the use of game design elements in non-game contexts (Deterding et al. 2011, 9).

Hobby
A hobby is a secondary and gratuitous activity undertaken and pursued for pleasure (Caillois 2001, 32).

Magic circle
A magic circle is a temporally and spatially limited space where play takes place. Inside of it is "different" and outside is "ordinary" (Huizinga 1955, 10).

- However, according to Salen and Zimmerman, the boundaries between different and ordinary are "fuzzy and permeable" (Rodriguez 2006, 11).

Play
Play is a voluntary activity or occupation executed within certain fixed limits of time and place according to rules freely accepted but absolutely binding. It has its aim in itself and is accompanied by a feeling of tension, joy, and the consciousness that it is "different" from "ordinary life (Huizinga 1955, 28).

Play thus should be understood as a free-form activity, whereas games can be seen as systems characterized by rules. (Sotamaa 2009, 41)

Playfulness
Playfulness is a mindset whereby people approach everyday activities with an attitude similar to that of paidia—as something not serious but fun and with no clear goals. (Based on Lucero et al. 2014, 36; Deterding et al. 2011, 10).

- Note: I have left out "no real-world consequences", which was included in Lucero et al.'s definition.

App Store terminology

Apple App Store
In this study the Apple App Store refers to an ecosystem consisting of the following: Software Development Kit (SDK), iTunes Connect for uploading the software and receiving of sales reports, iPhone Provisioning Portal for certification and provisioning profiles, and iTunes App Store marketplace. In the developers' quotes the term App Store can refer to the whole Apple App Store or just the iTunes App Store.

Application = App
An application is a piece of software designed to run on a mobile device. In this study it is more specifically an iOS application for iPhone, iPod Touch, iPad, or iPad Mini. App is the abbreviation for application.

Freemium game and Free-to-play game
The game is free upfront, but premium content can be bought through in-app purchase (freemium), or in-app purchase can be used to beat the timers and to advance faster in the game (free-to-play, f2p).

In-app purchase
In-app purchase means that it is possible to buy extra content/features or less delays etc. within a free or paid application.

iOS
iOS is the operating system of Apple mobile devices (iPhone, iPod Touch, iPad, and iPad Mini).

1.5 Structure of the report

Chapter 1 offers an introduction to why it is important to study the actions of hobbyist game developers targeting the Apple App Store and how the research is conducted. This is followed in chapter 2 by a literature review where previous research on entrepreneurship and play is discussed. Chapter 3 lays the methodological foundation of this study and shares the steps taken in data collection and analysis. The empirical findings are organized into chapters (4 – 8) titled as follows: *The players*, *The playground*, *The play*, *Going Pro*, and *The team*. The approach in these chapters is reflective; instead of splitting the findings and the discussion into separate chapters, they are kept together in each context. In chapter 9, *The after-play*, I present the model of the entrepreneurial process of hobbyist game developers based on this research. The conclusion in chapter 10 offers contributions to entrepreneurship research, the implications for practice and education, and the limitations of this research. It also suggests avenues for further research.

2 THEORETICAL FRAMEWORK

2.1 Entrepreneurship as opportunity-driven action

What is entrepreneurship? Is it creating a product or is it a process? Is it selling something or creating value? Or is it is founding a company or making a profit or taking risks? For years as a teacher I was happy with the European parliament and commission definition of entrepreneurship as an individual's ability to turn ideas into action (Com 2005, 17). However, when I plunged into research on hobbyist game developers I soon realized that this definition is not enough. It says nothing about the origins of the ideas, how they are turned into action, and with what effects. What is more, it talks about an individual's ability, but present day ventures often are team efforts.

Over the past few decades entrepreneurship research has gone through a paradigm shift where the focus no longer is on the traits of the individual (Gartner 1990). Instead there seems to be a consensus that the opportunity process is central to entrepreneurship (e.g. Shane & Venkataraman 2000; Ardichvili et al. 2003; Shane 2004; Baron & Ensley 2006; McMullen & Shepherd 2006; Alvarez & Barney 2007; Berglund 2007). However, there still is no agreement on the origin of the entrepreneurial opportunities, which set the process in motion (Companys & McMullen 2007, 303). The chain of thought in this chapter flows from uncertainty to entrepreneurial opportunities and individual-opportunity nexus; after that, three emerging theoretical approaches to entrepreneurship are presented, and the implications of uncertainty and opportunity on entrepreneurial action are discussed. The chapter closes with a summary of the entrepreneurial process as seen in this study.

2.1.1 Uncertainty and risk in entrepreneurial decision-making

As human beings we are confined to time and space. Nobody can know with absolute certainty what the outcomes of our present decisions will be in the future. Some try to predict the future; others concentrate on grasping the moment. In the layman's world willingness to bare risk is routinely attached to entrepre-

neurship. Entrepreneurs put their money at stake: if they succeed they will make a profit, and if they fail they will lose their investment. Researchers agree that risk is an essential part of entrepreneurial decision-making. Nevertheless, they offer a much more nuanced picture of risk and uncertainty.

Knight (1964) identifies three kinds of uncertainty, which Read illustrates with three urns (e.g. in 1sth Effectuation Conference, Lyon 2011). The first urn is made of glass, and one can see the possible outcome (the color of the balls) and the distribution through the transparent wall. The second urn is opaque, and it is impossible to see the outcome (the balls actually are a different color than in urn #1) or the distribution of the balls. Also the third urn is opaque, and there is no way to tell if it even contains balls (it does not, it is filled with alarm clocks, rubber bands, and other unrelated items). When the distribution is known (urn #1), the probability of an incident can be calculated a priori. In the case of the second urn the outcome and distribution are not known a priori, nevertheless it is possible to make draws and calculate the probabilities by statistical methods. Urns one and two thus depict situations with measurable probabilities, and Knight calls the uncertainty involved in these situations risk. In the third urn true uncertainty prevails (Knight 1964, 233.) Not only are the outcome and probability distribution unknown, they are non-existent: by drawing a rubber band one cannot predict the likelihood of getting an alarm clock with the next draw.

Rational choices are made to reduce the uncertainties involved in adapting means to ends, even though we seldom are fully rational and would not always prefer to live in a world of no surprises (Knight 1964, 238). Risk and true uncertainty call for different strategies from the entrepreneur. It is possible to reduce risk by attempting to make better predictions and by taking insurance, but true uncertainty is unpredictable and uninsurable. It is rarely possible to calculate a priori probabilities in business situations, and even statistical methods seldom offer all the necessary information; most of the time entrepreneurs have to make decisions under true uncertainty. One way to deal with it is by attempting to control the future instead of predicting it. (Knight 1964, 239.)

Knight (1964, e.g. 20) mentions several times that risk is an ambiguous term. By this he refers to the everyday use of the word, which covers both measurable risk proper and un-measurable true uncertainty. Nevertheless, he does not call statistically measurable risk (urn #2) ambiguity, although many other researchers use that term to describe a situation where all information is not available a priori but which is still knowable. For Einhorn and Hogarth (1986, 227) ambiguity is the uncertainty about uncertainties. They distinguish between risk, ambiguity, and ignorance, where risk refers to a situation in which all distributions but one can be ruled out and ignorance to a situation where no distribution can be ruled out. Ambiguity lies in between these two poles and is defined as an increasing function of the number of distributions that are not ruled out by one's knowledge of the situation (Einhorn & Hogarth 1986, 229). Their main interest is in ambiguity; that is why they do not elaborate very much on risk and even less on uncertainty.

Ambiguity affects judgment; people generally are ambiguity adverse. Nevertheless, there might be situations where ambiguity is sought, not avoided.

Einhorn and Hogarth (1986) developed and tested a model to find out how people assess uncertain probabilities. In the experiment participants were to make a choice between an urn with a known probability distribution and an ambiguous urn. The choices were tested at two levels of known probability and with both positive and negative payoffs. The results show that although the urn with known probability is favored, with positive payoffs there is a considerable share who choose the ambiguous urn, especially when the known probability in the other urn is low. With negative payoffs people are less willing to choose the ambiguous urn in the first place, and with a low probability in the other urn the willingness is even lower: ambiguity avoidance reaches 75%. (Einhorn & Hogarth 1986, 237.)

Also Shepherd et al. (2007) list three kinds of entrepreneurial uncertainty. While Einhorn and Hogarth (1986) talk about *one*'s knowledge of the situation in connection with ambiguity, Shepherd et al. are concerned with what *others* know:

> Entrepreneurial ambiguity refers to a situation where the decision maker does not know all possible outcomes of entrepreneurial action, does not know the probability distribution of those outcomes, but knows that the lack of knowledge is created by missing information that is relevant and could be known to others (Shepherd et al. 2007, 77.)

Alvarez and Barney (2007, 14) separate two main categories, risk and uncertainty, and treat ambiguity as a special case under the later. For them risk refers to a situation where the decision maker can collect enough information to know both the outcomes and their probability; uncertainty refers to a situation where neither the outcomes nor their probability can be known; and ambiguity refers to a situation where possible outcomes are known, but their probability is not known. The way in which they interpret risk and uncertainty is in line with the previous approaches. However, their view on ambiguity differs from that of Einhorn and Hogarth (1986), and Shepherd et al. (2007). They do not specify who knows the outcome in ambiguity (in Einhorn & Hogarth "one's knowledge", in Shepherd et al. "known to others"). What is more, they claim that ambiguity is a special case of uncertainty even though the outcomes are known. To me known outcomes do not reflect true uncertainty. They rather carry a resemblance to Knight's second urn, where the missing knowledge of the outcome and probability distribution can be acquired through additional draws and by exploiting statistical methods. In my view, instead of treating ambiguity as a special case of uncertainty, it should be treated as a special case of risk.

Table 1 draws together these different approaches to uncertainty. Although there are some differences in the nuances of the approaches, I interpret that there is a general agreement on what is meant by risk and uncertainty at the two extremes. Ambiguity, however, still remains quite ambiguous! Knight (1964) includes a priori unknown statistical distribution into the risk concept, whereas Einhorn and Hogarth (1986), and Shepherd et al. (2007) put unknown but knowable uncertainty into a category called ambiguity, a concept Alvarez and Barney (2007) treat as a special case of (true) uncertainty.

TABLE 1 Different approaches to (entrepreneurial) uncertainty

	Risk/Ambiguity/ Uncertainty/Ignorance	**Set of possible outcomes**	**Probability distribution**
Knight 1964	Risk	Known	Known through probability calculation a priori
		Not known a priori, knowable	Not known a priori, knowable through statistical calculations
	True uncertainty	Not knowable	Non-existent distributions
Einhorn & Hogarth 1986	Risk	Known	Known
	Ambiguity - A function of the number of distributions, which are not ruled out by *one's* knowledge of the situation.	Not known, knowable	Not known, knowable
	Ignorance - No distributions are ruled out	Not known	Not known
Shepherd et al. 2007	Entrepreneurial risk	Known	Known
	Entrepreneurial ambiguity - The entrepreneur is missing relevant information, which he knows could be known to *others*	Not known, knowable	Not known, knowable
	Entrepreneurial uncertainty - The entrepreneur knows that others do not know either	Not known	Not known
Alvarez & Barney 2007	Risk	Known	Known
	Uncertainty - Ambiguity is a special case of uncertainty	Not known - In ambiguity outcomes are known, distribution is not known	Not known

In an attempt to make sense of the table, my reasoning goes as follows: ambiguity refers to a situation where the decision maker does not know all relevant information, but the missing information is knowable at least by somebody. A behavior triggered by ambiguity could be a search for the missing information, so that the entrepreneur would be able to make better predictions. True uncertainty would prompt totally different action. In it information is not only unknown, it is unknowable, and there is no point in attempting to search for it. Consequently, I do not agree with Alvarez and Barney (2007) that ambiguity could be treated as a special case of uncertainty. In this study the word ambiguity is used interchangeably with Knightian risk (in urn #2): something that is not known a priori, but whose probability could be calculated using statistical methods if enough information were to be accumulated.

Even when the content of the two concepts is in the most part overlapping, as I interpret is the case with true uncertainty and ignorance, the words themselves can carry additional meaning. As a non-native English speaker I find the connotations of ignorance and uncertainty very interesting. To me ignorance implies not only a state of not knowing, but also the observer's uninterested or avoiding attitude toward that state ("Who cares?"). Uncertainty on the other hand is a neutral word to me. However, Knight (1964, 233) points out that the word uncertain often has a positive tone: we talk about the risk of a loss, and the uncertainty of a gain.

Whether the environment is perceived as risky, ambiguous, or uncertain, one thing is certain: nobody knows what consequences a decision will ultimately have. That is why an entrepreneur can never rely solely on probability calculations and mathematical optimizing in her decision-making; instead she must exercise judgment (Shane 2004, 39).

Milliken (1987, 135) recognizes the limitations of human cognition and states that the correspondence between an objective indicator of uncertainty and a perceptual indicator of uncertainty can never be complete. He focuses on perceived rather than objective uncertainty and defines three types of perceived environmental uncertainty: state, effect, and response uncertainty. State uncertainty refers to the changes in the organizational environment, which are difficult to predict. It involves uncertainty about the future state of the world. Effect uncertainty deals with the uncertainty of the impact that this change of state has on the organization. The definition of response uncertainty is twofold: it can refer to a lack of knowledge of the response options available or to one's inability to predict the consequences of a particular response choice (Milliken 1987, 137.) I find the definition of response uncertainty somewhat disturbing. In my understanding, the inability to know the response choices calls for different action than the inability to predict what happens when a choice is made.

2.1.2 Entrepreneurial opportunities - found and made

Neoclassical equilibrium models of perfect competition assume complete mutual knowledge where price, quality, and quantity are presented to all actors as external facts of nature. In these models there is no need for anyone to grasp an opportunity. The Austrian School of Economics is convinced that standard neo-

classical microeconomics fail to capture what actually happens in market economies (Kirzner 1997). From the 1940s on Austrians von Mises and Hayek criticized neoclassical models from separate, yet overlapping and complementary angles. Mises's main interest was in the active enterprising person, and Hayek was interested in the role of knowledge in the equilibrative process. Kirzner builds on their ideas to offer an explanation of how equilibrating tendencies are set into motion from any initial set of non-equilibrium conditions (Kirzner 1997, 61). Cornerstones for his reasoning are as follows: information asymmetry; alert entrepreneur, who discovers opportunities for profit; and rivalrous competition, which follows opportunity discovery and leads to market equilibrium (Kirzner 1973).

According to Kirzner (1973, 74) opportunities for pure profit exist per se for alert entrepreneurs to discover. Oftentimes the source of these opportunities is the discovery of errors, which were made in the past due to missing information (Kirzner 1973, 14.) Noteworthy is the distinction between imperfect information and sheer ignorance. The former refers to known-to-be-knowable information, which is not available e.g. because it is too expensive or finding it would be too time consuming. The latter is something that the entrepreneur does not even realize exists until she suddenly becomes aware of it. When the opportunity is based on this unthought-of information it cannot be searched for systematically (Kirzner 1997, 71). After all, how could one look for something one does not know exists in the first place? (see also the discussion on risk-ambiguity-uncertainty in the previous chapter).

Kirzner (1999, 7) emphasizes that the entrepreneur notices the opportunities by passive alertness. This suggests that alertness is like observing the terrain without a deliberate search: without knowing what to expect, yet being open to surprises. That is why it is so confusing to read elsewhere Kirzner's statement that the essence of the entrepreneurial role is the deliberate *search* for profit opportunities (Kirzner 1973, 83). Despite this seeming controversy, I interpret that the word "passive" is used not only to make a difference between "passive alertness" and "active creation" but also to differentiate "passive alertness" from "active search".

The entrepreneur has an essential role in the market process. Although Kirzner is inspired by von Mises's work Human Action (Kirzner 1999, 7), he seems to be more interested in "action" than "human". An entrepreneur for him is more a function in the economic system than a human being. He does not ponder the traits, motives, emotions, resources, or prior knowledge of the entrepreneur. For him entrepreneurship does not require owning assets (Kirzner 1973, 16) or call for production (Kirzner 1999, 6). According to him the market opportunities of an asset owner can never be exactly duplicated, whereas anybody can make profit by discovering new opportunities to take advantage of the hitherto unnoticed price differences (Kirzner 1973, 16). For Kirzner, entrepreneurship in its pure, abstract form equals arbitrage (Kirzner 1999, 11).

When the opportunity is discovered, the Kirznerian entrepreneur immediately takes action. For a while the early adaptor has a competitive advantage. However, during the process other market participants gain information on the opportunity, and this leads to rivalrous competition, which drives markets to-

ward equilibrium (Kirzner 1997). Schumpeter (1934) on the other hand claims that entrepreneurs introduce new combinations in an economic system, which is initially in equilibrium, and by so doing cause creative destruction. This leads to disequilibrium in the markets, and makes it possible for entrepreneurs to exploit the emerging opportunities. According to Schumpeter (1934, 66) new combinations can include:

1. The introduction of a new good.
2. The introduction of a new method of production.
3. The opening of a new market.
4. The conquest of a new source of supply or raw materials or half-manufactured goods.
5. The carrying out of the new organization.

Although newness is emphasized, Schumpeter clearly points out that it is enough that the production method is new for the branch; it does not have to be a new scientific discovery. Likewise, the source of supply can be deemed new "irrespective of whether this source already exists or whether it has first to be created". The entrepreneur thus can be perceptive to something that already exists in other fields, or he can create something truly new. What matters are the new combinations. The process involves innovation[3] and creation of new knowledge. It is important to notice that an invention turns into an innovation first after it is commercialized:

> …as long as they are not carried into practice, inventions are economically irrelevant (Schumpeter 1934, 88)

The economic system evolves through the innovative actions initiated by entrepreneurs. Innovations can be incremental, one small step at a time, or they can be radical, where new combinations appear discontinuously (Schumpeter 1934, 66). Schumpeter acknowledges both types of innovation. Nevertheless, he is more interested in the latter, which have the potential to truly create economic development. Radical innovations call for special kinds of entrepreneurs. Schumpeterian entrepreneurs are bold heroes, who have a will to conquer, and who get *joy* from their creativity (Schumpeter 1934, 93). This is in contrast with Kirzner's view of the entrepreneur. For Kirzner (1973, 16) anybody can be an entrepreneur as long as she is alert to discover market failure. In a way, Schumpeter is more concerned with the supply side of entrepreneurs, the qualities the "entrepreneur product" must possess, and Kirzner's interest is in the demand side, the entrepreneurial role, which needs to be filled so that the economic system can work (Thornton 1999, 20).

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[3] Based on Schumpeter's ideas, OECD now defines innovation as the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, the workplace organization, or external relations.

Kirzner distinguishes between his own view of the entrepreneurial role and that of Schumpeter (1973). Over the decades there has been an abundance of literature on this matter, and a common theme is that authors see Schumpeter's and Kirzner's views as almost antithetical (Kirzner 1999, 8; De Jong & Marsili 2011, 1). In his later writings Kirzner (1999, 13; 2009, 149) points out that the alert entrepreneur should not be seen as an alternative to the Schumpeterian creative and innovative entrepreneur. His own approach is on a more abstract theoretical level, while Schumpeter's portrayal may help understand the profile of the real-world entrepreneur; nevertheless, both views can be accepted simultaneously. Furthermore, acceptance is not only limited to differences in the entrepreneurial role but to the opportunity process as a whole (Kirzner 1999, 16).

Shane (2004, 20) agrees that both Schumpeterian and Kirznerian opportunities can co-exist in the economy. He summarizes the differences as five dimensions, which are listed in table 2. Schumpeterian opportunities disrupt existing ways, whereas Kirznerian opportunities reinforce established ways of doing things. There is one pair of dimensions, which I would want to add to the list: Involves production – Limited to arbitrage. I understand that this dimension probably is on a different abstraction level and is therefore not included. Nevertheless, for a pragmatist like me this seems to be one concrete difference between the two sets of opportunities.

TABLE 2 Schumpeterian and Kirznerian opportunities (Shane 2004, 21)

Entrepreneurial Opportunities	
Schumpeterian Opportunities	**Kirznerian Opportunities**
Disequilibrating	Equilibrating
Requires new information	Does not require new information
Very innovative	Less innovative
Rare	Common
Involves creation	Limited to discovery

In their seminal article *The promise of entrepreneurship as a field of research* Shane and Venkataraman (2000) outline the field of entrepreneurship [research] as follows:

> entrepreneurship involves the study of sources of opportunities; the processes of discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate, and exploit them (Shane & Venkataraman 2000, 218).

They combine Kirznerian and Schumpeterian views on opportunities and argue that while entrepreneurship involves discovery of existing market inefficiencies, it also drives the change process through innovation. According to them opportunities are objective phenomena, but discovery is a subjective process (Shane & Venkataraman 2000, 220). People differ in their ability to notice relevant information and in their ability to exploit that information. That is why Shane and

Venkataraman (2000, 221, 222) want to find out how and by whom entrepreneurial opportunities are discovered, evaluated, and exploited. Shane (2004) later elaborates on this theme in his model of individual-opportunity nexus.

Entrepreneurship combines economics and human agency, and at different times the focus of interest has fluctuated between the two poles. Shane (2004, 2) claims that academics have failed to offer a coherent conceptual framework for entrepreneurship because the field is divided between those who are exclusively interested in external forces and those who only focus on individuals and their characteristics. To combine the two approaches he introduces a model for individual-opportunity nexus. He builds on Kirzner's idea on opportunity discovery but compliments it with Schumpeter's view of the importance of change as a source of opportunities (Shane 2004, 40). Entrepreneurship does not occur spontaneously as a result of technological, social, or political change. It requires the individuals who identify and evaluate opportunities for profit in the changing environment and take action upon them.

An opportunity for profit arises when the entrepreneur believes that the value of a resource is higher than the price she needs to pay for it, while others at the same time perceive the value differently:

> I define entrepreneurial opportunity as a situation in which a person can create a new means-ends framework for recombining resources that the entrepreneur *believes* will yield a profit (Shane 2004,18).

The entrepreneur exercises judgment in her decision-making, and in order to make different decisions than others in the same situation she must either have different information than others or she must interpret the same information differently (Shane 2004, 41). Even though entrepreneurial action on an opportunity can be taken up in teams, Shane argues that opportunity discovery itself, being a cognitive process, is inherently individual. Hence, it can never be a collective act (Shane 2004, 45). He digests a host of research to answer the questions why, when, and how some people and not others discover and exploit opportunities. His model starts with entrepreneurial opportunities, individual attributes, and the environment. The process, which follows, includes discovery, exploitation and execution of opportunities. Out of the three steps, only steps one and two, discovery and exploitation, are discussed here. Shane's view on execution does not seem to apply for hobbyist game developers, and it is therefore not covered in detail in this study.

In Shane's model prior knowledge plays an important role both in opportunity discovery and at the exploitation stage. Figure 1 shows how Shane (2004) perceives the origin of an opportunity; an individual's ability to access information and to recognize the opportunity and eventually the psychological and non-psychological factors involved in exploiting the opportunity.

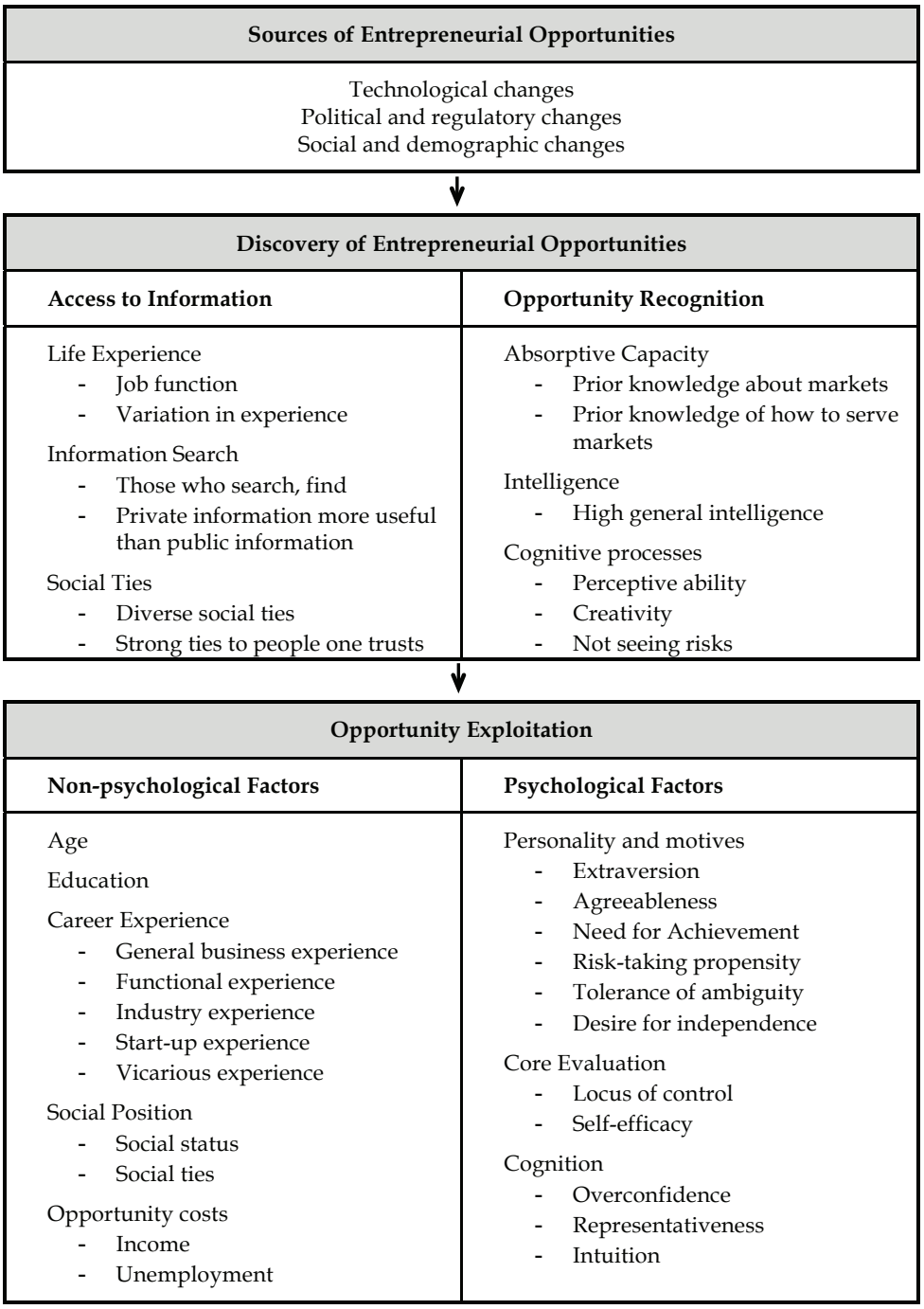

FIGURE 1 Sources of entrepreneurial opportunities, their discovery, and exploitation (Shane 2004, 22 – 117)

Most of the listed factors have a positive correlation to entrepreneurship, but people with high agreeableness are less likely than others to exploit entrepreneurial opportunities. It is also worth mentioning that although some characteristics, e.g. high desire for independence, enhance opportunity exploitation, these same characteristics may have a negative effect on firm performance (Shane 2004, 99, 108). The factors depicted in figure 1 form a lens for my analysis of the hobbyist game developers and are discussed further in chapter 4, The Players.

Since the Promise article the focus of entrepreneurship research has strongly gravitated toward the opportunity process (e.g. Ardichvili et al. 2003; Fletcher 2006; Alvarez & Barney2007; Companys & McMullen 2007; Dimov 2011). Ardichvili et al. (2003) depart from the Kirznerian view of entrepreneurs merely discovering opportunities, which are already formed. Instead they regard that opportunities are developed through a continuous, proactive process where individuals shape the original ideas into full-blown business plans. According to them, opportunity recognition consists of perception, discovery, and creation (Ardichvili et al. 2003, 109.) Individuals do not search for opportunities; they stumble on them accidentally. People differ in their sensitivity to market needs, thus the opportunities they identify differ. Discovery represents a match between perceived market needs and available resources. What follows is the creation of a business concept. This goes beyond adjusting needs and resources, and may involve radical innovation. Evaluation is an essential part of the opportunity development process. It takes place at different stages, and if the business concept does not pass a certain stage-gate, the approach can be reformed or the concept under development can be aborted. The process of opportunity development thus is emergent, and they conclude that opportunities are made and not found. (Ardichvili et al., 110 – 113.)

They construct a model for opportunity identification and development where personality traits (creativity and optimism), social networks, and prior knowledge in two domains (domain 1 = special interest, domain 2 = industry knowledge) heighten entrepreneurial alertness. What is especially interesting in regard to this study is their notion of the importance of prior knowledge in domain 1, which is described in terms of fascination and fun. An entrepreneur[-to-be] spends a lot of time and effort doing her hobby, learns more about her special interest, and deepens her knowledge and capabilities in that area. All this is valuable for her entrepreneurial process. (Ardichvili et al., 114.)

2.1.3 Bricolage and Effectuation

Entrepreneurial bricolage attempts to understand what entrepreneurs do when faced with resource constraints (Senyard et al. 2009, 1). It builds on Levi-Strauss's ideas of the bricoleur always making do with whatever is at hand, where making do implies a bias toward action and active engagement with problems or opportunities (Baker & Nelson 2005, 334). According to Baker et al. (2003, 256) the dominant view of the founding process is that of design-precedes-execution (DPE). To contrast and compliment this image they introduce the improvisation framework where design and execution converge at the

start-up (Baker et al. 2003, 256). The concept of improvisation builds on Miner, Bassoff, and Moorman (2001), who define it "as the substantive and temporal convergence of the design and execution of a novel production" (Baker 2007, 695). Although improvisation and bricollage often coincide, they are two separate constructs. Improvisation may imply bricolage, but bricolage can also occur without improvisation as in cases where the decision to use whatever is at hand is preplanned. (Baker et al. 2003, 260; Baker 2007, 698.)

In their study on knowledge-intensive new firms Baker et al. (2003) discovered that founding can be improvisational, but even the entrepreneurial activity after founding may be carried out in an improvisational manner. Bricolage activities help nascent entrepreneurs overcome resource constraints. The founders in the sample applied bricolage with customers, financing, suppliers, office space, advice, and employees. The commonality between these activities is that the founders exploited their prior contacts in order to get things done. To grasp this phenomenon Baker et al. (2003) introduce a new construct, network bricolage, where founders of new firms depend on pre-existing contact networks as the means at hand. (Baker et al. 2003, 265.) While some improvisational strategies work well even after founding, some can sustain ineffective work habits and prevent the company from assuming the DPE approach even when it would be called for (Baker et al. 2003, 268).

Sarasvathy (2001) outlines two entrepreneurial strategies: causation and effectuation. The former is in line with the discovery view. After the opportunity is discovered, the entrepreneur locks her goal and selects between the possible means that can be used to reach that goal. Selection criteria are based on expected returns, and the entrepreneur attempts to reduce risk by making better predictions (Sarasvathy 2001, 251). The effectuation process on the other hand starts from a set of means and focuses on selecting between possible effects that can be created with that set of means (Sarasvathy 2001, 245). According to Sarasvathy (2008) effectuation is learnable. In her empirical studies she found out that causation is the predominant approach in business schools, whereas expert entrepreneurs are more likely to use effectual heuristics that they learn during the entrepreneurial process. (Sarasvathy 2008, 46.) Sarasvathy points out that effectual heuristics are particularly useful in situations where the firm or market does not yet exist, and decisions are made under true Knightian uncertainty. Characteristic of effectuation is:

> To the extent we can control the future, we do not need to predict it (Sarasvathy 2003, 208).

Effectuation thus places a high emphasis on control and low emphasis on prediction. This would suggest a transformative course of action, as depicted in figure 2. Although both effectuation and causation can occur simultaneously, in the early texts Sarasvathy deliberately depicts them as a dichotomy:

1. Affordable loss, rather than expected returns.

2. Strategic alliances, rather than competitive analyses.

3. Exploitation of contingencies, rather than pre-existing knowledge.

4. Control of an unpredictable future, rather than prediction of an uncertain one. (Sarasvathy 2001, 259.)

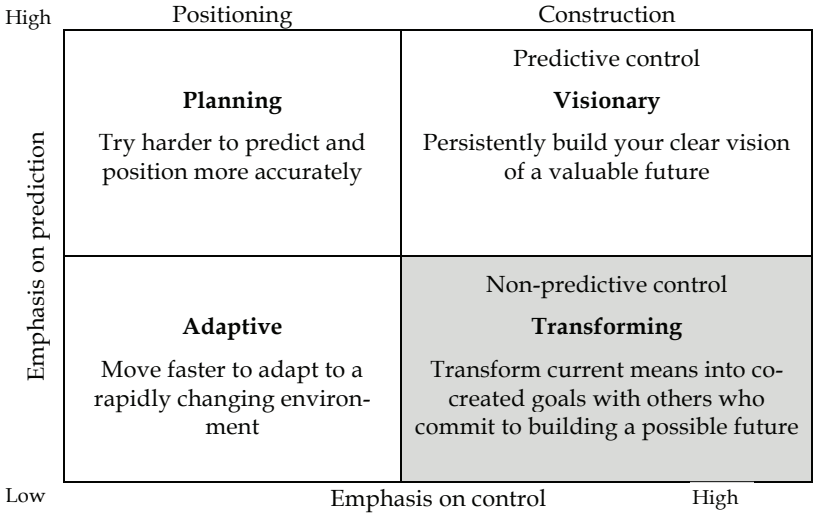

FIGURE 2 Predictive versus non-predictive strategies (Sarasvathy 2008, 58). Grey highlight added by the author.

During the decade that followed more effort was put into defining the dimensions of effectuation (Dew & Sarasvathy 2003; Sarasvathy & Dew 2005a; Dew et al. 2009a). As a result the following five principles of effectuation have taken their form as follows:

1. **Bird-in-Hand Principle**: start with who you are, what you know and whom you know.

2. **Affordable-Loss Principle**: focus on the downside and only invest what you can afford to lose.

3. **Crazy-Quilt Principle**: build a network of self-selected stakeholders, the importance of pre-commitment.

4. **Lemonade Principle**: leverage contingencies, both positive and negative.

5. **Pilot-in-the-Plane Principle**: apply non-predictive control. (Sarasvathy 2008, 71 – 94.)

Effectuation starts with the available means "who I am", "what I know", and "whom I know". Interestingly, "what I have" is not in the inventory of means.

Instead, resources like materials and capital are understood as a function of the entrepreneur's identity, competence, and contacts (Sarasvathy & Dew 2013, 289).

Affordable loss refers to both financial and other losses which the entrepreneur can take if things go wrong. Typically, people are more willing to invest time than money into an uncertain venture, and affordable loss in terms of time is therefore usually higher than affordable loss in terms of money (Dew et al. 2009a, 117). How one feels about losing money depends on the mental account in which the money has been put: for instance, it is more difficult to part with a child's college fund than savings that were put aside for a vacation trip (Dew et al. 2009a, 115).

On the surface, effectual partnerships and network bricolage resemble each other; after all, both are built on pre-existing contacts. However, a closer look reveals their difference. Network bricolage says nothing about the mechanism through which pre-existing networks turn into valuable assets, whereas effectuation is very interested in the How-question. In effectuation, self-selected stakeholders make pre-commitments based on their own affordable loss. Neither opportunism nor trust needs to be considered: pre-commitments toward the shaping of an unknown future create constraints on one's future choices (Dew & Sarasvathy 2003, 16; Sarasvathy 2008, 105).

Effectuation is means oriented, not goal oriented, and as a result it welcomes surprises (Read et al. 2009, 3). Some claim that the lack of predetermined goals makes effectuation a random process where anything goes. This is not the case: effectuation is a theory of constrained creativity with learnable and teachable principles. It is not irrational; it pluralizes the notion of rationality. (Wiltbank & Sarasvathy 2010, 3.)

Non-predictive control is particularly useful when new technologies are commercialized. A new-venture business model, in which both the product and the market are new, is called the suicide quadrant. Traditional forecasting methods have very little to offer in the suicide quadrant, but expert entrepreneurs prefer this problem space just for that very reason: when the market is truly unpredictable a lean start-upper has a chance to shape it into something new. (Sarasvathy 2008, 94.)

The dynamic model of effectuation ties together the five principles (figure 3). The process starts with actual means (bird-in-hand) and is based on affordable loss. This leads to actual courses of actions possible. Interaction with other people does not imply pitching and compromises. It is about asking, but it is also about listening: how can each stakeholder contribute to the transformable artifact? Instead of trying to fit together a little bit of blue and a little bit of green, the self-selected stakeholders set out to explore a world that is neither blue nor green, but grue: something truly original, and something each participant can commit to. (Sarasvathy 2008, 100.)

The mechanism of effectual stakeholder commitment (crazy-quilt) is the core of the model, and it is highlighted in grey in figure 3. Each stakeholder makes a pre-commitment to the process based on her own affordable loss. This increases resources available to the network (upper cycle in figure 3), but at the same time constrains possible future goals (lower cycle). In an effectual world stakeholders do not predict and compare opportunity costs between alterna-

tives (Sarasvathy 2008, 81), instead it is typical that whoever first makes the commitment gets on board (Sarasvathy & Dew 2005a, 556).

Karri and Goel (2006) do not agree that the mechanisms of pre-commitment and affordable loss are sufficient to explain stakeholder commitments. They emphasize the importance of trust, "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions and behavior of another", and claim that entrepreneurs following effectual logic tend to over-trust (Karri & Goel 2006, 479). In their answer to Karri and Goel, Sarasvathy and Dew (2008) argue that the effectual process does not require trust ex ante even though it suggests a bias toward trust-related decisions. Likewise, intelligent altruism is not a prerequisite for partnerships. Instead, an effectual entrepreneur finds it to be a rational strategy, which cues in intelligent altruism in others. (Sarasvathy & Dew 2008.)

One important question is who is considered to be a stakeholder. In the recent attempts to operationalize effectuation the view on stakeholders is quite narrow and traditional. In the measurement scales stakeholders are mainly seen as customers or suppliers. (Chandler et al. 2011; Fisher 2012; Alsos et al. 2013.) I fail to hear this limitation in Sarasvathy's original discussion on self-selected stakeholders. That is why I count into the Crazy-Quilt even teammates, friends providing help in marketing, and different online communities etc.

I find the lower cycle very inspiring (again highlighted in grey). Constraints often have a negative connotation, but in the dynamic model of effectuation they have a positive effect. The expanding cycle of resources is not enough as such; the converging cycle of constraints is needed in order to offer a condensation point for new market creation.

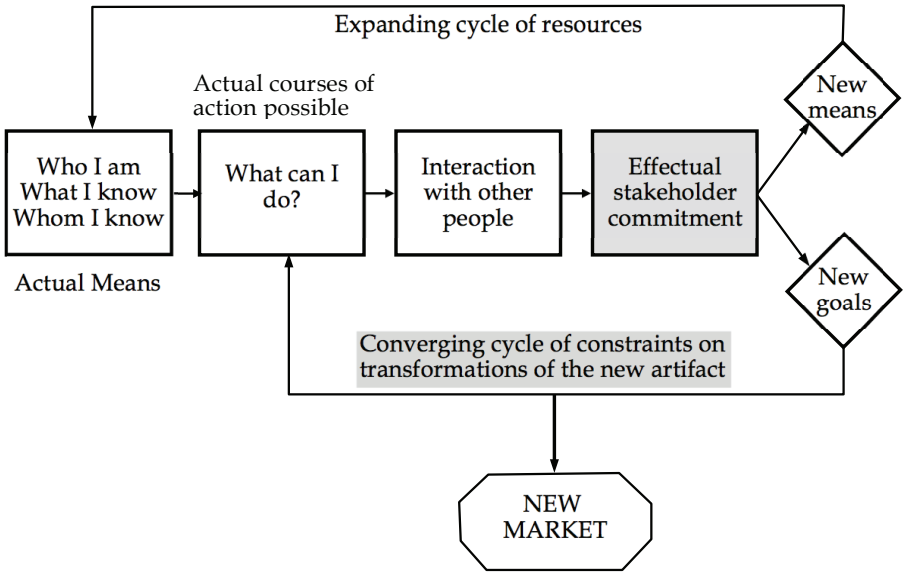

FIGURE 3 The Dynamic Model of Effectuation (Sarasvathy & Dew 2005a, 543). Grey highlight added by the author.

Before taking the plunge to entrepreneurship the causal entrepreneur spends a lot of time and effort trying to evaluate which course of action and which partnerships will provide prosperity for her firm. Compared to this her effectual counterpart may appear reckless: she makes no calculations on the expected returns and accepts as her partner whoever first commits to the venture. However, this is just an optical illusion: instead of abandoning rational choices all together, effectuation converts uncertainty into opportunity by applying different and by no means inferior rational (Wiltbank & Sarasvathy 2010, 7). According to Dew et al. (2009a) entrepreneurs, who take the plunge decision using expected returns calculations, will actually be more prone to escalating commitments than those who use the affordable loss heuristic. That is why, should the venture fail, affordable loss folks will fail earlier and lose less than prediction-oriented entrepreneurs (Dew et al. 2009a, 120). What is more, firm failure does not equal the entrepreneur's failure. Entrepreneurs applying effectual heuristics are not tied to one firm; they are often serial entrepreneurs, who take the expertise gained in one firm and start a new venture. (Sarasvathy & Menon 2002):

> Fail fast, fail cheap, and never do it alone! (Sarasvathy)

Effectuation is still a nascent theory, but over the last few years there have been attempts to transition it to the intermediate state by creating measurement scales (Perry et al. 2012). Chandler et al. (2011) are the pioneers in creating entrepreneur-level measurement scales for effectuation, while Brettel and Mauer (2012) created a corporate-level scale of effectuation to study R&D project performance. The entrepreneur-level scales, both the Chandler et al. scale and the others inspired by it, have in common that while they manage to capture well causation measure, they are less accurate with effectuation measure (Chandler et al. 2011, 386; Fisher 2012, 1037; Alsos et al. 2013, 7). Chandler et al. (2011) originally measured one dimension of causation (seven items) and four dimensions of effectuation: experimentation (four items), affordable loss (three items), flexibility (four items), and pre-commitment (two items). They conclude that causation and effectuation are separate constructs; and experimentation, affordable loss, and flexibility are sub-dimensions of effectuation, even though these sub-dimensions are not highly correlated. They also argue that pre-commitment is a sub-dimension shared by both effectuation and causation. (Chandler et al. 2011, 383.) In their second scale, Chandler et al. added four more items to the pre-commitment dimension in order to better capture the alliance aspect. Also this scale yielded results that suggest that pre-commitment is used both in effectuation and in causation (Chandler et al. 2011, 386).

In his study on six consumer Internet ventures Fisher (2012) offers a behavioral comparison of causation, effectuation, and bricolage He applies alternate template research design (Fisher 2012, 1029), where Chandler et al.'s (2011) scale is adopted to measure causation and effectuation, and Senyard et al.'s (2009) scale is used to measure bricolage. The findings show that in the domain of consumer Internet the emergent approaches to entrepreneurship are predom-

inant. What is more, the behaviors associated with effectuation and bricolage are similar in many respects. According to Fisher (2012) the dimensions that appear to be consistent across effectuation and briclage are: existing resources as a source of entrepreneurial opportunity; action as a mechanism for overcoming resource constraints; community engagement as a catalyst for venture emergence and growth; and resource constraints as a source of creativity. (Fisher 2012, 1039.) Also, Baker et al. (2003) agree that bricolage carries a resemblance to effectuation, but they continue that bricologe can be used both in an effectual way and in a causal way:

> Both bricolage and effectuation involve starting with a set of means. However, bricoleurs may use materials at hand both to see "What can I accomplish with my current resources?" (effectuation) and to find out "How can I meet my pre-existing goal through what is at hand?" (causation) (Baker et al. 2003, 273).

2.1.4 User entrepreneurship

In traditional manufacturing models the users' only role is to have needs that the companies identify and try to meet by designing new products and services (von Hippel 2005, 64). Parallel to that there have always been users who outgrow the role of a mere consumer and innovate new products and services to fit their own needs. These lead users face needs much earlier than others encounter them and have personally a lot to gain from new solutions (von Hippel 1986, 796). One motive for users to engage in the innovation process can be the enjoyment that the problem solving offers them (von Hippel 2005, 69). In the Internet era people interested in niche topics can easily form global communities that are a fertile space for new ideas and can considerably speed up the innovation process (Hienerth & Lettl 2011). These communities provide demand side information but also a test-bed and delivery channel for new products and services. Some user innovators freely share their ideas with the existing companies in order to get access to products and services that better fit their needs (Baldwin et al. 2006). Others start tinkering and take up own production (Shah & Tripsas 2004). The likelihood of a user innovator turning into a user entrepreneur increases:

- When the industry is in its infancy, and there are not many established companies in the field.

- When the method requires little capital but is labor intensive. (Baldwin et al. 2006, 1294.)

Shah and Tripsas (2007, 124) define user entrepreneurship as:

> commercialization of a new product and/or service by an individual or group of individuals who are also users of that product and/or service.

They argue that the main difference between the classic view on entrepreneurship and that of user entrepreneurship is that in the later the process tends to be both emergent and collective. Users are often accidental entrepreneurs who de-

velop an idea based on their own experiences and then share it with other users. It is common that the development of an idea takes many steps before the formal decision to start a venture (Shah & Tripsas 2007, 126). By collective the writers refer to informal user communities, which gather together people, who are interested in the same things. Sports clubs, book circles, and knitting meets have existed forever, but like user innovation, also user entrepreneurship particularly flourishes in online communities.

Shah and Tripsas originally suggest that the role of the user community is valuable in two ways:

- The user entrepreneur obtains demand-side information on the needs and preferences of the potential customers when they provide feedback and ideas for product refinement as beta testers. In these communities the sense of trust is typical, and it increases willingness to try products and provide feedback.

- Higher levels of novelty can emerge due to collective creativity. (Shah & Tripsas 2007, 131.)

Agarwal and Shah (2014, 1120) see that the importance of user communities is threefold: members of the community provide feedback, advance the creation of a potential market, and provide information on the existence of an entrepreneurial opportunity.

In their empirical research on user entrepreneurship in the juvenile product industry Shah and Tripsas (2007) discovered that the founders very often belong to such communities. User entrepreneurs are commonly motivated by non-pecuniary benefits, such as satisfaction derived from self-employment, a possibility to work on something they enjoy, a desire to participate in a particular industry, or a chance to assume a particular lifestyle (Shah & Tripsas 2007, 133).

They offer four propositions on when user entrepreneurship is likely to dominate classic sources of entrepreneurship. I find particularly interesting their suggestions that user entrepreneurship will occur when:

- Use provides enjoyment, as opposed to pure economic benefit.

- Users have relatively low opportunity costs.

- The product is new, and high levels of uncertainty and ambiguity about user needs exist as these needs are just evolving. (Shah & Tripsas 2007, 135.)

All the above reasons were present at the dawn of the Apple App Store, when the hobbyist game developers in this study started their endowers.

2.1.5 From opportunities to action

According to McMullen and Shepherd (2006, 132) discovery seldom prompts immediate entrepreneurial action; meaning the creation of new products or processes, entry into new markets, or the creation of new ventures. In their model, depicted in figure 4, third-person opportunities for somebody are discovered in the radical uncertainty of the attention stage, where prior knowledge and personal strategy heighten alertness. The attention stage is followed by the evaluation stage, where the potential entrepreneur evaluates the third-person opportunity, and takes entrepreneurial action only after she is convinced that the idea is both feasible and desirable, not just for somebody but also for herself. The mechanism is twofold: prior knowledge reduces perceived uncertainty, and motivation increases willingness to bear uncertainty. (McMullen & Shepherd 2006, 140; Shepherd et al. 2007, 78.)

Out of Milliken's three types of uncertainty - state, effect, and response uncertainty (Milliken 1987, 136) – the context of entrepreneurial action is concerned with response uncertainty (McMullen & Shepherd 2006). McKelvie et al. (2011) and Autio et al. (2013) agree that uncertainty related to the outcomes of the entrepreneur's own actions is a more important impediment to action than state or effect uncertainty. Interestingly McKelvie et al. view the rate of change in customer demand as a component of state uncertainty and the impact of demand change as a component of effect uncertainty (McKelvie et al. 2011, 277-278), whereas Autio et al. (2013) state that exposure to information regarding user needs is an element of response uncertainty for the nascent entrepreneurs. One can claim that with little exposure to information about user needs the entrepreneur lacks knowledge of response options and is unable to predict the consequences of a particular response choice. (Autio et al. 2013, 137.) Even so, this example shows how difficult it can be to apply Milliken's three uncertainties, although on the surface the definitions appear to be quite straightforward. Response uncertainty in particular is a rather elusive concept.

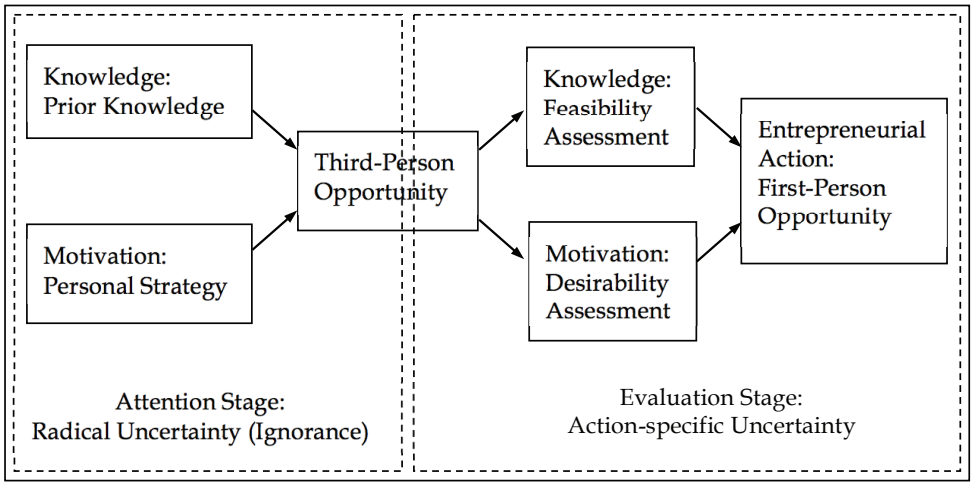

FIGURE 4 Conceptual model of entrepreneurial action (Shepherd et al. 2007, 78)

This model of entrepreneurial action represents the discovery view and as such draws from Shane's notion of the importance of prior knowledge and evaluation. Inbuilt in the model is the idea that uncertainty must be reduced before action can be taken and that planning precedes action.

2.1.6 Summary of the entrepreneurial process

In this study the entrepreneurial process is seen as follows: entrepreneurial opportunities are situations that bring about the discovery of new means–ends relationships and generate economic value (Shane & Venkataraman 2000). One can discover entrepreneurial opportunities by being alert, but entrepreneurial opportunities can also be created (Alvarez & Barnet 2007, 211; Companys & McMullen 2007, 308; Sarasvathy & Venkateraman 2009, 3). The mere existence of an opportunity is not enough. Something can be considered to be an entrepreneurial opportunity only after somebody perceives it as such and is willing to take action (Sarasvathy et al. 2003, 143).

Uncertainty is always present in entrepreneurship, and even more so in the founding phase (Knight 1964). Willingness to take action is affected by uncertainty (McMullen & Shepherd, 2006). Although most researchers agree that uncertainty is an impediment to entrepreneurial action, there are also those who think that uncertainty may promote action (McKelvie 2011, 274), especially when the entrepreneur assumes an effectual strategy (Mauer 2011, 184). Also bricolage implies a bias for action; the bricoleur does not delay his decision to act in order to look for the right means, she makes do with whatever is at hand (Baker & Nelson 2005, 334). The founding process is emergent even in user entrepreneurship, and the founder takes many steps toward building a company without carrying out formal evaluation of the commercial viability of the business idea (Shah & Tripsas 2007, 129).

The outcomes of entrepreneurial action can take several forms, like new products or processes, new markets, or new ventures (McMullen & Shepherd 2006, 132). However, the ultimate manifestation of entrepreneurship is in the process of organization creation, which occurs over time (Gartner et al. 1992, 15; Gartner et al. 1994, 7; Gartner 1985, 698).

2.2 Play and game – another approach to action

2.2.1 Play - a free and meaningful activity, an aim in itself

There are two scholars of play and game whose ideas have endured the pressure of time and the emergence of new game forms: Johan Huizinga and Roger Caillois. Huizinga (1955) in his book Homo Ludens describes play as an essential part of human life. It is not only for children; it is also present in adult life in for instance religious rituals, sports, and drama. In fact Huizinga is convinced that human culture evolves in play and as play. That is why he prefers the Play element *of* culture rather than the Play element *in* culture for the English trans-

lation of his book. He argues that it is not a question of what the role of play is among other cultural phenomena as culture itself has the character of play. He defines play as follows:

> Play is a voluntary activity or occupation executed within certain fixed limits of time and place, according to rules freely accepted but absolutely binding, having its aim in itself and accompanied by a feeling of tension, joy and the consciousness that it is "different" from "ordinary" life. (Huizinga 1955, 28)

Words that are of particular importance for this study are:

- Voluntary: nobody is forced to play, but they seek it freely.
- Activity: play involves action.
- Limits: there is a playground.
- Rules: they are set by somebody and accepted by the players.
- An aim in itself: playing in itself is gratifying, and there is no need for any other rewards.
- A feeling of tension, which can be detected as physical reactions.
- Joy: things can be done just for fun.

Figure 5 depicts the Magic Circle, which separates the ordinary from the different, but with a twist: I draw the boundary with a dashed line to indicate that in there can be a flow between the different and the ordinary. Huizinga would probably disapprove of my loose interpretation. For him economic activity stains the sacredness of play, even though he acknowledges the permeability of the Magic Circle in cases like the insurance business emerging from betting on future eventualities in the seventeenth century (Huizinga 1955, 53) and the contemporary professional sports. However, he adds that:

> The spirit of the professional is no longer the true play-sprit; it is lacking spontaneity and carelessness (Huizinga 1955, 197).

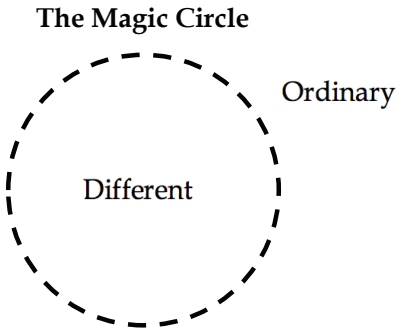

FIGURE 5 Magic circle, where play takes place (Huizinga 1955). The dashed line is added by the author to indicate the permeability of the border

Caillois (2001, 10) defines play as follows:

> Free, separate in time and space, uncertain in its outcome, unproductive and creating neither goods nor wealth, governed by rules or make-believe.

On the surface I find that his ideas of the essence of play are very similar to Huizinga's. Both men talk of a voluntary/free and unproductive action, which takes place within temporal and spatial limits. However, Caillois claims that Huizinga's definition of play is both too narrow and too broad. According to him Huizinga concentrates too much on competitive games and neglects games of chance (Caillois 2001, 5). To overcome the problem of Huizinga's too narrow definition, Caillois proposes four game categories:

- Agôn, or competition.
- Alea, or chance.
- Mimicry, or role playing.
- Ilinx, or dizziness, the sensation one gets in merry-go-rounds and roller coasters.

Within each category he sees a continuum from free play to play governed by rules. He calls the two ends of this continuum paidia and ludus. (Caillois 2001, 12.) Paidia refers to the primary power of improvisation, expressiveness, spontaneity, and joy that are typical in children's free-form play, while ludus refers to formal play, governed by rules and obstacles, where feelings can range from desperation to ecstasy, and where you have winners and losers. When Huizinga discusses the different words the ancient Greeks used for contest and play, he points out that both words carry the ludic factor of non-seriousness, but the main distinction is in the way they look at victory. Playing, as in children's play, is gratifying without any explicit goal, but a contest is all about victory. (Huizinga 1955, 30). Thus both Caillois and Huizinga agree that play can be free of form or rule-based.

Also Caillois (2001, 10) points out that play creates neither wealth nor goods, and he very clearly states that professional athletes are not players; they are workers. Nevertheless, I am not alone when I see that the limits of the Magic Circle can be permeable. Many recent game scholars have criticized the concept (Rodriguez 2006, 11; Juul 2008, 59; Sotamaa 2009, 43). Although the idea of a separate sphere of unproductive joy is very tempting, in reality the spatial and temporal boundaries can be loose or non-existent, and the claim that games are unproductive is difficult to meet. After all, many people earn their living by designing, playing, and studying games (Sotamaa 2009, 44).

In the chapter Play and contest as civilizing factors[4,] Huizinga (1955) discusses different play forms and their cultural value. According to him playing

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4 Which is interestingly translated in Finnish as *Leikki ja kilpailu luovana kulttuuritekijänä*, that is *Play and contest as a creative cultural factor*!

together carries more cultural value than playing alone. He does not think that gambling and other games of mere luck have much to offer, and he adds that although dicing can be an important cultural object, it still is unfruitful to culture as such, whereas plays that demand application, knowledge, skill, courage, and strength are valuable for culture. (Huizinga 1955, 48.) He also ranks higher those games that have aesthetic, physical, intellectual, moral, or spiritual value.

He describes the competitive instinct by saying that it is not motivated by a desire for power or a will to dominate, but rather the desire to be better than others and get honor for that. Money or other valuables do not motivate it. There can be a prize, even some money, but a laurel-wreath or an inexpensive trophy can serve the purpose as well. Winning a prize in a contest lies within the realm of play, but earning wages for work does not (Huizinga 1955, 51). In competition the success of one member of the group passes to the entire community, and thus e.g. sports have the power to unite people and create a fan culture around the teams. (Huizinga 1955, 50.) One form of competition worth mentioning is potlatch, an Indian feast where two groups of people compete in giving valuable gifts to each other (Huizinga 1955, 58). This habit of splendid donations prevails in online communities and could be called the potlatch spirit.

Are play and game parallel concepts, or is one embedded in the other? To me Huizinga's and Caillois's texts suggest that game is a subset of play.

2.2.2 Game – a rule-based system with goals

Juul (2003) defines game as:

> a rule-based system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels emotionally attached to outcome, and it is optional whether a game has real-life consequences.

A game is a system where the player's actions have an impact on what happens. A movie keeps on running its predetermined path, once you push the play button, even if you fall asleep and fail to follow it, whereas a game requires the player's constant input to continue. Both play and game have a power to elicit emotions. What differentiates them is that games have fixed victory conditions, while free play is fulfilling even without any explicit goals. Both play and game can have rules, but in games the rules are more detailed and binding. Juul's definition leaves open whether a game has real-life consequences, while Huizinga and Caillois are adamant that play is unproductive and has an aim in itself. Sotamaa's view is in line with Juul's definition; also he argues that games can and often do have a productive character (Sotamaa 2009, 46). In his study on modders he describes how the space of game is negotiated among the players, and between the players and the producers of the games. Negotiations spread beyond the borders of the Magic Circle as games are more and more integrated into our daily lives (Juul 2003; Sotamaa 2009, 103). Thus these contemporary game scholars do not rule out external outcomes such as earning money or learning skills usable outside the game.

In games the outcome of the player's actions is always uncertain. A game is not challenging if the player is either certain to reach the goal or certain not to reach the goal. Uncertainty about the goal attainment makes games engaging (Malone 1981; 359, Järvinen 2008, 134). Part of the engagement comes from game challenges, which must be in balance with the player's abilities (Kiili et al. 2012, 85). Learning is an integral part of playing a game. That is why the game system must provide immediate feedback on the player's actions. Järvinen (2008) distinguishes between ability, aptitude, and skill. According to him skills develop through experience when the player learns to use the abilities that make up that skill. However, people have different aptitudes for certain abilities, and that is why their starting points for developing the skill vary. (Järvinen 2008, 160.) Enjoyment does not only emerge from the outcomes as mastering the decision-making activity is fulfilling in itself (Hamari 2013, 244).

Game dynamics provide the big picture, the "grammar" of the game, and consist of narrative, constraints and progression, relationships between the players, and both negative and positive emotions. The dynamics are accomplished through different game mechanics, which drive action forward. These mechanics include e.g. challenges, chance, competition, cooperation, feedback, resource acquisition, rewards, transactions, turns, and winning states. (Werbach 2015.)

2.2.3 Game elements

Järvinen (2008) looks at game elements from a three-fold perspective: systemic, compound, and behavioral, as shown in Figure 6.

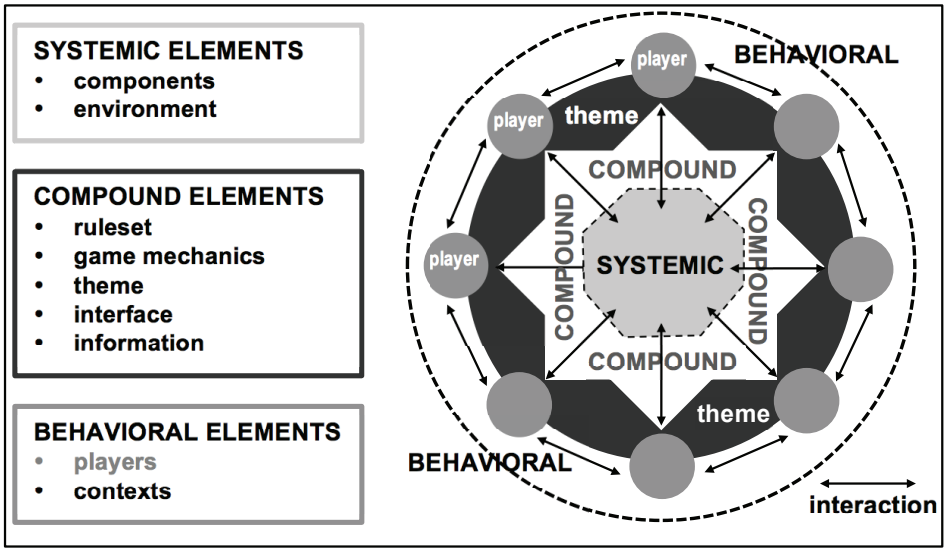

FIGURE 6 Game elements, overview (Järvinen 2008, 55)

Components are objects, which the players can manipulate and possess during the game, like checkers, chips, or avatars. They have a characteristic physical

appearance, but they can also have other attributes that carry information. Components-of-self and their attributes show the player's success and standing in the game, and they often embody game rules in some way. (Järvinen 2008, 62 – 64.)

Environment is where the game takes places. Components are put on the environment, e.g. checkers on a board, and players' actions take place there. Also the environment embodies rules (Järvinen 2008, 64).

The rule set is documented in a rulebook or a manual. It must, however, be embodied into other game elements before it can provide a satisfying game experience for the players (Järvinen 2008, 69). The actions of the game system are called procedures. According to Järvinen explicit goals are the main difference between games and non-games. That is why it is of particular importance to extract goal rules and victory conditions in the rule set. He defines seven different goal forms[5]. Of these goal forms three are aimed at reaching desired objectives, two at avoiding unwanted states, and two at reaching sub-goals on the way to final victory. (Järvinen 2008, 70.)

Game mechanics are actions carried out by the players. Performing game mechanics is what it takes to play the game. (Järvinen 2008, 71.)

Interface is the medium through which players produce input to the system in cases where they have no direct contact with the game system. Interface is of crucial importance to the game experience in digital games. In order to be good at a game, the player must first master its interface. (Järvinen 2008, 81.) This can easily be seen in games with a choice of different interfaces, e.g. a joystick, keyboard, or touchpad can function as the controls, and the player's scores in a game can vary much according to the device in question.

Information is delivered in the form of scores and statistics. The game system can distribute information perfectly or imperfectly. The former means that the players have access to all the information stored in the game system, and the latter means that the system conceals some information from the players. Often the statistics provided by the system are not enough from the players' point of view, and they can consult other sources of information like the records of opponents' performance in previous games. (Järvinen 2008, 74 - 76.)

Theme is a metaphor. It builds another layer of meaning in the game. For example, it is possible to have a chess set, where the rules of the game are the same as in regular chess, but the components and the board have a Star Wars theme. So instead of horses and queens this chess has figurines like spaceships and princess Leya as its components. The purpose of the theme element is to add fantasy and drama in order to enhance the player experience. It would not be necessary just for the sake of delivering information. (Järvinen 2008, 77.)

Context consists of the physical location of the game and the time the game takes place. Context thus carries the necessary ingredients of the Magic Circle. As long as the player believes what he is doing is out of the ordinary, he is in his own magic circle. (Järvinen 2008, 91.)

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5 Originally in Schank, Roger & Robert Abelson (1977) *Scripts, Plans, Goals and Understanding. An Inquiry into Human Knowledge Structures*. Hillsdale, NJ: Lawrence Elbaum Associates.

Players are the actors, and the game only becomes meaningful through their decisions. The game system should direct the players into anticipated behavioral patterns; otherwise the rulebook would be full of holes. While the players indulge in the act of playing their abilities develop into skills. If the players' choices are narrow and are determined by chance rather than skills, they cannot develop their abilities and strategies. (Järvinen 2008, 83.)

2.2.4 Gamification – applying game mechanics in non-game settings

Gamification is the use of game design elements in non-game contexts (Deterding & Dixon 2011, 9). The purpose is to advance the desired behavior, like sharing a service with your friends (gamification in marketing), or participating in learning activities (gamification in education). The stream of thought goes like this: games have the power to engage people, so, if we add game elements to mundane tasks we can engage our audience better. There is evidence that the approach works occasionally, but not in all contexts, and also the quality of the users counts (Hamari & Sarsa 2014, 5).

Gamification takes advantage of engagement loops and progression loops. The former means that action produces feedback, which adds motivation and leads to new action. A progression loop lets the player see the intermediate steps on the way to the overall goal. The first step is onboarding, the process of getting someone up to speed as quickly and efficiently as possible and preferably within the game itself: nobody wants to read a manual on how to behave to best be a target of marketing actions! Once the player knows the basics, she is faced with the challenges, and in between the escalating challenges a momentary rest takes place. The rest is necessary because it would be too exhausting to fight one's way all the way to the final goal in one stretch. (Werbach 2015). Applying gamification differs from using full serious games to reach the same outcomes (Hamari 2013, 237).

There are several ways to implement gamification. However, very often the companies, schools, non-profits etc. take a shortcut: instead of redesigning the deeper mechanisms of the system, they just add points, badges, and leaderboards. There is plenty of evidence that a sloppy gamification implementation can crowd out intrinsic motivation (Malone 1981, 335; Hamari 2013, 237; Hakulinen et al. 2013, 48). This could be detrimental. According to Malone (1981, 335) "children, who are intrinsically motivated to learn something, spend more time and effort learning, feel better about what they learn, and use it more in the future". It would be a pity to replace all this to simply chase for extrinsic rewards like points and badges!

2.3 Framework for this study

I first observed in practice how an experienced gamer and his team members started to develop games for iOS. They made new products, and while doing so they even built a new venture and made profit. Yet, they did not think of themselves as entrepreneurs. After this initial encounter I mingled with other developers on different web arenas and collected stories from five hobbyist developers and five team members (four from one team + one from another). Parallel to that, I set out to build the theoretical framework in an abductive manner. The focus of the study is on the entrepreneurial process where consumers of games transform into developers of games and venture creators. This process is approached from the vantage point of entrepreneurship literature and literature on play and game as depicted in figure 7.

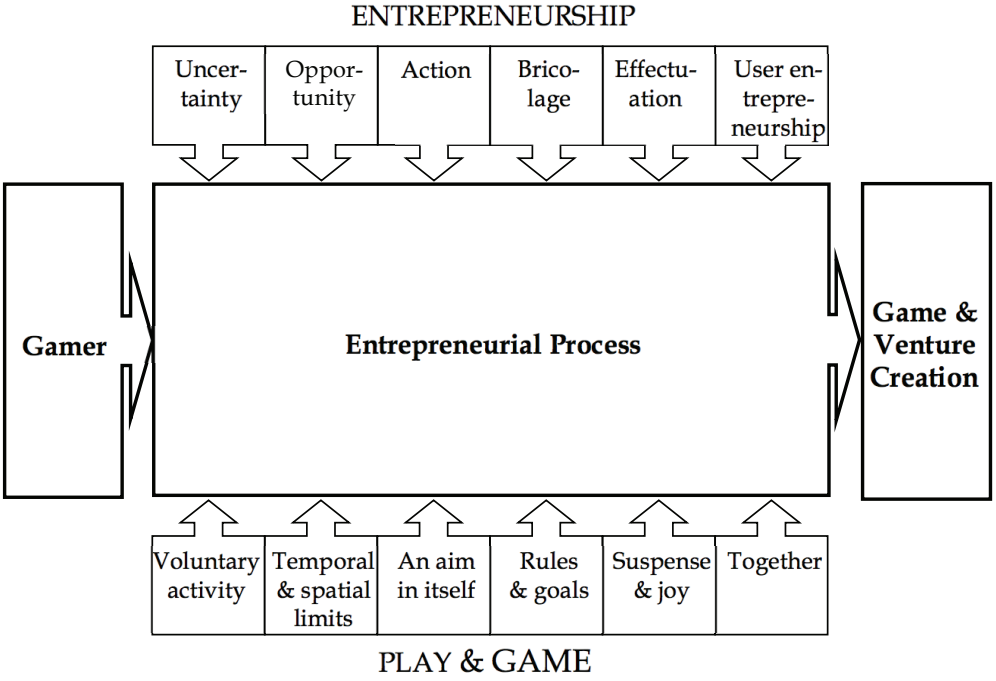

FIGURE 7 Framework of the study

3 RESEARCH METHODOLOGY

The aim of this chapter is to first share the ontological foundation of the study and the epistemological and methodological choices I have made. After that the chosen research design is discussed: the method is case study and data is gathered through verbal histories and secondary sources, and it is analyzed by structural narrative analysis and cross case thematic analysis. Following that, an outline of the research design is provided, and questions of trustworthiness and rigor close the chapter.

3.1 Research paradigm

> This study is based on the world-view that human beings are by nature playful. They are curious and want to try new things just for the fun of it. They prefer social interaction to solitude and like to play together. By doing so they learn from their own actions and from the actions of the other participants. Virtual is real. This refers to virtual products, environments, encounters, and communities. In virtual life and real life alike people develop cultural settings and are willing to share within these settings. Action precedes knowledge. (Irmeli)

A paradigm is the set of basic beliefs the researcher explicitly or inexplicitly holds. It ties together ontology, epistemology, and methodology (Guba & Lincoln 1994, 108). Natural sciences and social sciences have different paradigms (Heikkinen et al. 2001, 17). Entrepreneurship can be categorized as an applied social science (Bygrave 2007, 30-34). However, Sarasvathy (2003, 216; 2004b, 715), and Venkataraman et al. (2012, 25) draw on Herbert Simon's (1996) notion of a science of the artificial and point out the possibility that entrepreneurship is neither a natural science nor a social science, but instead it resides on the boundary of these two. They argue that both natural sciences and social sciences are mainly interested in causal explanations, whereas the science of the artificial has its focus on design and transformation (Venkataraman et al. 2012, 24).

I perceive that this study belongs to social sciences; nevertheless, I keep in mind the notion that entrepreneurship research may also be considered to be a science of the artificial, where opportunities are made as well as found (Venkataraman et al. 2012, 25). There is no dichotomy where social reality exists, re-

gardless of whether it is due to human perception or as a relative product of the mind. Rather, there is a continuum from a subjectivist to an objectivist approach (see table 3, Morgan & Smircich 1980), and on that continuum the ontological position of this study is more toward ontological relativism than ontological realism (Guba & Lincoln 1994, 110). Objects do not primarily exist as such, but they come to be through the meanings we attach to them. This does not imply that the material world should be denied; it just suggests that we should value people's perception of reality and the interpretations they give to it. It is the meaning of things that affects behavior, not the objective nature of things. (Berglund 2007a.)

Epistemology is concerned with what knowledge is, and what can be known. As a teacher I feel at home with John Dewey's pragmatic view that knowledge and action are tied together; knowledge is socially constructed, and practical knowledge is not inferior to theoretical knowledge. In pragmatism knowledge follows action and gets its justification through the consequences of this action. (Dewey 1998.) Especially fitting in the realm of entrepreneurship studies is Dewey's notion that knowledge cannot be attained by trying to escape from conditions of doubt or uncertainty. (Dewey 1930.)

It is quite natural that the epistemological choices I make in this research are in line with the social constructionist worldview I hold. I share the understanding that knowledge is created in human interaction, which means that also the interaction between the interviewer and the interviewee should be acknowledged: I am a passionate participant in the knowledge creation process (Guba & Lincoln 1994, 115). In many entrepreneurship studies social constructivism and social constructionism (Berger & Luckmann 1967) are used as synonyms. In social constructivism the focus is on individual cognitive processing and the socio-cultural practices that shape it, whereas social constructionism is interested in the process where individual level sense-making and enactment is linked to societal level construction (Fletcher 2006, 427). Social constructionists argue that concepts are constructed rather than discovered. Nevertheless, this does not imply that concepts do not correspond to something real in the world (Andrews 2012, 40). Society thus exists both as objective and subjective reality (Andrews 2012, 45). This resonates well with the epistemological view of entrepreneurship as the science of the artificial (Venkataraman et al. 2012, 25).

Knowledge is not static (Dewey 1930, 20; Knight 1964, 243; Andrews 2012, 44; Venkataraman et al. 2012, 27), the moment it is grabbed it can already be undergoing a transformation. This study does not attempt to chase a pure unchanging truth; instead the approach is interpretative. I acknowledge that the findings embody contextual and temporal meaning, and the interpretations are subjective (Howorth et al. 2005, 29). Interpretation actually takes place on several levels: the informants interpret their actions, I interpret what they say, and the reader of this manuscript interprets what I have written. For somebody rooted in the positivist research tradition all these multiple levels of interpretation might seem fluffy and intangible. However, it should be remembered that even when the results in a quantitative study look precise and statistically significant, they might fail to have any meaningfulness or applicability in practice (Guba & Lincoln 1994, 106). Meaningfulness is what motivates me, and that is

why my epistemological aim is in interpreting and understanding rather than finding absolute and objective truths (Morgan & Smircich 1980).

TABLE 3 The Network of basic assumptions characterizing the Subjective-Objective debate within social science (Morgan & Smircich 1980, 492). Gray cells indicate the positioning of this study.

Subjectivist Approach to Social Science						**Objectivist Approach to Social Science**
Core Ontological Assumptions	Reality as projection of human imagination	Reality as a social construction	Reality as a realm of symbolic discourse	Reality as a contextual field of information	Reality as a concrete process	Reality as a concrete structure
Assumptions about Human Nature	Man as pure spirit, consciousness, being	Man as a social constructor, the symbol creator	Man as an actor, the symbol user	Man as an information processor	Man as an adaptor	Man as a responder
Basic Epistemological Stance	To obtain phenomenological insight, revelation	To understand how social reality is created	To understand patterns of symbolic discourse	To map contexts	To study systems, process, change	To construct a positivist science
Some Favored Metaphors	Transcendental	Language game, accomplishment, text	Theater, culture	Cybernetic	Organism	Machine
Research Methods	Exploration of pure subjectivity	Hermeneutics	Symbolic analysis	Contextual analysis of Gestalten	Historical analysis	Lab experiments, Surveys

Methodology is concerned with how the researcher goes about to find what he believes can be known (Guba & Lincoln 1994, 108). Hermeneutic phenomenology is most fitting for the purpose of this study. The Husserlian idea of transcendental essences (Berglund 2007a, 77) is too abstract for me to fully comprehend, but the hermeneutic twist makes it more practical and easier to grasp. Ricoeur (1981, 43) defines hermeneutics as the theory of the operations of understanding in their relation to the interpretation of texts. Hermeneutic phenomenology is interested in the human world as it is found and experienced. Hermeneutic circle means that the unknown can only be understood via the mediation of what is already known (Czarniawska 2004, 139). What is known can originate in theory or in practice. In the context of this study the hermeneutic approach manifests itself in a spiral-like structure, where the same stories are looked upon from different point-of-views.

Logical reasoning can be deductive, inductive, or abductive (Kyrö 2006; Kyrö 2003, 73). Deductive reasoning starts from the general, an existing theory, and proceeds to the singular, the phenomenon under empirical observation. Mobile app stores have only existed for some years, and there is little research

on the entrepreneurial actions developers take in these arenas. That is why the direction of reasoning in this study cannot be from general to singular (Bygrave 2006, 40). Induction on the other hand starts with empirical observations and continues step by step to generalizable theories. It is a usable approach in grounded theory, but it is not a good choice for this small-scale preliminary study on an emerging new phenomenon. Abduction seems to be the form of logical reasoning that is well suited to the cognitive interest of this study.

In abductive reasoning the literature and empirical data are in dialogue. There are stretches where theory is leading the way, and moments when empirical findings suggest the direction. Identifying the research problem, for me, is a good example of the interplay between practice and theory: I empirically stumbled on game development in the Apple App Store, but it was through exposure to literature that I was able to define my focus. At first the literature review process was not a systematic search with well-chosen keywords. Instead it began with some books that seemed to be relevant, and their bibliographies opened new avenues to follow. Gradually I learned to see connections between concepts and ideas, which at first appeared randomly scattered. What started as jumping from reference to reference took a more systematic form when I learned to use the Web of Science. In retrospect my reading process carries a resemblance to effectuation: I did not lock the goal at the early stages and then proceed to find the relevant literature for that particular goal; instead I took what was at hand and grasped themes that evolved from that literature and from the developers' stories. I was fortunate: literature and course work at my own university were not my only exposure to theory. As an auditive person I benefited from the live encounters with professors Saras Sarasvathy, Stuart Read, William Gartner, Helle Neergaard, and Matti Bergström in workshops, conferences, and personal interviews. Hearing what they had to say helped me understand what they write.

3.2 Research design

3.2.1 Case study method

Case studies can involve either single or multiple cases. They combine various data collection methods like archives, interviews, and observation, and they can be carried out to describe a phenomenon, test a theory, or to generate one. (Eisenhardt 1989, 534.) Yin (2002, 3) agrees that case studies are suitable in descriptive and explanatory research. Case studies can also be used as an inspiration for new ideas and further studies (Siggelkow 2007, 21; Yin 2009, 15). The method is good for research questions "How?" and "Why?" particularly in previously unexplored arenas (Eisenhardt, & Graebner 2007, 26). The case approach does not seek generalizability through statistical analysis. Instead generalizability depends on how the cases are chosen. Random sampling should be avoided, and cases should be selected on theoretical grounds (Eisenhardt 1989, 537; Eisenhardt, & Graebner 2007, 27).

There is very little previous literature on entrepreneurship in the mobile market places. The aim of this study thus cannot be theory testing. It attempts to give a preliminary description of an emerging phenomenon and to go beyond that by giving an interpretation of the actions of hobbyist developers. That in turn can inspire further studies with more ambitious goals of theory building. The research question is a how-question. All this warrants the use of a case study approach (Eisenhardt 1989; Eisenhardt & Graebner 2007; Siggelkow 2007; Yin 2002; Yin 2009).

Choosing the cases

The unit of analysis in chapters 4, 6, and 7 is the individual developer and in chapter 8 the team. Thus in chapters 4, 6, and 7 there are five cases, and in chapter 8 one single case. The aim was to get a mix of informants, so no attempt was made to find informants that somehow depict the average hobbyist developer. The stories were selected keeping in mind that they should be suitable for demonstrating the relationship between the constructs and for showcasing polarity (Eisenhardt & Graebner 2007, 27). According to Riessman (2002, 705), verification of the facts of life stories is not as important as understanding the changing meaning these incidents have for the individuals involved. Nevertheless, one prerequisite for case selection in this study was that there should be plenty of secondary data available to enhance triangulation.

Chronologically the research on team building, chapter 8, was carried out first. The original idea was to recruit informants through Touch Arcade developer forums. I later learned that participant recruitment from online forums is still a fairly new approach (Palys & Atchison 2012, 355), but at the time I was not aware of the novelty of the approach. It just seemed like a good way to reach developers from different countries. I first started following the discussions on Touch Arcade developer forums. After a while I joined, made my own nickname and started commenting, and when people learned to know me, I started posting my own threads. From the hobby of blogging I have learnt the importance of trust in online communities. I built my online presence on Touch Arcade based on things like reciprocity, social proof, consistency, and authority (Cialdini 2001). I agree with Palys and Atchison (2012, 357) who argue that once a trusted member of the community accepts the researcher, the legitimacy of the study is effectively transferred to other members. For me such important insiders were Tony and Flickitty. The threads I started gained over 5 000 views, I got lots of comments, and 27 people answered a small background survey I made in order to gain a better pre-understanding of the phenomenon. Based on this, I had high hopes that I could recruit informants through Touch Arcade.

However, things did not turn out that way. Some contacts pulled through, but the developers were hesitant to share information on who their partners are. In the team development case it was important to hear multiple voices, and I had to look for other alternatives to reach informants. The logical step was to contact people I knew well: the team, which produced the Apple Design Award winning iPhone application in the student category in 2009. The case is theoretically interesting and depicts richly stakeholder commitment (Neergaard 2006, 263). I had access to correspondence between team members, and the team ex-

perimented with a wide variety of marketing moves. In addition, the game itself was exceptionally successful for an independent production, and that is why there is an abundance of archived material available on this case.

Nevertheless, there is one drawback: the central developer in the team is my son. Observing his actions was my initial inspiration for conducting research on hobbyist game developers. Yet, I considered leaving him and his team out of the final study due to eventual ethical considerations. I finally decided that it is not necessary. According to Siggelkow (2007, 20) it is often desirable to choose a particular case precisely because it is special in the sense that it allows access to certain insights that would otherwise be hard to get. It can be argued that as my son's mother, I could be biased. Also, it might sometimes be difficult to separate the knowledge acquired in the course of this study from the things that I have learned during the 28 years I have known my son. Our relationship could also influence what the other team members tell me. I try to overcome these obstacles by being aware of their existence and by giving them critical consideration throughout the process.

In chapters 4 and 6 the focus is on the developer. Therefore it was not necessary to recruit the entire team, which made it easier to find informants. One of them is a contact I made on Touch Arcade during the first round of interviews. Others were recruited through Experimental Game Dev Podcast Show. I listened to hundreds of developer interviews on the show before contacting potential informants. I wanted the stories to be from several continents, from developers of various ages, at different points in their developer career, from successful and less successful developers, and developers who have adopted different monetizing models. With these requirements in mind I contacted three developers, who all agreed to give me an interview. I would have welcomed both genders, but for the time being, male developers dominate the field, and my only female informant is the mother of one of the developers. Although she has an active role in game development, in this study she is treated as a team member rather than a developer. Two cases are from Europe, two from North America, and one from Australia. Unfortunately none of them is from the emerging economies in Asia, Africa or Latin America. The ages of the developers vary from 14 to 41 years (at the time they started to develop for iOS), and their first games for iOS were made in 2008 – 2012. The time-span makes it possible to grasp the transformation that has taken place in the Apple App Store from its infancy to year 2012.

3.2.2 Data gathering

A narrative approach is suitable for exploring what people say about what they do (Gartner 2007, 616). It is important to notice that this approach is subject to retrospective sensemaking (Weick 1995). That could be viewed as a drawback, but as Riessman (2002) puts it personal narratives are meaning-making units. It is irrelevant whether the events actually happen exactly as the narrator tells them, because "the truths of narrative accounts lie not in their faithful representation of a past world, but in the shifting connections they forge between past, present, and future" (Riessman 2002, 705).

The main source of information in this study is verbal histories collected from hobbyist developers and their teammates. Verbal histories are life stories told in the form of narrative discourse (McKenzie 2006, 310). A narrative is a spoken or a written text, which gives a chronologically connected account a serious of events/actions (Czarniawska 2004, 17). What separates events and actions is the degree of intention; events happen, but actions are deliberate (Czarniawska 2004, 3). In a narrative incidents are not merely listed out in a chronological order; they are connected to form a plot where a stable situation transforms into another situation (Polkinghorne 1987, 18; Czarniawska 2004, 19). The storyteller selects, organizes, and evaluates events to share meaningful sequences for a particular audience (Riessman 2003, 1). These short topically specific stories have a setting, characters, and a plot. Such short personal narratives can be called discrete narratives (Riessman 2002, 697). Another tradition in narrative research is to study entire life histories (Riessman 2003, 1). The focus then is on the trajectory the series of stories forms (Riessman 2002, 698).

In this research all five developers tell a comprehensive life story and some shorter anecdotal stories around game development. The stories of the team members concentrate on developing and marketing the game. All talk is not narrative. Informants' accounts typically include sections with question-answer discourse and long stretches of informational speech (Riessman 1993, 3; Riesman 2003, 5). In this study these non-narrative sections offer insights on how the Apple App Store works and are an important source of information in chapter 5, The Playground. Also chapter 6, The Play, includes non-narrative information.

Before going into details about data gathering, I share two insights, which influence the choices made both in data gathering and at the analysis stage. First, I am rooted in the oral tradition: I memorized my first poems when I was around 4 years old by listening to my mother, who was rehearsing for a poetry reading, and I have myself recited poetry for more than 50 years. It is therefore quite natural that I prefer spoken narratives to written ones. I want to hear the informants' rhythm of speech, tone of voice, pitch changes, and occasional laughter. In the voice joy and the presence of play are communicated much more effectively than in a written account. Speaking and writing are two separate modes of discourse (Czarniawska 2012, 69), and a written story is a different narrative than a verbal history covering the same incidents (McKenzie 2006, 311).

Second, the choice of digital data gathering tools is based on who the informants are and who I am. Hobbyist game developers are embedded in the digital world, and for them online communication is a natural way of interaction. Likewise, I am familiar with different web-based services. I started hobbyist blogging in 2004 and have taught online courses since 2006. Due to this active online participation I feel comfortable when talking with people online, and I know many free tools that can be applied to research. My background also helps me in finding secondary data from various forums and podcasts. For me virtual communities and online communication are as natural as any other form of human interaction. I share Palys and Atchison's (2012, 364) view that the digital world opens wonderful opportunities for conducting research.

Steps taken in data gathering

The informants were invited to Dropbox[6], a cloud computing service, where it is possible to place folders for file exchange. Materials were also shared on Google Drive[7]. These were the only tools used in the first round of data gathering (team building). Three members of the team completed four tasks: a profile card, a picture of the team, a recording on his own story as an iOS developer, and a timeline of his actions. The duo responsible for the musical theme only submitted a short written account on their participation. For details of the first round of data gathering, see Appendix 2. During this first round I was still very insecure about my role in the knowledge construction. I was afraid that, if I participated in the interview, I would influence the course of discussion too much. That is why I suggested that the informants record their stories by themselves and upload the recordings in mp3 format to our shared folder in Dropbox. Also the other tasks were saved in the Dropbox folder or in the Google Drive folder, which could only be accessed by the respective informant and myself.

I later understood that there is no reason to tone down my presence; an interview should indeed be a situation where two persons seek knowledge and understanding in a conversational manner (Czarniawska 2004, 47; McKenzie 2006, 327). As a guidance counselor for my online student teachers I am used to having conversations on Skype[8], a video-conferencing tool available for free. That is why I chose Skype to be the arena for the three following interviews. It would be possible to carry out a videoconference on Skype, but we preferred audio. The recordings were saved with Skype Call Recorder, and a backup was made using a recording app on iPad. In the two last interviews we used Face Time, an in-built application available on iPhone and iPad. Also these interviews were recorded using an iPad app. The switch was made because I encountered technical problems with some of the first Skype calls: the connection was occasionally dropped during the interviews, and on one occasion we needed to schedule a new interview because the line was too weak. In this study the informants are iOS developers and thus have an iPhone, which made it possible to use Face Time. Had that not been the case, we would have continued with Skype despite the small technical inconveniences.

Each interview took about two hours. I opened it by referring to a consent form and by asking for the nickname I should use. I had a very loose agenda for the encounter. I looked at the interview as a play with four levels: what happened before iOS development, what happened during the development stage, how the game was kept alive on the market once it was accepted to iTunes App Store, and what happened/will happen after the initial game. Every informant was asked to begin his story by telling about his first childhood memory. I do not use these memories in any specific way. The opening was chosen to distract the developers' thoughts: all of them have been interviewed numerous times, and there was a risk that they would just repeat the rehearsed version of their

6 https://www.dropbox.com
7 https://drive.google.com
8 http://www.skype.com

story. By using a surprising opening question I wanted to invite them to a fresh exchange of thoughts. I adopted this method from performance/oral interpretation courses I have attended over the years. For more details on the second round of interviews, see Appendix 3.

Most of the interviews were carried out so that both the interviewee and I were sitting in our studies. However, there was one exception, which deserves to be mentioned. One of the developers had been working late, and when our interview was about to start he still had not had time to eat. That is why he asked me if it was ok if he cooks supper while talking to me. We agreed that it was fine, and while he was talking I could hear in the background the sound of running water, butter sizzling on the skillet, and the clatter of cutlery. All this in a strange way added to the intimacy of the situation. What could have been a potential distraction turned into something positive: when the interviewee's mind was partly preoccupied by the task of cooking, he did not slip into mechanically memorizing the familiar narrative construct (Czarniawska 2004, 50), and instead he offered fresh insights. Or so I interpret it. In the future, if I interview people over Skype, I might suggest that they perform some light chores while talking to me. It could help them relax and think freshly, and it definitely would make me feel more connected with the person during the interview, and afterwards, when I listen to the recording.

The audio files were shared with the informants in Dropbox. They thus had an opportunity to listen to their interview. If there was something they were not willing to share, that section could be erased from the recording. Four recordings were left as they were, but from one recording I cut three minutes as requested by the informant. After the informants had had a chance to download the materials, I removed the files from Dropbox to minimize the small risk that an outsider could get access to them (Palys & Atchison 2012, 362).

One of the prerequisites for choosing the cases was that there should be secondary sources of information available. I gathered authentic forum threads, where four of the developers and two team members discussed the making of their respective games. All developers have their own web pages, and some of them even reflect on the making of the game on a blog. I saved locally the forum threads, blog entries, and home pages. Three of the informants also appeared on Experimental Game Dev Podcast Show, and I saved those episodes of the podcast. Additional information was collected from YouTube and Vimeo[9] videos, review sites, and magazines available on the Internet. All this provided material for triangulation. I also follow blogs like Flurry[10], Gamasutra[11], and Vision Mobile[12] to form a general picture of the hobbyist game development scene. The interviews were made 2011 – 2013. Tony and eVp participated in both rounds (2 years apart); Stephen and Tabus in round one; Adriaan, Madpoet, Sterling, and Carolyn were only interviewed in round two.

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9 http://vimeo.com
10 http://blog.flurry.com
11 http://www.gamasutra.com/blogs/
12 http://www.visionmobile.com/blog/

3.2.3 Data analysis

According to Riessman (2003) personal narratives can be analyzed using thematic, structural, interactional, or performative analysis. Thematic narrative analysis concentrates more on what is told than on how it is told, and it is suitable for theorizing within a case rather than across cases (Riessman 2003, 3; Riessman 2008, 74). In thematic narrative analysis the aim is to keep the story intact and theorize from cases rather than from the component themes (Riessman 2008, 55, 57). This means that the sequences in each case are preserved, and the stories are not fractured into coding segments as is done in grounded theory (Riessman 2008, 74).

Another approach is structural narrative analysis, which comes in multiple forms. In social sciences the model introduced by Labov and Waletsky (1972, 1997) is quite prominent. In this model the basic elements are sequentially ordered narrative clauses. Changing their order changes the meaning of the whole narrative. The basic components of the model are (Labov 1972, 370):

- Abstract: the point of the story, a summary.
- Orientation: time, context, characters.
- Complicating action: the plot of the story, usually with some crises or turning points, which the narrator has to overcome.
- Evaluation: where the narrator comments on the meaning of the actions and shows emotion.
- Result: the outcome of the plot
- Coda: the concluding section, which wraps things up, and often comes with a moral.

The Labovian model has been criticized for not paying attention to the context in which the interview takes place and the influence the interviewer may have on the narrative. There are also those who claim that the clause level narrative sequence is too narrow to capture the complexity of an interview situation. (Hyvärinen 2008, 452.)

Vladimir Propp studied Russian wonder tales and found out that in the stories seemingly identical actions can have a different meaning depending on their place in the course of the narration. Propp (1968, 21) came up with the notion of function, which he defined as "an act of the character from the point of view of its significance for the course of action".

According to Propp there are altogether 31 functions like absentation, interdiction, violation etc. that occur in the tales in an identical sequence (Propp 1968, 25 - 65). In order to be able to give a description of these functions, Propp introduced a cast of dramatis personae, seven in all (Propp 1968, 77 – 83), and the spheres of action surrounding them. In Propp's approach the chronological order of elements is important. This type of analysis, where the sequence of events matters, is called syntagmatic structural analysis (Propp 1968, xi; Wang & Roberts 2005, 54). Levi-Strauss, on the other hand, tried to capture the underlying patterns of the tales and believed that the linear sequential structure is just

a surface ripple that hides the more latent deep content. This approach is called paradigmatic structural analysis. (Propp 1968, xii.)

The works of Propp and Levi-Strauss inspired Greimas, who was originally a scholar of semiotics. He describes his own theorizing in the field of narrative grammar as a form of bricolage, where he takes a bit from Levi-Strauss and adds some Propp (Greimas et al. 1989, 541). He shares Levi-Strauss's view that syntagmatic surface structures are generated from paradigmatic deep structures, but unlike Levi-Strauss he sees that building a paradigmatic model serves as a basis for analysis rather than its objective (Wang & Roberts 2005, 54). Greimas (Greimas et al. 1989, 541) says that he picks from Propp the syntagmatic component for the surface level narrative grammar, but there are those who claim that there is also a connection between Propp's archetypical characters and Greimas's actants. Both Propp and Greimas share the aim of developing a generalizable model of narrative structure (Katilius-Boydstun 1990).

Greimas builds a complex narrative grammar on his prior work on semantics. The grammar includes the paradigmatic fundamental level, intermediate surface level, and a figurative level where actors perform their tasks. Ricoeur et al. (1989) argue that it is relatively easy to distinguish between the deep structure and the surface structure but much harder to describe the difference between the surface structure and the figurative structure. As part of the grammatical surface structure Greimas introduces the narrative utterance, defined as "a program the subject wishes to carry out". (Ricoeur et al. 1989, 588 – 589.) The narrative utterance can be of type being (state) or of type doing (action) (Wang & Roberts 2005, 57). Greimas also distinguishes between being and becoming. Becoming has a specific duration, and it takes place between two states (Greimas et al. 1989, 544).

The next building block in the grammar is a narrative program, defined as "an elementary syntagm of the surface narrative syntax, composed of an utterance of doing, governing an utterance of state" (Greimas and Courtés 1982, 245); in other words, a change of state produced by any subject affecting another subject. Narrative programs can be connected to each other to form a narrative trajectory; a syntagmatic line connecting programs to further programs (Czarniawska 2004, 79, 81).

At the core of Greimas's actantial model is the semiotic square with its four poles: the subject, the anti-subject, the non-subject, and the non-anti-subject. The three logically possible relations between the concepts refer respectively to the subject's contrary, contradictory, and complementary positions. These relationships are unordered and the system is static at first. But to set the model into motion, all one has to do is treat the relations as operations. In the transformation, which follows, a given content is negated and others are affirmed. Greimas calls transformation by negation disjunction and transformation by affirmation conjunction. (Ricoeur et al. 1989, 583 – 584.) He introduces the concept of actant, which refers to "that which accomplishes or undergoes an act" (Greimas and Courtés 1982, 5). An actant is not necessarily a human being; it can be an animal, a magical character, or an artifact of any kind; even a concept (Czarniawska 2004, 80; Hébert 2011, 58). The original semiotic square has four corners, thus four actants: the subject, the object, the helper, and the opponent.

In the full actantial model the sender and the receiver supplement these four. Actants and characters do not necessarily have one-to-one relations. One character can have multiple actant roles, and those roles can change during the narrative (Wang & Roberts 2005, 56). The hero in the story can for instance be the subject, but also his own helper or opponent. In sum, the actantial model is a relationship between a subject and an object, where the subject desires the object, the sender communicates the object to the receiver, and the helper and the opponent modulate the desired junction between the subject and the object (Manjali 1997).

Figure 8 is the visualization of the actantial model. It consists of six actants and three axes. There is some confusion on both the names of the actants and the names of the axes (mostly based on Hébert 2011, 56, see also footnotes).

- **The axis of quest (or desire)[13]:** Subject - Object. The relationship between the subject and the object is a junction. If the subject wants to unite with the object, the junction is a conjunction. If the subject wants to separate from the object, the junction is a disjunction.
- **The axis of conflict (in some sources the axis of power)[15]:** Helper – Opponent. The helper assists in achieving the desired junction between the subject and object and the opponent impedes this effort. In some sources the helper is called the adjuvant, and the opponent is called the villain or the traitor. [14] The focus of the helper and the opponent is object-subject junction, not the subject as such.
- **The axis of knowledge (or communication, in some sources also transmission, transfer, transference, or transformation)[15]:** Sender - Receiver. The sender initiates the action on the junction between subject and object. The receiver benefits from when the subject achieves the object. In some studies the sender is also called the destinator. [16]

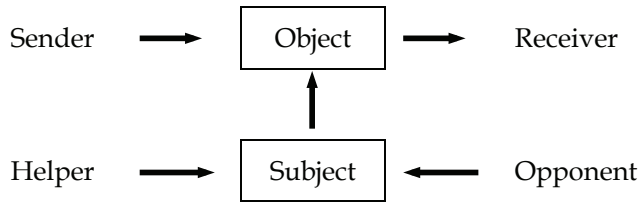

FIGURE 8 Greimas's actantial model (Greimas 1966, 207)

The full Greimasian narrative grammar is an intricate instrument with an abundance of detail and a deep philosophical undertone. What adds to the challenge is the fact that Greimas himself calls the same thing by a different name

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13 E.g. axis of quest, conflict, and communication (transference relationship) (Wang & Roberts 2005, 56)
E.g. axis of desire, power, and transmission (Hébert 2011, 56)

14 Subject, object, destinator, receiver, adjuvant, and traitor (White & Taket 2000, 702)
Subject, object, sender, receiver, helper, and villain (Sintonen & Auvinen 2009, 104)

depending on his vantage point. He uses one concept if he looks at the story with the eyes of a semantic and a different one if he sees it as a part of the narrative grammar (e.g. axis of desire vs. axis of quest). There is also shakiness in the English translations of his terminology. For instance transformation, transfer, and transference are used interchangeably, although the words have a distinctively different meaning in the English language (see e.g. Hébert 2011; Katilius-Boydstun 1990; Ricoeur et al. 1989; Wang & Roberts 2005).

Czarniawska (2004, 80 - 82) claims that Greimas's version of structuralism appeals to scholars of science and technology because it does not assume that the actants are human beings. Greimas's universalistic ambitions are not important for them, and they seldom apply the whole apparatus. Rather, they use the actantial model as a springboard to communicate whatever they want to say. As an example she provides Latour's research on innovation. Latour's finding that "at many steps of the story, the innovation was highly flexible, negotiable, at the mercy of a contingent event" (Latour 1992, 113) resonates well with effectuation. Also, Czarniawska's notion of outcome-embedded narrative trajectories is an important take-away for this study.

Steps taken in data analysis

I intuitively think that data gathering and data analysis should go in pairs: written – reading, spoken – listening. A lot of rich information is wasted if spoken accounts are written down, and the outcome is analyzed as any other written text. That is why I looked for guidelines on how to carry out "analysis by listening". McKenzie and Riessman agree that the recording is an actuality, first-hand evidence of the verbal history, and a transcript is already a form of interpretation (McKenzie 2006, 311; Riessman 1993, 13). However, they each suggest a different approach to documenting oral narratives. For Riessman (1993, 56) transcribing is an essential part of narrative analysis. She suggests that before making a transcript the stories should be listened to several times (Riessman 2008, 100). From the first rough transcript certain areas are then taken under closer scrutiny, and a detailed retranscription is made where structural moves are indicated (Riessman 1993, 59). McKenzie (2006) on the other hand sees no need to make verbatim transcripts and suggests the use of outline tables where the researcher documents a summary of what takes place in the story. He recommends two-minute intervals. (McKenzie 2006, 323.)

I followed McKenzie's advice for the first round of recordings, albeit somewhat modified. I did not keep the interval constant but made the breaks so that the line of thought was not interrupted. As a result the intervals vary between 2 to 5 minutes. I collected direct quotes in one column and a summary of what was discussed was documented in another column. The voice reveals the informant's relation to what is said. That is why I marked perceived prosodic events (pitch, rhythm, pauses…) and laughter in the tables. Riessman stresses the importance of paralinguistic features and suggests that they should be indicated in the transcripts (Riessman 1993; 2003; 2008). For the time being the notes in the tables are my only attempt to incorporate prosody, but the rapid advances taking place in speech recognition technology might soon open up new possibilities to computer-aided analysis of spoken narratives.

I did not make outline tables for the second round of interviews. Analysis is based directly on the audiotapes. This means that I walked in the woods for hundreds of hours while listening to the recordings. I followed the same route every time and anchored incidents to trees and rocks along my path. The physical environment thus became scaffolding for my memory. The interviews were transcribed first after the analysis was done (just for archives). Instead of verbatim transcripts I wrote developer narratives based on what I remembered from what I heard (Czarniawska 2004, 55) and took up some direct quotes. I assumed this approach because I was afraid that if I had access to transcripts during the analysis they would lure me into paying too much attention to individual words instead of focusing on the whole story. I thus did not fragment the narratives to coding units (Riessman 2008, 12). The decision was deliberate, yet potentially controversial. Nevertheless, I am confident that in this preliminary study openness to the full story is a merit, not a fault. A more detailed content analysis can later be carried out in further studies.

In an article on employees' wellbeing Syrjälä and Takala (2007, 41) constructed short narratives, and after each narrative they provided quotes "conveying the shared meanings in relation to the story". Inspired by this approach I constructed stories, which were based on the interviews. However, instead of separating the narrative and the quotes as Syrjälä and Takala had done, I embedded authentic quotes in the stories, which I wrote in the first person. It can be argued that writing in the first person is a questionable choice when the text is not a direct transcript. I still chose to do so for the sake of fluency: the stories are smoother when there is no need to jump between the plot and the quotes. These rather long narratives form the basis for the analysis.

In chapter 4, The Players, the stories are presented and analyzed from the point of view of who the developers are. This is done by constructing timelines and in the form of profile cards. In chapter 5, The Playground, the accounts are used as any other matter-of-fact information; there is no attempt to make a narrative analysis. The focus in chapter 6, The Play, and chapter 7, Going Pro, is on the actions of the developers, and for that purpose actantial analysis is well suited. However, the way it is used in this study is not a "true" Greimasian analysis; rather, it is an approach strongly inspired by the visualization of the actantial model but without the deeper finesses of Greimas's original model. A metaphor of game levels is used to present narrative programs, and the outcome-embedded narrative trajectories that they form (Czarniawska 2004, 79 – 83). A sequence of development actions is viewed as a sequence of game moves, and each level ends when the narrative program wins or loses its anti-program. A trajectory of 2 – 3 levels is visualized for each developer.

Customarily the receiver actant is a person or an animal (Hébert 2011, 58). Nevertheless, inspired by Czarniawska's (2004) notion of outcome-embedded narrative trajectories, I take the liberty to replace Receiver with Outcome. Instead of analyzing who benefits when the subject succeeds/fails in acquiring the object, I look at what is accomplished on that particular level. In this game the outcome on one level becomes the sender on the next level. Helpers are arranged in the diagram according to effectuation principles. Most of the diagrams are drawn with the developer as the subject, and the outcome depicted is

the one that actually took place. Nevertheless, also two alternative diagrams are drawn: one by changing the point of view so that a helper actant is moved to the subject position, and another one where the outcome is an aspiration. Thematic narrative analysis is applied in chapter 8, The Team.

3.2.4 Outline of the research design

Table 4 depicts the outline of the research design. *What?* refers to the research question, which is in focus, *How?* to the applied method, and *The lens* to the literature.

TABLE 4 The outline of the research design. Main research question: How do hobbyist game developers pursue entrepreneurial opportunities and take entrepreneurial action in the Apple App Store?

	What?	**How?**	**The lens**
4. The Players	Who are the players (=informants)? What is the profile of a hobbyist developer in this study? **Research question:** 1. Who are the hobbyist game developers targeting the Apple App Store (in this study)?	Verbal histories of five hobbyist developers + the mother of one of the developers. Secondary sources such as blog entries, forum discussions in Touch Arcade, YouTube videos, and Experimental Game Dev Podcast Show. Timelines to provide a general overview. Profile card was sent to the informant, who could correct and compliment it. Outline of the profiles in a table.	Psychological and non-psychological characteristics (Bandura et al. 1986; McClelland 1967; Shane 2004), Bird-in-Hand principle (Sarasvathy 2008), Personal characteristics in Panel Study of Entrepreneurial Dynamics (PSED) (Gartner et al. 2004).
5. The Playground	Facts about the Apple App Store. What kind of game elements can be detected in that environment? **Research question:** 4. How does the Apple App Store as an environment enhance playful entrepreneurship?	Searching for information on the Apple App Store rules and for mechanisms from official Apple developer pages, on different discussion forums, from analysts like App Annie, Flurry, and Gartner, and by listening to the informants. The interviews are used as source of information; they are not analyzed as narratives.	Järvinen's classification of game elements (2008).

Continued	**What?**	**How?**	**The lens**
6. The Play	How do the hobbyist developers and their team members create their game? How do the hobbyist developers and their team members act to keep their game in the market? **Research question:** 2. How is effectuation expressed in their actions? 3. How is play expressed in their actions?	Verbal histories of five hobbyist developers + the mother of one of the developers, secondary sources. Structural analysis inspired by actantial model (outcome-embedded narrative trajectories). Thematic analysis across the cases.	Opportunity creation (Alvarez & Barney 2007; Ardichvili et al. 2003), uncertainty (Knight 1964), bricolage (Baker et al. 2003, 2005), suspense (Järvinen 2008). Lemonade, Affordable-Loss, and Pilot-on-the-Plane principles (Sarasvathy 2008), play (Huizinga 1955; Caillois 2001; Juul 2003; Järvinen 2008; Sotamaa 2009).
7. Going Pro	How do the hobbyist developers create ventures? **Research question:** 2. How is effectuation expressed in their actions? 3. How is play expressed in their actions?	Structural analysis (actantial model) continues. Gestation diagram with 14 steps of venture creation.	Gestation (Mauer 2011), third person opportunity - first person opportunity (McMullen & Shepherd 2006), venture creation (Gartner 1985; Gartner et al. 2004)
8. The Team	How do the stakeholders self-select to a game project? **Research question:** 2. How is effectuation expressed in their actions? 3. How is play expressed in their actions?	Five team members of a hobbyist game design project performed four tasks: – Task1: Profile Card – Task2: A Picture of Your Team – Task3: Your Story – Task4: Timeline Thematic analysis.	Crazy-Quilt & Affordable-Loss principles, opportunity cost, trust (Sarasvathy 2008; Amit et al. 1995; Karri & Goel 2008), play and game (Huizinga 1955; Caillois 2001; Juul 2003; Järvinen 2008; Sotamaa 2009).
9. The Afterplay	Summary of empirical findings. **Research question:** 5. What is their venture creation process like?	A model for the hobbyist developer's entrepreneurial process.	Opportunity discovery and creation, entrepreneurial action, effectuation, venture creation (Kirzner 1997; Schumpeter 1962; Shane 2004; McMullen & Shepherd 2006; Sarasvathy 2008 Gartner et al. 2004; Huizinga 1955; Caillois 2001)

3.3 Trustworthiness

Traditional scientific research criteria expect a study to demonstrate validity, reliability, and objectivity. Internal validity is concerned with the logic of the study, and external validity looks at its generalizability. Reliability seeks to guarantee that the same methods will yield same results if the study is repeated. Objectivity means that the study gives an accurate representation of reality. (Lincoln and Guba 1985; Wigren 2006, 387.) Validity, reliability, and objectivity together build the rigor of the research.

These quality criteria reflect positivism, and it is argued that the nature of reliability and validity is fundamentally different in qualitative studies (Gartner et al. 1992, 27; Rolfe 2006, 305; Syrjälä & Takala 2007, 36; Wigren 2006, 387). The very idea of correspondence can be questioned (Czarniawska 2004, 133; Heikkinen et al. 2000; Riessman 1993, 64; Riessman 2002, 706). In narrative studies with a cognitive interest in interpretation the same material can yield multiple interpretations. This is demonstrated by the Journal of Business Venturing special edition, where six scholars write their narrative studies on one story, and each of the articles offers different new insights (Ahl 2007; Baker 2007; Fletcher 2007; Hjoert 2007; O'Conner 2007; Steyaert 2007). In Czarniawska's (2004, 7) words: openness to competing interpretations is considered a vice in science but a virtue in narrative. Riessman (1993) suggests that in narrative studies quality is attained through persuasiveness and plausibility. Persuasiveness is high when empirical evidence supports theoretical claims and when alternative interpretations are considered. (Riessman 1993, 65.)

However, there are those who see that validity and reliability are good general concepts for assessing quality even in qualitative studies. Morse et al. (2002) claim that the introduction of new quality criteria has lead to confusion as there are too many terms with minute variations, and as a result the ability to discern rigor has deteriorated. Moreover, they are concerned that there has been a shift from "during the process" to "post hoc" procedures, which means that the focus is not on attaining quality in the process but on evaluating it afterwards. They call for better verification, that is, mechanisms which are used during the research with the aim of providing better rigor (Morse et al. 2002, 17).

I, aware of this criticism, nevertheless adopt the approach introduced by Lincoln and Guba (1985). Instead of rigor they emphasize trustworthiness, which consists of:

- Credibility: the respondents' views fit with the inquirer's reconstruction.
- Transferability: there is enough case information available to warrant that the findings have applicability in other contexts.
- Dependability: the research process is logical and traceable and the findings are consistent and can be repeated.
- Confirmability: the findings are neutral and not shaped by the researcher's bias.

Credibility corresponds to internal validity, transferability to external validity, dependability to reliability, and confirmability is a matter of presentation (Rolfe 2006, 305). It could be argued that when there is such a strong correspondence between the concepts, it is not necessary to introduce new criteria for qualitative research. The way I see it is that although the original scientific terminology (validity and reliability) and Lincoln and Guba's terminology aim to increase the quality of the study, the way they approach it differs: validity and reliability are inherently quantifiable. In this study there is no attempt to prove anything with numbers, thus the use of trustworthiness is justified.

Credibility

There are recommended strategies for attaining credibility. These include member checks, negative cases, peer debriefing, prolonged engagement, and audit trails (Lincoln & Guba 1985, 314). The credibility of the researcher increases the credibility of the entire study. That is why the investigator should be responsive, be able to adapt to changing circumstances, and have the ability to clarify and summarize (Guba & Lincoln 1981).

According to Patton (2002) credibility can be increased trough triangulation. Different forms of triangulation include:

1. Methods triangulation - consistency of findings attained using different data collection methods.
2. Triangulation of sources - consistency of findings attained using different sources within the same method.
3. Analyst triangulation - consistency of findings attained using different analysts.
4. Theory/perspective triangulation - using different theories and perspectives to interpret findings. (Patton 2002, 556.)

During the interview I periodically drew in the conversation starting: "Correct me, if I am wrong, but I interpret what I hear like this…". The informants thus could correct my misinterpretations during the interview. They also had access to the recordings after the session and could clarify misunderstandings and even ask that some parts should be removed. They were asked to read and compliment the profile cards I compiled based on the interviews. However, further analysis was not subject to member check. Riessman (1993, 66) argues that the researcher's interpretation cannot necessarily be affirmed by member checks, as human stories are not static. Moreover, an individual narrator would not be able to evaluate cross-case theorizing. Morse et al. go further and warn that member checks might sometimes even lower the quality of the research by forcing the researcher to remain on a descriptive level, which tends to keep analysis too close to the data (Morse et al. 2002, 16).

None of the cases can be defined as a negative case, but Tony's approach to coding is more structured than anybody else's, and Adriaan's story is chosen to depict a process, which is, at least on the surface, less accidental than the rest of the stories. The cases are not artificially forced to fit one model; instead there

is room for polarity and different interpretations. All cases are followed through secondary sources for several years, and eVp and Tony are interviewed twice during a time span of over 2 years. My own credibility as a researcher utilizing oral histories and web-based tools is based on my long experience in using these approaches in other arenas of my private and professional life.

Many of the incidents the informants share in the interviews can be verified through secondary sources like top-lists, review sites, forums, and blogs. Three of the informants are interviewed on the Experimental Game Dev Podcast Show. This makes it possible to compare the answers they give to an interviewer, who is free of the biases I might have, to those they give to me. The podcast episodes also allow me to check whether the meaning the developers attach to different incidents, when interviewed on the podcast, is in line with what they tell me. Theory triangulation is attained through the use of various theories of entrepreneurship and play. Analyst triangulation is not directly applied as one single researcher carried out the study. Nevertheless, the research process was shared with peers in seminars at home and at several international conferences.

Transferability, dependability, and confirmability

I share the research process in a transparent way. Digital data gathering is described at length, because I think there is some novelty in the approach, and the readers of this report could benefit from it even in research targeting a totally different phenomenon. Authenticity is present in the direct quotes. The findings could be applicable to a certain extent in other fields of user entrepreneurship. However, even though I attempt to share enough case information and pay attention to the logic of the process, if somebody else repeated this study, her interpretation would probably be different than mine. Narratives are inherently open to interpretation, and the same method does not guarantee the same results (Czarniawska 2004; Gartner 2007; Riesman 2008). I try to avoid bias, but my attitude towards entrepreneurship and play is positive, and that can have an impact on how I interpret the findings (Morse et al. 2002, 16).

The selection of cases is vital for transferability. In statistics a type I error is the incorrect rejection of a true null hypothesis. A type II error is the failure to reject a false null hypothesis (The Sage dictionary of social research methods). In case-selection a type I error will occur when a potentially valuable case is left out, and a type II error will take place when an unsuitable case is chosen. In a narrative study the amount of informants, which can be analyzed, is limited. When I listened to the podcast, I heard many interesting stories, and there was an abundance of potential informants. First I pre-screened cases that fit my selection criteria and assumed then an effectual approach: whoever first committed to participating, came onboard. Likewise, an effectual entrepreneur reduces type II errors at the cost of incurring type I errors by assuming pre-commitment and always favoring the error of letting possible stakeholders go as opposed to letting non-stakeholders drive the decision process (Dew & Sarasvathy 2003, 17). In this study the voice is given to the committed ones who are willing and able to share their experiences, although this choice can leave out many equally interesting stories.

4 THE PLAYERS

The aim of this chapter is to give an overview of the players, the five hobbyist developers, who are the informants in chapters 4 – 6 and 8, and to answer the following question: Who are the hobbyist game developers in this study? The chapter opens with five developer stories. For the sake of fluency the stories are written in the first person, although they are not direct transcripts. Each story is based on the informant's account, and embedded in it are authentic quotes. The compilation of the story is an interpretative action, and one should keep in mind the following:

- The informants' could have told different stories if the interviews were made some other time or by somebody else.
- Somebody else might have heard the stories differently, might have written different accounts, and might have interpreted the accounts differently.

A summary of the players follows the narratives. The timelines depict each informant's story in a condensed form. This makes it easier to grasp an overview and draw cross-case comparisons. The chapter ends with an outline of each informant's profile. The topics in the profile card are partly derived from existing literature and partly from the informants' own perception of the competence areas, which a game developer should master. In this chapter the focus is on the players. Their actions are analyzed in more detail in chapter 6, The Play.

4.1 Adriaan's story

I[15] was born in the early 90s somewhere in Europe, and grew up in this tiny village with almost nothing but farms:

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15 Only the indented quotes are verbatim transcripts. The rest of the story is based on Adriaan's account, but the interpretation is the author's.

> I skipped second grade in elementary school. Because of that, I was always a year younger than anybody else. Every time I went to a new place everybody around me seemed so mature. So that has definitely been one important thing. (Adriaan)

I went to this school where I was bullied a lot. Then I went to another school where I learned to deal with it, and everything was pretty fine. I did not have many friends though. When I was thirteen I heard about a game design course in a nearby city, and it sounded like really fun so I decided to go for it. I also did a lot of sports. Until I was eighteen I did anything from tennis to soccer to swimming at least twice or three times per week.

I started playing videogames when I was around 6 years old. I really don't remember the names of the early games, but then my dad got me a joystick, which was super cool, and I remember playing a lot of Star Wars games till I shifted toward strategy games. For 2 years in high school all I did was play World of Warcraft. If I wasn't playing it, I was thinking about it, so it took up a lot of my time:

> But then I thought it was about time to get a girlfriend, and World of Warcraft wasn't really helping in that, so I quit. (Adriaan)

And pretty soon after that I did get a girlfriend! After high school I went to the School of Arts where they had a program in Game Design and Development. I got into this course where I met so many talented people, most of who were super nerds. I first majored in game art. After a year or so I realized I wasn't going to be an artist unless I would teach myself to draw and paint:

> I had stupid expectations that going to school would just teach me all these things without me having to put a lot of effort in it. But that was very wrong approach it turned out! (Adriaan)

So I decided to go into game design instead. That didn't help much! For the first 2 years I did not learn a lot. We did team assignments, which were super boring. They were not very much game related. They were supposed to be interdisciplinary, but the problem was I always ended up in teams where everybody was from my own course. Those people believed that they were going to be something, like programmers, artists and so on, but they were not, and they hadn't found out yet:

> I learned a lot about team dynamics: people promising things and delivering crap. (Adriaan)

After 2 years I went to do an internship in a big company. I learned so much there! There were super inspiring people there, who showed me what game design really is all about:

> I guess if I hadn't been there, I would never have been inspired to really learn to program. (Adriaan)

Right after my internship I decided to learn to program in Unity. The following half a year was the craziest half a year I have encountered! Within three months

I was able to program pretty much anything I wanted: I learned Action Script for Flash, and I made thousands of small prototypes in Unity. I also got an iPad from my father, and I realized I could make games for it in Unity. At that time I moved away from my parents and gave up exercising. For 4 weeks I just coded nonstop for about 16 hours per day:

> What happened then was that I kind of got a burnout. I remember going to school one day and I felt super bad. I drank coffee, which I normally don't...I started hyperventilating, and I had no idea what the hell was happening to me! I had been fit all my life. Like super fit, I could do anything I wanted. (Adriaan)

It took me about three months to recover. I took some lessons in how to breath and started to exercise again. What I really wanted to do, what was really fun for me, was programming, and now I realized that there were physical boundaries to that. I started to focus on a healthier life style. I still had quite a lot of work to do. At school I started to work on a big project. There were nine of us developing a game for a big multi-touch table, but at the end it was only four or five who contributed:

> In that project I met BE, who is now my colleague at GO[16]. Another one I met was TH, who is the artist for our first game. So that's where I met those guys and also saw, how skilled they were. Especially BE, who is ridiculously good at anything he does, especially in programming, but he is also a very social guy, which is a difficult combination to find these days. Most of the good programmers I know, have social issues, but the best ones, they don't. (Adriaan)

After that project I had to make my graduation project, and I also had to write my master's thesis. I made my graduation project on game experience that went beyond the screen. I made some fifteen prototypes, and one of them was inspired by the previous project I mentioned:

> I saw that when people would touch each other's hand they'd back off and go like uuh, uuh, that's nasty. (Adriaan)

I wanted to make a game where I used that awkward moment when hand touches hand. I made a prototype in Unity, and I decided to go for it for real in the App Store. That was around the time when I still had to write my master's thesis. My original idea was to write about luck in game development. I had realized that in many successful games there really was a lot of luck involved. But then I found out that it would be a difficult topic for a thesis, and I solved a design problem instead.

BE and I started developing the game, and we soon realized that it was difficult to optimize it in Unity, which is a 3D program. Instead we decided to use a 2D engine BE had developed. I trusted that he could make the game much smoother in his technology. It took us another 3 months to figure out that the dirty, sweaty style of a 70s porn movie was ideal for the game. It was still very difficult to go from that vision to a concrete visual style. We first had one artist,

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16 The company they founded.

but then TH jumped in and completely made that thing alive. Next I made some levels and tried lots of other features:

> At some point we had to make money, and to do that, we needed a company, so it was a practical reason to make a company, if we ever wanted to put it [the game] to the App Store. (Adriaan)

Me and BE founded the company, and there were also two other investors. They did not invest in terms of money, but they invested in terms of feedback and advice. We also got a lot of advice from my parents, who are entrepreneurs. We decided to start a limited liability company, which is the most expensive way, but also the safest way to start a company. We took a loan to pay the equity capital, but once we got the game on the market we could pay the loan back.

I wanted to get into the right mindset for marketing, and asked help from two journalists. They told me that we should have a professional press kit and a promo video. I took that advice seriously. I contacted a friend who was making videos, and he made awesome videos for the game. A copywriter friend helped me put together a four-page marketing document, which I sent to Apple. I also made a press release and contacted 300 websites. And we made a webpage:

> Yeah, the marketing and pr, it was really fun to do, at least for the first time. (Adriaan)

The sales picked up quite well; already the first day we became number three in our country. Pretty soon we made an update to the game, a Valentine's Day Pack, and we also got an Apple feature. That really made the sales soar. Later we also got a feature in Touch Arcade, but it did not have as big an effect as I would have expected. We managed to get a lot of other publicity, too, thanks to winning the national Game Award for Best Mobile Game and being nominated for the Independent Game Festival Nuovo Award:

> In lots of ways we were super lucky! In the end you need a lot of luck, but I'm trying to make sure we also try and go around all the possibilities and just try a lot of things. That's basically my relationship to uncertainty: just try a lot of things! (Adriaan)

After the game was released I made a lot of friends in the Game Garden, which is a non-profit organization funded by the government. They have a big building in the heart of the city. I made sure we would get an office there. There are currently 40 game developing companies in that building, and it is the perfect place to share knowledge. Also, it's not just a building, but it also has incubator programs and accelerator programs:

> Their mission since two years now is that they want to make the industry grow up, so that every company doesn't just think about making the best game, but also making the game that sells well. (Adriaan)

At the moment we run the company on the money we make on our first game, and we also do some consultancy work. It is me and BE working there, and we even have two interns now. We want to make GO a sustainable business, but

for me the product comes first. I want to make great games, which go beyond the screen, and if money follows, that's great:

> As a game designer I believe that hard work (alone) just isn't going to get you to the concepts…For me personally it's so immensely cool that I can come up with and I can make games that have not been thought of before. And one of those games can be our next big game, or can be THE next big game! (Adriaan)

4.2 eVp's story

I[17] was born in the mid-80s, somewhere in Europe. My brother is 3 years older than me, and I remember always doing things together with him and his friends. I started school a year younger than others. That's why I had a hard time getting along with my classmates. Another reason could have been that our family moved many times in my childhood. I guess I was always getting along with adults better than with my peers:

> We got our first computer when I was six, but what sort of defined our family culture, was that we got a Mac when I was on third - was it third? - Probably on fourth grade. (eVp)

Up to that point we had only played games on the computer, but now we started doing graphics. I have used Photoshop since the 90s. We were known for our ability to make good-looking presentations. We also started tinkering with the games we played. We didn't know how to code, but we opened the programs in Resedit and changed the graphics. I also learned English by playing games. My favorite was Civilization II, which we got when I was in the sixth grade. We did not understand the game at all but kept on playing anyway! It wasn't till 5 years later that I finally beat the game on the hardest difficulty. By the end of the sixth grade I felt, that:

> the sort of definition of me was that I was good at math, I was good at general knowledge, I was ok at English, and I was a computer person with not too many friends. (eVp)

I had talent for math, and my father always pushed me to do advanced stuff in math. In the ninth grade I was number one in the preliminaries of the national math competition but failed in the finals and was only sixth. I did also well in the national physics competition. With my younger brothers and cousins we participated in a EU competition about the Euro as a currency. We designed a board game, which won the second prize in our country. Also my two cousins are now active in the startup scene, so I guess we really were a super concentrated team of future entrepreneurs! I also made graphics for another tabletop game, which was actually my older brother's school project:

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17 Only the indented quotes are verbatim transcripts. The rest of the story is based on eVp's account, but the interpretation is the author's.

> In the end of the ninth grade I finally had the sort of self-image that I was good at everything… At that point I realized that I could handle everything better than most people. And, so, my grades were like super good. And I was very motivated to keep my grades good. I still hadn't too many friends, but at that point I actually had more than ever, up until lately. That was the highpoint of my social life. (eVp)

It all changed when I went to high school. I still had good grades, but I didn't have friends. I was a total child physically, and my classmates were all grownup. During high school all I did was play videogames and Photoshop stuff. I hung around in a graphics oriented forum, posted my images there, and got quite good feedback. My favorite game at that time was Myth 2, which was the first game where I created my own levels and did some scripting. I still didn't know how to program, and I am kind of disappointed that nobody introduced coding to me then. I was good at math, good at logic, and good with computers. What else is there to coding?

After high school I went to the university of technology like my parents and my older brother. I majored in telecommunications technology, and it totally killed my motivation. I was still doing well in math and physics, but I wasn't too keen on signal processing, and even the programming courses weren't what I had expected. Back then we were not making user interfaces, instead we were writing terminal applications:

> There is a massive mismatch between what people use in real life and what people are taught at the university. (eVp)

An exception was the final project in a C++ course. We built a game in a team of three. We never actually met during the project, we communicated in IRC[18]. I created the graphics and coded the user interface, and the guys programmed the rest of the game. There were also a couple of courses in software law that I found quite fascinating. On the whole I was doing good with my studies, but I still think that the most important thing in the university for me was that:

> I met Tabus and LT in my freshman group. Tabus and I were not too interested in the lectures, so we hang around in the back and played games. (eVp)

After 3 years of studies I got a summer job prototyping user interfaces for mobile phones. I was doing graphics and coding with Flash and Action Script. My summer job lasted for 1,5 years, and I never really returned to school. In 2008 I bought an iPhone, got a developer license, and downloaded the SDK:

> And then I started hacking… What it started with was Moonlander, an application that Apple provided as a sample for open GL[19]. I got the application, and was browsing through the source code. That is the same way I started my Action Script. I had never read any sort of schoolbooks on Action Script. I got a project that had code, and I started modifying that code. (eVp)

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18 Internet Relay Chat, a protocol for live interactive Internet chat or synchronous conferencing.

19 Open Graphics Library is a cross-language, multi-platform application programming interface (API) for rendering computer graphics.

I got the idea for my first game from my younger brothers, and I managed to talk my friend Tabus into making the sounds for that game. The game was released in December, and it immediately dominated the charts in the local App Store, but it did not sell well in other regions. So I started to tinker with another game concept. This time I got the idea from a real-life toy, which we had when I was a kid. I made the first demo in three days. After that it still took me a while to convince Tabus that the idea was good, and he really should make the sounds for the game. Tabus finally recorded the sounds, and he also arranged music, made levels for the game, and created an algorithm for infinite levels. It took 5 weeks to finish the game, which was released in February 2009. We got unexpected help from Stephen, probably the only American fan of my first game. He loved that game and uploaded a review of it to YouTube. After that he contacted me, and I replied:

> "That's great, I love fans, great, great, great"…and I asked him: "Would you like to be a beta-tester for my new game", and he said: "Yes". (eVp)

He did beta-testing and made levels for the game, and once it was released, he flooded forums with his comments. His most important contribution was that he suggested I should enter Apple Design Awards (ADA) competition. I did it, and I won the ADA in student category! That visibility boosted the sales, and the game broke the top-one-hundred barrier in the American App Store for paid games, and the free version, which I had introduced in March, was number one for a while.

Parallel to working on the games, I co-founded Company Q with LT from my freshman group, and TP, who was actually my brother's friend. The business idea of Q had originally nothing to do with iOS development, but when I started to get publicity after ADA, and could not motivate Tabus to make another game, I channeled my personal fame from winning the award to Q instead. By the end of the year more than half of the company's turnover came from iPhone projects:

> That was the time when I should have made another game…Instead customer work at Q was taking up my time. I was still adamant about making a new game, so we discussed different concepts with Tabus, who I hoped would join me in making the game. But nothing really panned out. (eVp)

There was also a side episode regarding my first game: the national slot machine organization threatened to sue me for violating their monopoly if I didn't withdraw my first game from the App Store. I did not back down, and the negotiations lasted several months. I even got help from my former law professor. In the fall we settled the matter out-of-court.

At the end of the year I was offered a job in Company F, one of the first customers Q got after adding iOS development into its repertoire. As their Head of Software Development I could deepen my professional competence, and I accepted the offer in January 2010, but only half-time: I also continued to work in Q. Unfortunately this meant that there was no time left for my own game projects:

> After spending half a year of my life in total freedom, I actually managed to give myself financial freedom as well, at least for the time being. And what I ended up doing with that was to tangle myself in all sorts of commitments and responsibilities to two different companies now. (eVp)

In November 2011 I rejoined Q, and diminished considerably the time I allocate to F, although the company still remains our client. Q already employs over twenty people, and my input is needed full-time. Q is a nice, profitable little company. However, it never really has been my vision of a company:

> During the past year I have felt it's the obligation towards clients, towards partners, that sort of [determines actions]. You can't leave them out to dry, whereas you'd personally see value elsewhere. (eVp)

What describes my current situation is frustration. I have been working in projects that I cannot control. If the customer makes stupid decisions, I just have to go along with that. Customer products seldom are exceptional, and I want to create something exceptional. The time might be ripe for a spin-off where I no longer concentrate on the consultancy work, but where I develop a product of our own. If we were to make that decision, we would need outside funding for the first time in the history of our company. One thing is sure:

> I'm not going to be a subcontracting developer all my life, that's not an option. (eVp)

4.3 Madpoet's story

I[20] was born in early 70s, somewhere in North America:

> I was basically a kid with a passion for visual arts. I was a very imaginative child, and I was always told that I was very good in art. And I knew at a very early age that I'd want to pursue something in the arts. (Madpoet)

I also liked computers. I wanted to play on them, but I also loved the idea of typing commands and making something happen, something as simple as a black object that would go across the screen:

> To me it was like a revelation, wau, I can't believe I actually control this object that is on the screen. (Madpoet)

I would draw all kinds of schematics for my own graphically rich games. I was learning Basic-language on Commodore 64 on my own. There were magazines that would come with sample code, and I would take that code and change things around to see what happened. Even to this day I love that process of discovery:

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[20] Only the indented quotes are verbatim transcripts. The rest of the story is based on Madpoet's account, but the interpretation is the author's.

> It's like the ultimate puzzle. Because as you are trying to make something work and you have pieces of elements that you can put together in different ways to have, to achieve a different outcome. And it's like the best puzzle ever, like to actually make things, to make a game, to make it work. (Madpoet)

However, the computers at that time were very slow, and I would run into obstacles in terms of the hardware. With my next computer, Commodore Amiga, I started painting imagery and experimenting with 3D animation and vector-based animation. I wanted to learn how to make amazing games or tell amazing stories or just draw amazing pictures. I made a portfolio of my drawings and managed to get into a decent arts college where I majored in illustration. After graduation I became a freelance commercial illustrator. By this time I had switched to Macintosh. I did all kinds of illustrations from magazine covers to brochures, to billboards. I also started getting into animation, even though I didn't take animation in school:

> I just had a passion for making my images move. (Madpoet)

Knowing animation helped me get a job in an actual game company in 1995, but after a year they laid off the whole animation staff. I went back to freelancing, which wasn't bad, because the late 90s actually were a good time for illustrators. Many publishing companies had money to spend on illustrations. Things were also happening with the Internet. Unfortunately around 2001 things started to slow down in terms of budgets for illustrations. So I decided that I'd focus more on animation and not so much on print illustration. I had learned through experience that uncertainty is always there, and I had learned that my way to control it is never having only one client:

> I'm never content to do just one thing, like I'm always, even if I'm working for a company, it's always like on weekends I have a side project, I'll work on that with my own clients, like that. (Madpoet)

When Apple launched the App Store I didn't immediately start developing games for it, although it was something I was familiar with as a person who uses Apple products. My first goal was just to make something, but then I read all these articles about hobbyists who actually made money on the App Store. My attempt then was to partner with other programmers to make a game and split the profits. I tried to recruit them through Craigslist. That has worked for some people. The other day I heard a story of a guy, who had an idea for a game, but he did not have any game developing experience. He got an artist and a programmer together and he didn't even meet these people, they just used Skype. They were able to create the game, which is now doing really well in the App Store. Global crowdsourcing and globally working together can work, but unfortunately it didn't work for me. There were a couple of experiences where I had a partner, and even though it was a good process, it was hard for them to stay committed when I did not have money to pay for their input:

> So, what I ended up doing was I decided, you know what, instead of partnering with someone, I'm gonna just have to learn how to program. … When it comes to tutorials,

> I sort of look at the stuff, and I kind of play around with it and I'll cut and paste some of the scripts and play around with that. (Madpoet)

I heard about a game engine called Unity. It is like a 3D program, but it allows you to script, and it is possible to use Unity 3D to export to iPhone. I started experimenting with it:

> As I said, even as a kid I was actually always trying to figure out, you know, how can I make a game. I kind of realized without even being cautious about it that, wait a second, I'm an indie gamer because I love making art, I love making animation, and now I'm actually using Unity 3D to do something to make a game. (Madpoet)

Everything I have been doing since I was a kid, learning how to create interesting visuals, learning how to animate, rigging the characters, making the system work, learning to code, has lead to my being able to make a game almost completely on my own. My first game in the App Store was a simple math puzzle game. It sold for 99 cents, and it was not a huge hit, but I learned a lot. Then an interesting thing happened:

> I was doing illustration and animation for this TV-company, and they asked me, do you know anybody who does programming, and I said, well, actually, I'm not a seasoned programmer and I didn't take computer science in the college or university or anything, but I have some background in game development. And in fact, you know, I have been learning Unity 3D on my own, and I actually have a game that's on the App Store, would you like to see it? (Madpoet)

It was a lucky break, and I have been making games for that customer for 2 years now. This goes to show that if an opportunity suddenly comes, grab it. However, most of the time I believe I create my own opportunities. I could have been just an illustrator, and that would have been great. But I wanted more. By learning to do animation, by learning to code, by going to forums and getting help from so many wonderful people all over the world, I now have other options. I still want to keep my consultancy job, which helps me pay the bills, but on the side I want to do my own projects just out of passion:

> When I work on a customer project, if they want a game with zombies that is what I make, even if that is not what I want myself. But with my own projects I have total control. (Madpoet)

I keep my self-published stuff separate from my consultancy work. After the puzzle game I partnered with a friend of my wife and made an interactive children's book, which sold for 99 cents. I was surprised to see that this book sold better on the App Store than my previous puzzle game. It had some issues though; the storyline was perhaps a little too New Age for some of the parents.

For some time now I have been working on a new game of my own. It's much bigger than any of my previous games. This time I have done many things differently. With my previous games I never told anybody in advance what I was doing. This time I have a thread on Touch Arcade where I discuss the development as it is being done. I want to solicit ideas from other developers, but even more than that I want to bond with them, and I hope to make them my fans. I hope that when the game finally gets released they would al-

ready know it and would want to give it a try. I am also potentially planning on using a different business model this time. Instead of selling it for 99 cents, I might release it for free and have in-app purchases for different planes, different missiles, different maps, and so on. I hope of course that my next game will be a hit, but if it isn't then I'll just have to make another one and another one.

Ever since I was a child I wanted to make games and now it's possible, even for a one-man studio. It's an opportunity for me, but I also encourage my children and nieces and nephews to go for their passion, and I have started teaching Unity 3D to my son.

4.4 Sterling's and Caroline's story

Caroline:

Sterling was born in the late 90s somewhere in North America. He has an older brother and sister. We[21] are a family that loves to read. We'd go together to the library to get books, and Sterling would listen while I or his older siblings would read to him:

> And I just wanted to point out how it's a wonderful thing for parents to help their children to learn how to read. You know they should be involved in that. (Caroline)

I'd also get him a lot of workbooks that would teach him the alphabet and the numbers, and we used the computer programs as well as the paper workbooks:

> He advanced really quickly; he could read chapter books before he went to kindergarten. (Caroline)

Sterling:

> I don't think I remember any specific instances [when somebody would read to me]. But I liked to read all kinds of books, I liked fiction and fantasy books but I also read non-fiction books. (Sterling)

I also liked using the computer. I would draw pictures and paint on the computer, and I had this typing software that I used to learn how to type. I also had small games that I played.

Caroline:

Sterling had a wonderful kindergarten teacher, who recognized that he could do all these things, and she made sure that he had an advanced kindergarten program. She saw to it that all the kids could work on their own level and that there was no bullying in the class:

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21 Only the indented quotes are verbatim transcripts. The rest of the story is based on Caroline's and Sterling's accounts, but the interpretation is the author's.

> I think that he had a very good kindergarten experience, and his other years, too. He has always loved school and he has always done his homework. I know that not for some kids, but all my children, they have loved school. And so they know that education is important. (Caroline)

Sterling:

I have a very logical mind, and at school my favorite topics are math and science. I also do a lot of music. I play the trumpet for a band, and we meet two-three times a week. And I take piano lessons once a week.

Caroline:

Sterling's older brother used to program in Basic when he still lived at home, and Sterling would watch.

> I really didn't limit the computer time for my kids, because they were using it wisely. But I can see how some parents might need to do that, if the children are goofing off or something. (Caroline)

Sterling has always been really good with computers. Learning how to program was a natural development for him:

> He had his own iPod Touch so he had games on there that he could play, but he did not spend a whole lot of time playing games, cause he preferred the programming. (Caroline)

Sterling:

I don't play so much on the computer. I like some Flash games, though, and I also play sports games on Wii and platform games, like Angry Birds, on iPod Touch. But I really like programming, because in it I can create my own challenges. I started experimenting with HTML[22] and CSS[23], and after that I started to learn other languages. I didn't take any programming classes, I learned by myself:

> As I learned more programming stuff, I would spend more time on computer, because I could do more. (Sterling)

Caroline:

Although Sterling was good with computers, we did not come up with the idea that he should make an iPod game. It was his friend's father who suggested it.

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22 HyperText Markup Language is the authoring language used to create documents on the World Wide Web.

23 Cascading Style Sheet is used to create a uniform look across several pages of a Web site.

Sterling:

> I don't think I had ever thought of making any games… So, I started thinking about reasons why it probably would not work. But then I thought, maybe I actually could do this. (Sterling)

I first went to the library and got some books on Objective-C, but I soon noticed that the learning curve was too steep. For a while I didn't really think about making the game, but then I was reading on the Internet somewhere that there was a thing called Game Salad, and I downloaded it and started playing around with it:

> I liked Game Salad, it was really easy to use and I was making progress with it. There were just little things like, it wasn't very fast loading the app, or switching between themes would take a while, and the physics objects were all squares and you could not have like triangles or other shaped objects. Then in the forums people occasionally mentioned Corona SDK, and how they were trying that out or they wanted to go use that instead. So I decided to look into Corona SDK. (Sterling)

It took me about a week to learn enough Corona and Lua[24] to get started. I then got my game idea and started working on it.

Caroline:

Sterling was 14 at that time, so he could not register the App Store account himself. I was the support person, who read the developer's license and did the other grownup stuff, but he was the programmer. I also helped him with the levels. He told me what basic elements I could use, and I would sketch the levels on a piece of paper, and he would take the idea and make it real, which was awesome. When he had made the levels, I'd test them. Sterling plays in a band, and somewhere along the line I suggested that he could have some sort of reward sound when the player completes a level; perhaps some sort of trumpet fanfare sound.

Sterling:

> It was nice to have someone to give feedback and make levels. I guess I have a logic mind and not so much creative or artistic. She'd make levels that were really cool. And then I'd be able to implement them. (Sterling)

The game had a budget of zero dollars, so I designed the game mechanics, all the artwork, sounds, music, and so on by myself. There was this one time when I realized I have to start the whole programming anew, because the logic that worked with the first levels would not carry the whole project. What motivated me to keep on working was that my friends thought the game was pretty cool:

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24 Lua is a lightweight multi-paradigm programming language, which is used for scripting in Corona SDK.

> And another time I was reading on the forums when Apple would shut down and would not accept any more apps for Christmas. And the time I was reading that, it was like two weeks before that or something, and I wasn't even close to being done. So that was exiting, I guess. (Sterling)

I missed the time goal by some days, but it turned out it wasn't that bad after all: my game was on the App Store right after Christmas when everybody already had their presents and were looking for something to download. I didn't really do any marketing, but I posted on Corona forum that my app is on, and they made a feature, and the sales picked up. To my surprise my game got 1 026 000 downloads in the first two weeks!

Caroline:

> The game was the very number one in 27 countries, including Finland. So it had Slovakia, Argentina, Peru, Uruguay, Estonia, Latvia, Lithuania, Bulgaria, United States, France, United Kingdom, Austria, Belgium, Ireland, Luxemburg, and then there were like 11 more, so a total of 27 countries. And then it was in the top ten in eighty countries. (Caroline)

Sterling:

Some of the countries I had to look up on a map, because I had no idea where they were!

Caroline:

This success caused a lot of free publicity. He got an Apple feature, and we were interviewed for local and national papers, The Wall Street Journal, radio, TV… We were even asked to make a TV-commercial. Whenever he is in the media, it definitely boosts the game.

Sterling:

> My original idea was just to get an app up there, but then when it did start getting millions of downloads, people were suggesting I should put ads on it or in-app purchase or make a paid version. So I thought, yeah, that'll be a good idea; I could get some money from that since I have all these downloads. (Sterling)

I still have the free version, but I now offer also in-app purchase and a standalone paid version. And the game is also available on Android. Recently I added community levels to it. This means that people can make their own levels, which I review and approve.

Caroline:

> Well, I think it is good to have it [in-app purchase], where they can try it before they buy it. See if they like it. (Caroline)

Sterling:

> Originally we only had 21 levels, which isn't very large number, so people could complete those very quickly, and be bored after a day or two, and delete the app and just never look at it again. So, that's why I want to release updates with more levels so that they'd come back to the app again and play more levels and buy the in-app purchase with even more levels. (Sterling)

Caroline:

> It has just been so fun for us! (Caroline)

This all started as a learning experience. When it later became evident that there was an opportunity to make money for Sterling's college fund, we did not rule that out. Yet, money is not the main thing:

> He has been able to meet with, and speak to so many wonderful people… And all these people, they are doing fabulous things too… This is worth more than money. This is an opportunity, which opens doors to him. So, whatever he wants to do in his future, this will help him. (Caroline)

Sterling:

I have learned a lot about business in general and definitely about mobile business. In college I probably would have gone into some computer related field anyway, but this experience re-enforces that. I'll probably also take business classes, and I think it might be fun to start my own company and do something.

Caroline:

> He has these computer skills that he has been working on. And he gets recognized for that. As a mother, I hope that this will inspire lots of children and even grownups to try something wonderful themselves…This is like a gift, you should pick what you are good at. You should choose what you like to do, and go polish it up, create some wonderful project and share that with others. (Caroline)

4.5 Tony's story

I[25] was born somewhere in Australia around 1970. My mom and dad split up when I was 5 or 6 years old, and I ended up living with my mother and my sister. They were never very academically inclined. They were also very extroverted and I would say I'm introverted, so they were very different from me. I liked reading science fiction. In those books there were always scientists, and I wanted to become a science person myself:

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[25] Only the indented quotes are verbatim transcripts. The rest of the story is based on Tony's account, but the interpretation is the author's.

> That's not something I really aspired to later on. I guess I just drifted in that direction, because I was always very academic and I liked computers and I liked the artificial intelligence side of things, cause that is science fictiony and all that sort of stuff. And, so I eventually became a scientist and after I had done that, I sort of realized that, ah, I kind of fulfilled that childhood ambition without ever sort of driving myself into that direction. (Tony)

I got my first computer, an Apple II, in 1984. I played games a lot, and I also did some programming. I always wanted to make games, but at the time the hardware just wasn't up to it yet. At school I liked math, and took advanced courses in it.

We moved when I finished Year 10 at school. I had a bit of a struggle there, because the different parts of the country have different school systems, and I ended up having some gaps. I probably should have retaken Year 11, but instead I ended up doing an extra year of high school to make up for the 2 years when I didn't do so well. I started at university studying information technology, and the first years were crap. But then I found some interesting courses, and the third year I did really well:

> After that I got into honors year, and became the top honors student that year. So that was quite a turnaround! (Tony)

I then had an option to go to industry and write boring accounting software like my classmates or continue with interesting research stuff. I got lucky and got a scholarship to do a PhD in artificial intelligence and robotics. The school I went to had previously been a more technically oriented institution, and that was the first year it was a full university:

> Mom and I had enough of each other, I wanted to do my thing, she... and I got the scholarship, so, I actually had enough money, and I rented a house near the university. (Tony)

During my PhD studies there was a month or so when we'd go to school around 9 am, work till 10.30 am, and start playing Civilization II till it was time for dinner. We'd have chicken rolls and get back to play till 10 pm. And the same thing over the next day! Of course there was also coursework to do, and I was doing teaching. That's how I met Linda. She was one of the tutors in information technology. She had a problem with one of her teachers, and I was able to help her get around it. Our story started for real when I reasoned that she isn't actually my student, she is more like a colleague (I would not have dated my student).

After 4 years of studies I felt that I was stuck with my thesis and decided to take a break. My two female supervisors told me that odds are against my ever graduating, if I quit then, but I promised I'd finish my thesis. Linda and I went to the UK for 2 years. I got a job with the Yellow Pages coding in Lisp, which was a lucky break since Lisp is an academic language and not much used commercially. After the first year I took a couple of months off and totally rewrote my thesis and got my PhD. We still had another year in the UK. Linda got a well-paid job, because she really is an excellent programmer with solid work experience. When I was offered a job at exactly the same pay, I was think-

ing, wait a minute, I've got to get more, and suggested 43 pounds. The deal was made at 42 pounds, which is still the highest I have ever been paid:

> I was bargaining with nothing! (Tony)

We got back in 1998, and for 9 months Linda was the only one working. I wasn't worried that I wouldn't get a job; I just wanted to have some time off. One university got interested in my PhD and invited me to an interview, paid for the trip, and everything. While I was in that city, I went to another interview. And as it turned out, the university never called back to me, but this other research institute hired me. So we moved. At work we use a game engine for simulations. It is not for developing games though; we just use that technology in our research:

> In 2003 we [Linda and I] made a conscious decision that we would have children…we sort of realized intellectually…(Tony)

We decided that before we have children we should take another trip to the UK. I told at work that I want to take a year off, and they said that they have an opening in the UK and asked if I'd like to work for them there. That was a lucky break, but I think we would have gone anyway. I worked, but Linda didn't, she went to all the museums and had a wonderful time. Then we got back home, and our son was born in 2004. And 2 years later we had a daughter.

During the years my job has become more and more managerial, and I don't like that. If I had wanted to be a manager, I would have gone to business school! So one day I was bored stupid at work, and a colleague was bored stupid, and we started talking about how we work for somebody else, and that we are basically earning money for other people rather than ourselves. We started brainstorming cool ideas:

> And the idea of remote controlled tanks that people could control over the Internet was cool! (Tony)

So, we started a company, which offered people an opportunity to drive remote controlled tanks over the Internet. However, that didn't turn out to be a viable business idea. We thought of the technical stuff, but didn't realize how difficult it would be to build the monetizing model when people are used to having everything for free on the Internet. Also, it wasn't a scalable idea with the physical tanks and all. Nothing came of it, but it sort of tuned me into looking for other options. And then Apple opened its iTunes App Store:

> Previous to that Xbox had an indie developer program. They'd charge 5 000 dollars a year to be part of the program, and they'd take 80 - 90 % of your profits. So, Apple coming up and doing this [100 dollars per year and 30% of the sales] was, like, oh my gosh, the entry bar just got lowered so low that, oh my gosh, even I can do that. (Tony)

I know many programming languages, and it is easy for me to pick up new languages, so I decided to have a look at Objective-C. I learn new languages to a degree by trial and error; I look at tutorials and examples to get a grasp of the

style. Then I go to the forums and look up answers. I seldom post anything myself, because the number of people working on this stuff is massive, and the chances are that somebody has already had a similar problem:

> [At the university] we were taught, we were quite strictly taught programming; lots of documentation… There is a couple of ways of programming. One of them is a sort of hacking spaghetti style coding and one of them is a structured, organized way. And I'm a structured, organized coder. (Tony)

I got the idea for my first iPhone game from a retro game. I released it first as a free game with ads, but when somebody on Touch Arcade asked if it was possible to buy it without ads, I made a paid version. For that I had to register a business name. The game never made more than a couple of hundred in ad revenues. But surprisingly it became very popular in Turkey.

I made the next game on Unity 3D. The game turned out to be a bit of a mistake in terms of the user interface and its complexity. My original idea was to try and make something popular rather than something I wanted to make, but it sort of evolved into something that I did enjoy making, but the audience didn't enjoy playing:

> Next time I'm going to spend a little bit more time on the concept. I'm going to run it by my wife as a filter, because it failed last time, because I didn't get extra external opinions on the game. So, I'm going to be a little bit more cautious about other peoples input, because, what works for me doesn't work for everybody. I'm definitely not my demographic! (Tony)

It didn't turn out quite that way. In my third game I tried to hit a popular game genre, word games. I decided to concentrate on the simplicity of the user interface and the overall polish. But Linda was not interested in participating, so, to get an external opinion, I used beta-testers from ibetatest.com. Some of those guys really gave me excellent feedback. The game already had a much better look and feel than the previous ones, but unfortunately that wasn't enough. I had both a paid version, and a free one with ads version, but neither of them really took off.

In the fourth game I switched back to coding in Objective-C. One of the reasons was that Unity 3D makes large code, and in order to strip it you'd have to buy a pro license that costs 1 000 dollars a year. I'm doing this on a budget, and I didn't want to spend that much on the license. I was also interested in learning more about Objective-C; especially the use of patterns. The game was inspired by a real-life competition, and I attempted to combine my expertise in genetic algorithms and iPhone development. The end results looks more polished than any of my previous games partly because I bought some of the icons. I also bought the design for the web site promoting the app. I didn't pay much though; there are nowadays places where you can buy professional looking stuff at reasonable prices. The concept, once again, was too complex for the layman, and the game didn't sell well:

> I'm working with somebody else this time [fifth game] in terms of the content…This is a friend of my mom's, she does the publicity for his books and stuff… He is quite topical in the media at the moment. So, he will be a natural publicity magnet. (Tony)

I have reached the point where I'm ready to give up editorial control. I have explored the space methodologically, and if a publisher now got interested in my work, I'd be ready to sell. But money is not my biggest motivation; I'd rather fail doing something interesting than succeed in doing something boring! However, in the long run I hope to make a living out of game development:

> Our retirement age is 65, so, I don't want to be at work for another 21 years doing, what I am doing. That's my goal. And so, I'm not trying to replace it with another boring job. I want to replace it with something that is interesting and I enjoy doing. (Tony)

4.6 Summary of the players

4.6.1 Timelines

The main incidents of each narrative are next presented on a timeline.

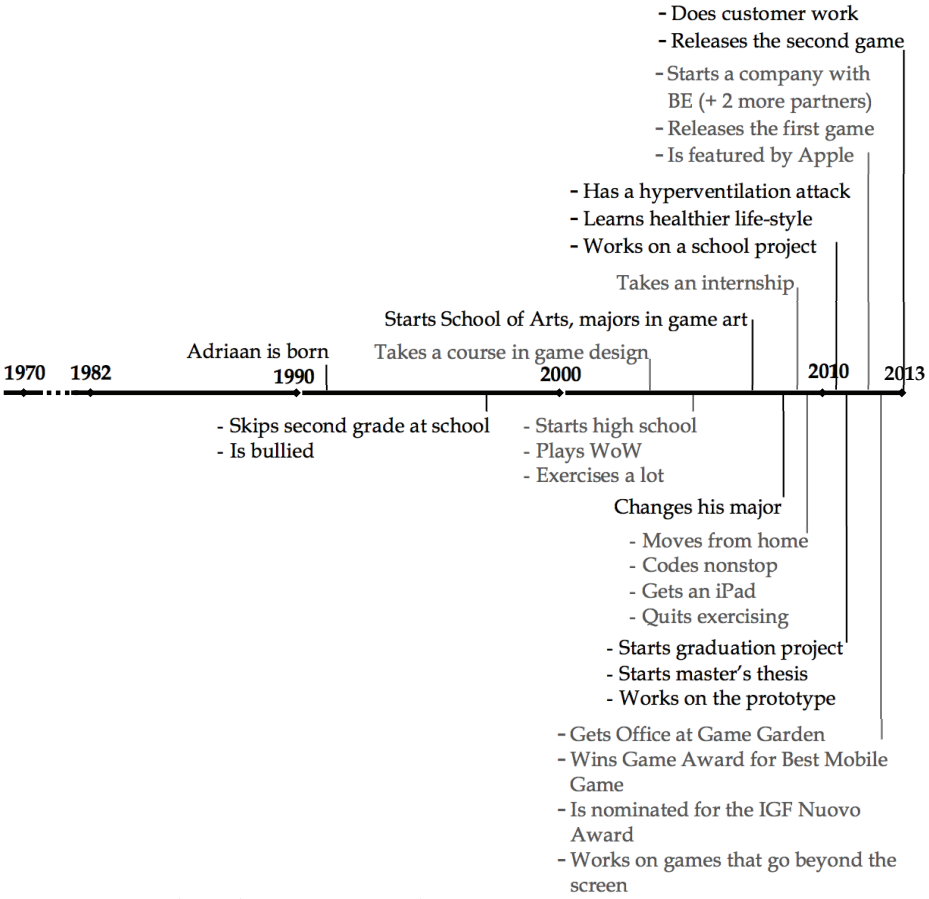

FIGURE 9 Adriaan's story on a timeline

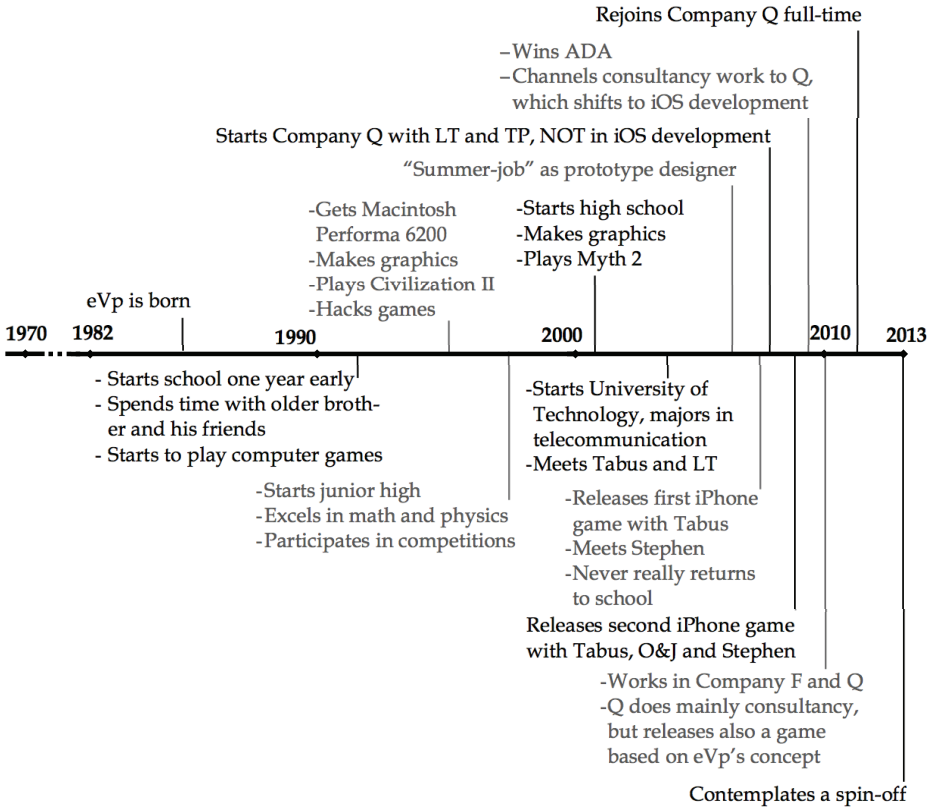

FIGURE 10 eVp's story on a timeline

FIGURE 11 Madpoet's story on a timeline

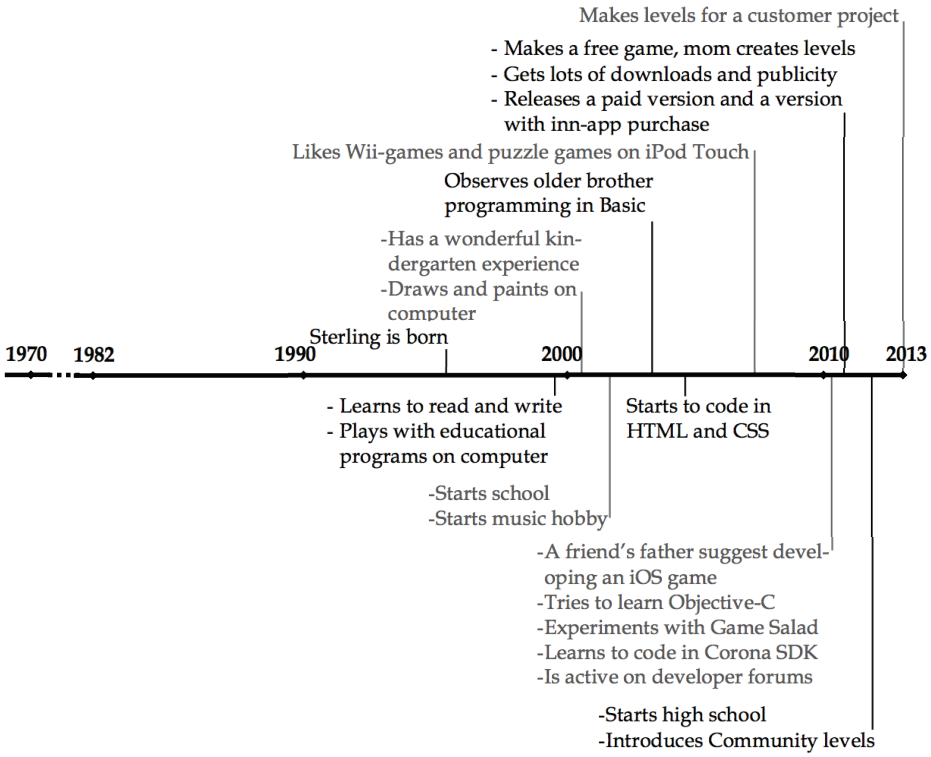

FIGURE 12 Sterling's story on a timeline

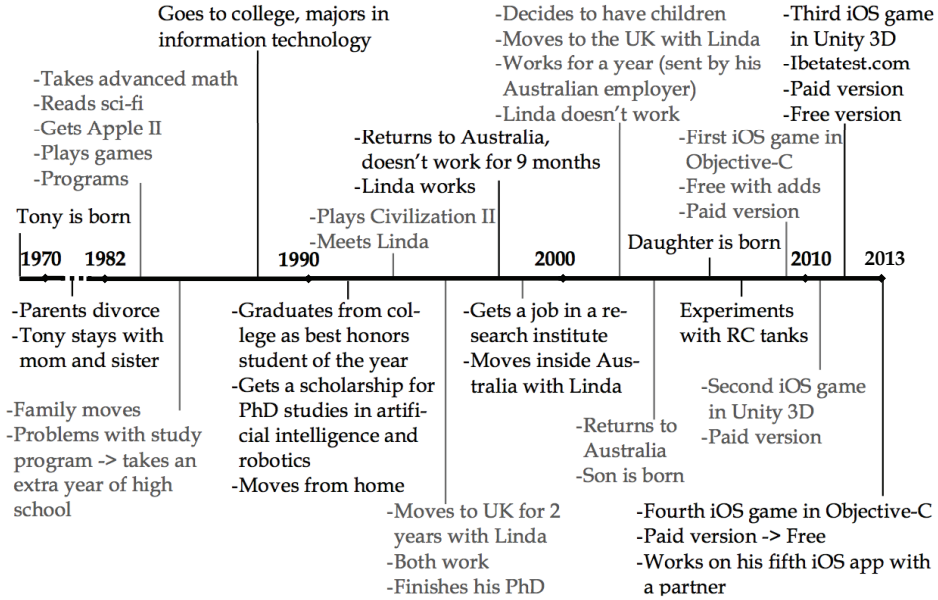

FIGURE 13 Tony's story on a timeline

4.6.2 Profile cards

"How do we know the dancer from the dance?" was the question Gartner asked when he wanted to shift the focus in entrepreneurship research from the actor to the process (Gartner 1989, 47). Effectuation might seem to be interested in the dancer, after all, the starting point of the dynamic process of effectuation is who you are and what you know. However, the absolute traits and skills of an entrepreneur are not in focus in effectuation; what is important is how well who you are is in line with what you do. (Sarasvathy et al. 2005, 543; Sarasvathy & Dew 2008, 731.) Likewise, the focus of this study is not the hobbyist developer, but his actions. Nevertheless, in order to be able to interpret the actions, I need to know the actors. The players and the play are inseparable.

I designed a profile card to draw together the details. It combines entrepreneurial characteristics derived from the literature and game development-specific skills and motives brought up by the informants. The card includes some of the factors Shane (2004, 19 – 117) discusses in connection with opportunity discovery and exploitation. They are included, although the entrepreneurial pursuit of a hobbyist developer resembles more creation than discovery. The factors are complemented with items, which the informants brought up in the first round of data gathering (Task 1, Profile Card), and with the themes that arose from the second round of interviews. After listening to the interviews I filled in the profile cards and sent them to the informants, who had a chance to correct and compliment them if necessary.

A summary of the answers is in table 5. The grey color in the first column indicates a factor, which I did not originally include, but which was derived from the data. Another shade of grey is used to indicate answers that were changed or complemented by the informant.

TABLE 5 The profile cards of the five developers

	Adriaan	**eVp**	**Madpoet**	**Sterling**	**Tony**
Age	21	23	40	14	41
Education	Master's Student at School of the Arts Major: Game Design and Development	Master's Student at University of Technology Major: Telecommunication	Graduate of a 3 year post secondary Art College Major: Illustration	8th grader in middle school (9 years of schooling including kindergarten)	PhD in artificial intelligence and robotics.
Gender	Male	Male	Male	Male	Male
Operating system	Windows, switched to Mac	Mac	Mac	Linux, a Mac in the family	Mac
Programming	Informal learning	Formal and informal learning	Informal learning	Informal learning	Formal and informal learning

Continued	**Adriaan**	**eVp**	**Madpoet**	**Sterling**	**Tony**
Start-up experience	No	Founded a company with two friends (parallel to game development)	No	No	Not a real start-up, but a small venture: I hired RC toy tanks on the Internet
App Store experience (# apps)	2 own games, customer work (1)	2 + 1 games, customer work (lots)	3 own apps, customer work (many)	1 game, customer work (1)	4 games, no customer work
Gaming experience	Experienced gamer	Experienced gamer	Experienced gamer	Casual gamer	Experienced gamer
Affordable loss	Low	Low	Low	Low	Low
Useful contacts and networks	Parents Contacts from School Game Garden	Contacts from School Occasionally active on forums like TA Stephen Company F	TV-company Active on virtual forums (e.g. Unity forums, Touch Arcade)	Family, especially mother. Previously active on virtual forums, e.g. Corona SDK –forums.	Account on TA. None. I follow forums, but seldom post my questions or comments.
Other relevant skills	Game design	Graphics design	Illustration, animation, music	Music	None, learning graphics design
Need for Achievement	High	High	High	High	High
Risk-taking propensity	Medium	Medium	Low	Medium	Medium
Desire for independence	High	High	High	High	High
Self-efficacy	Medium	Medium	High	?	Medium
Extrovert/ Introvert	I don't believe in such dualities.	Introvert	Extrovert	Introvert	Introvert
For fun?	Medium	High	High	High	Medium
For money?	Medium	Medium	Low	Medium	Medium
For honor/ respect?	Medium	High	Medium	Low	Medium

The age profile is interesting. Several studies have shown a curvilinear relationship between age and the likelihood of exploiting entrepreneurial opportu-

nities where the activity peaks in the early 30s (Reynolds 2004, 6; Shane 2004, 90). The developers in this study are either younger or older than a typical founder. If and when they start a business based on their hobby, they are not in the typical age bracket for a founder entrepreneur. Several possible explanations for why hobbyist developers come in so many ages can be heard in their stories. One could be: "I have always wanted to make a game, and now it is possible". First generation computer gamers started playing video games in the 80s and are now 40 something. As kids they dreamt of making their own games, and Apple App Store finally offers a way to fulfill that dream. Madpoet, Tony, and tens of other developers on Experimental Game Dev Podcast Show are representatives of this crowd.

Another explanation could be: "I have played online strategy games since the early 2000s, and I'm totally at home on the Internet. It would be cool to program a game". These guys are now twentyish and are embedded in the game culture (Sotamaa 2009, 53–59). If they want to learn a new programming language, they know where to find answers. Adriaan and eVp and the majority of developers interviewed on the Experimental Game Dev Podcast Show belong to this group. The third explanation could be: "I got an iPod Touch when I was 10, and I like to play games on it. I'm now in junior high, and I have all this spare time. Perhaps I should learn how to code a game." The first generation of iPod Touch natives are in their teens and eager to start coding for the familiar device. Sterling and Stephen (we will meet Stephen in Chapter 8, The Team) in this study and e.g. Thomas Suarez on TEDx all belong to this group (Suarez 2011).

None of the informants in this study are thirtyish, but no claim is made that people in their thirties do not develop games for iOS. The interpretations suggested above are neither the whole truth of why people develop iOS games when they are in their teens, in their twenties, or in their forties. A more generic takeaway would be that hobbyist developers come in a broad age range.

Education increases the likelihood of entrepreneurial activity (Reynolds 2004, 10; Shane 2004, 70). Especially technical entrepreneurs have a higher than average educational background (Brush & Manolova 2004, 79). Also the informants in this study are or will be well educated. The last part refers to Sterling, who is still in high school, and who has not yet started higher education. However, he is doing well at school and has plans to go to college. Of course that does not necessarily guarantee a degree: eVp with his excellent grades and 3 years of university studies decided that school was not for him; instead he prefers to be a developer and a founder. Formal education is no longer the only source of knowledge. The Internet offers an abundance of possibilities for informal learning. It remains to be seen if this will diminish the importance of formal education in the future.

The gender of all the developers is male, and even the voices on the developer forums and podcasts are predominantly male. Although mobile gaming is gaining popularity among women and girls, men still make the games. My only female informant has an active role in game development; nevertheless, in this study she is considered to be a team member, not a developer.

Operating system is important in the sense that programming for iOS takes place on a Mac. If the developers original operating system is different, (s)he needs to transfer. For three developers the make of the computer is so important that they talk about it at length. They are seasoned Mac users and have developed a personal relationship with the brand. Being a Macist is part of their identity, but having a Mac also means that they do not have to buy one when they start to develop for iOS. As long-time Mac users they were aware early of the opening of the Apple App Store. For two developers Mac is just another tool that they adopt when they start coding their games.

Programming skills are not a prerequisite since a hobbyist game developer is defined (in this study) as someone who can perform multiple tasks such as programming, graphics design, music, or sounds as long as her input is central in the project. However, four out of the five developers in this study are programmers, and even the fifth one knows programming. What is interesting is how they learn new programming languages. Although one of them has a college degree in information technology (and a PhD in artificial intelligence), and one has taken some programming courses at university, they all have in common that they have learned coding in informal settings. They know their way around the web and can find useful forums to get answers to their questions and to meet their potential customers.

Career experience has a positive relationship when starting a business (Shane 2004, 75). The informants in this study do not have very much industry-specific or start-up experience, but most of them are experienced gamers. The nature of digital games globally connecting people becomes evident when we see that eVp, an 11 years old schoolboy from Europe, and Tony, a 27 years old PhD student from Australia, both enjoyed playing Civilization II in the mid 90s! All the informants are embedded in gaming culture. They know the market for games from the point of view of a consumer. Their prior knowledge lies in Ardichvili et al.'s (2003, 114) Domain 1 of fascination and fun. Shane (2004, 87) mentions that experience can be vicarious, but by that he refers to the fact that children of entrepreneurs share an entrepreneurial life and are therefore more likely than others to start a company. He does not discuss the option that vicarious experience of the industry could be gained as a consumer. Of my informants, Adriaan is the only one with parents who are entrepreneurs. He does not reflect on exposure to vicarious learning, but he mentions that he got advice from his father when he was putting up the company.

Experience is interesting also from the effectuation point of view. Expert entrepreneurs use effectual logic, while novices tend to assume a more casual approach (Dew et al. 2009, 300). Trial-and-error experience in real situations can be a source of expertise, but each individual domain exhibits a set of domain-specific heuristics, and experience in one domain does not transfer into expertise in another (Dew et al. 2009, 290). This would imply that even though the informants have experience, even expertise in gaming, it does not transfer into expertise in entrepreneurship. If expert gamers actually use effectual heuristics, it would suggest that effectual reasoning can be learned also in domains other than entrepreneurship.

Opportunity cost or affordable loss? The informants all mention in one way or another that they are working on a budget and mainly commit time to their venture and not so much money. Should this time be looked upon in terms of an opportunity cost or of an affordable loss? According to Shane (2004) entrepreneurs always have an alternative use for their time and implicitly compare the value of entrepreneurial activity with what they lose when they are not doing something else instead. Opportunity cost is low when the gap between expected return from exploiting an opportunity and the alternative use of time is large. (Shane 2004, 63.) Current wages are often used as a proxy for opportunity cost (Amit et al. 1995, 97).

In this study opportunity cost is a problematic concept for two reasons. First, there is the problem with operationalization. When the hobbyist developer is a student like Adriaan, eVp, and Sterling, his wages are low, which according to Amit et al. (1995) would imply a low opportunity cost. However, the opportunity cost can be high even when the present wages are low. The student-developer can for instance allocate time to game development instead of taking exams, and as a result he can miss the chance to graduate on time and potentially get a well-paid job. Second, with opportunity costs there is an inbuilt assumption that expected returns are considered, but in this study the informants do not predict future incomes. Instead they are concerned with the downside:

> Loss would have been low - $250 money investment, weeks of time investment. Since we already had computers and iPods, we just had to pay $99 for the developer's license, $25 for the Android license, and $99 for the Corona SDK license. (Sterling)

This resonates well with affordable loss, where decisions are based on the worst-case scenario rather than predictions on expected returns (Dew & Sarasvathy 2003, 23; Read et al. 2009, 2).

Social ties increase the likelihood of people engaging in entrepreneurial activities, as valuable resources and information can be attained through direct and indirect social ties (Shane 2004, 92). Network bricolage suggests that founders of knowledge intensive firms rely on pre-existing contact networks as the means at hand (Baker 2003, 269), and effectuation emphasizes partnership between self-selected stakeholders as a way to cope with uncertainty and create new markets (Sarasvathy 2003, 210). For Shah and Tripsas user communities are an important asset for sharing information and ideas. Communities, as opposed to networks, have a distinct social structure, and members identify with the group rather than with individuals. (Shah & Tripsas 2007, 130.) eVp is part of both real-life and online networks and communities. Also Madpoet and Sterling get support from real-life and virtual contacts. Adriaan has strong real-life networks, and Tony is a loner, who does most of his work by himself. One thing all the informants have in common is the enabling support they get from their family.

Psychological characteristics used to be a central interest in entrepreneurship research. Later the discussion moved from entrepreneurial traits toward entrepreneurial behavior in e.g. opportunity discovery. More recently the individual characteristics of the entrepreneur have again gained interest, this time in the form of entrepreneurial cognition. However, entrepreneurial cognition

seeks to understand entrepreneurial thinking in relation to entrepreneurial action, whereas the old trait approach tried to find a stable entrepreneurial character (Mauer 2011, 22). Although there no longer is a quest for a magical entrepreneurial personality, many scholars agree that entrepreneurs might be prone to have different cognitive styles than non-entrepreneurs (Johnson et al. 2004, 172). In their meta-analytic review of effectuation and venture performance, Read et al. (2009, 582) found out that psychological characteristics of the entrepreneur do not correlate with the firm performance. Other effectuation scholars agree that there is no relation between effectuation and a wide range of psychological measures; the only exception being self-efficacy (Sarasvathy & Dew 2008, 732; Mauer et al. 2009).

Nevertheless, some psychological characteristics are still included in the profile card of a hobbyist developer. The answers are not based on any tests. They depict how the developers perceive themselves. Often, the way we act is based more on our judgment than on any objective truth (Knight 1964, 242). Need for achievement (nAch) refers to motivation that stems from fulfilling the task itself (McClelland 1967). It seems to resonate well, not only with entrepreneurship as McClelland claims, but also with gaming, where the act of playing gives pleasure even when there is no trophy (Caillois 2001, 29). People with high nAch work best at moderate risk and prefer tasks in which they achieve their goals because of their own actions, not just by luck. They also seek actively new information and use it in innovative ways (McClelland 1987, 250). In line with that, all the informants in this study perceive a high need for achievement, and all but Madpoet describe their risk-taking propensity as medium. However, a person's perception of risk does not necessarily match the objective risk level.

People with strong self-efficacy tend to perceive situations as less risky (Shane 2004, 58). Bandura, in his more recent texts, does not view self-efficacy as a stable trait. Instead he argues that the sources of self-efficacy are mastery experiences, social modeling, social persuasion, and choice processes (Bandura 2012, 13). If indeed self-efficacy can be nourished, who gives the nurture? In the informants' stories it is first the family. "I was always told that I was good at/with art, math, music, running, English, computers…" The families were not overly protective, but at the same time they were supportive. They encouraged activities where children could excel, but were they might also fail and learn to overcome the failure. As a result the informants took advanced courses in math, participated in national competitions of various sorts, played in a band, were athletes, were allowed to play digital games, made art, and so on. In these activities they personally experienced success and failure, but they also saw how their peers succeeded when they put in a lot of effort. In this study only Adriaan's parents are entrepreneurs. Nevertheless, the four other examples show that even non-entrepreneur families can have an entrepreneurial mindset and can impact a family member's future entrepreneurial activity by supporting the development of her self-efficacy.

Playing digital games provides opportunities to experience winning and losing. Fellow gamers around the world can act as role models for overcoming hardship, and they also give feedback and support. Furthermore, the gaming context offers ample opportunities for making choices. Both the families and the

hobby of gaming serve as excellent arenas for building self-efficacy. With good groundwork it is easy to survive the game development process, which in itself is a combination of mastery experiences, social modeling, social persuasion, and choice processes (Bandura 2012).

Interestingly my interpretation of the informants' level of perceived self-efficacy is different from what they report themselves. To me their actions demonstrate task-specific self-confidence: they put a lot of effort and time into a specific task, are persistent when facing obstacles (Shane et al. 2003, 267; Shepherd & Krueger 2002, 171; Krueger et al. 2007, 110), and have an optimism that they can reach their goals (Ardichvili et al. 2003, 116). Yet, only Madpoet perceives his self-efficacy as high. One explanation for this discrepancy could be that the informants were not familiar with the concept and thought that medium would be a good choice under the circumstances.

The distinction between extrovert/introvert was not included in my original draft for a profile card, but it was taken up by so many of the informants that it deserves to be recorded:

> I went to a workshop for work, and I heard a definition: an extrovert is a person who draws energy by interacting with people, and afterwards she feels invigorated, but an introvert is somebody who feels tired after interacting with people, and afterwards she needs some time alone to recover. I call my children energy vampires, because I feel they are sucking all the energy out of me. So after I spend a couple of hours with them, I need a break. (Tony)

> I'm a loner. People say that in the end everyone likes teamwork and what not. I freaking don't. I've had the best time of my life when I was alone doing my game. (eVp)

For Tony developing games gives the alone-time he needs to cope with family. This adds to his persistence to work on the games, even when there is no evidence of immediate success. Although eVp says that he was doing his game alone, he actually had partners. Elsewhere he mentions that he believes in small, intimate teams. Being a loner could thus be interpreted as a preference for small teams, not necessarily a desire to work by oneself.

Prior entrepreneurship research on the **reasons** for pursuing an entrepreneurial career has concentrated on concepts like innovation, independence, external validation, roles, and financial success (Carter et al. 2004, 148). In this study the reasons to pursue a hobby in game development, and potentially turn it into a business, are not explored in such detail. Nevertheless, the aforementioned reasons for choosing an entrepreneurial career seem to carry a resemblance to the following profile card items: for fun, for money, for honor, and a desire for independence. The purpose for including these for-questions in the profile card was to find out whether the activity is motivated by play or by money. Making something for fun and for honor would be within the realm of different, whereas making money would be in the realm of ordinary (Huizinga 1955). In their accounts all informants agree that while making money is one of the goals, enjoying the challenge of developing a game comes first. In Madpoet's words developing a game is like solving the ultimate puzzle. However, it is

not just fun and joy, and that is the reason why Adriaan drops his for fun – grade to medium:

> Developing games itself can be a struggle. It's often more about the result. Still, I want to keep on doing what I like best! (Adriaan)

Designing and programming the game is not the only part in the process, which is enjoyable. Also competing in the market, following statistics, meeting with the fans on different arenas etc. offer non-pecuniary rewards for the developer.

In May 2013 Vision Mobile collected data from more than 6 000 mobile developers that target different mobile platforms. They found out that measures like age, job function, target audience, or technology background no longer influence how developers choose which platform or app genre they will target (Vision Mobile Q3 2013, 52). The study explores the developers' aspirations, motivations, challenges, and plans in app development, and as a result eight categories are formed: the Hobbyists, the Explorers, the Hunters, the Guns for Hire, the Product Extenders, the Digital Content Publishers, the Gold Seekers, and the Enterprise IT developers. The hierarchy of developer motivation across these eight categories is depicted in figure 14.

Motivations by percentage of developers (n = 4 644)

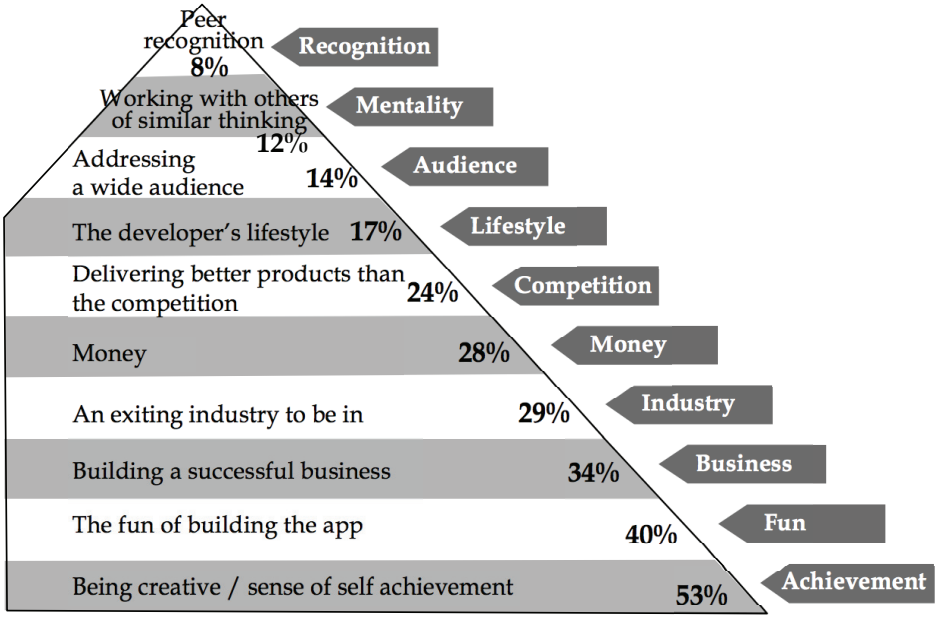

FIGURE 14 The hierarchy of developer motivation (Vision Mobile Q3 2013, 56). Source: Segmentation Q3 2013, http://www.developereconomics.com/seg13. Licensed under Creative Commons Attribution 3.0 License.

The study clearly demonstrates that money is not the only or even the most important motivator. The majority of mobile developers in the study are motivated by creativity and the sense of achievement. The fun factor is also an important motivator among all developers, and especially in the Hobbyists and Explorers categories (Vision Mobile Q3 2013, 55). It is important to note that the developers in Vision Mobile survey develop all kinds of applications for all kinds of mobile platforms, whereas the hobbyists in this study develop games for the Apple App Store. Nevertheless, it is interesting to learn that the Hobbyists and the Explorers, who together account for 33% of the mobile developer population, but only 13% of the revenues, value highest the aspiration to learn, have fun, and self-improve. This sounds very familiar: also the hobbyist game developers in this study talk about having fun and learning.

In Developer Segmentation Q3 2013 report the ten layers are further grouped into three categories:

- Personal fulfillment (achievement and fun)
- Community belonging (recognition, mentality, audience, lifestyle, and industry)
- Commercial success (competition, money, business).

The share of those who chose the two first categories is much bigger than the share of the third category. This suggests that also the developers in the Vision Mobile survey appreciate the opportunity to be within the realm of different. It would have been most interesting to compare the developer profiles from this study and the scorecards from Vision Mobile developer segmentation survey. Unfortunately the Vision Mobile scorecards are only available with the full report[26].

In summary: although the hobbyist developers in this study started game development as a hobby, and did not have intentions to start a company in the first place, they still resemble nascent entrepreneurs in many ways. Furthermore, the reasons they give for developing games are in line with the motivations hierarchy Vision Mobile puts up based on a large survey of mobile developers.

One takeaway for me personally is the fact that it is challenging to interpret actions: what I interpreted as evidence of a high level of perceived self-efficacy, most of the developers did not. This ambiguity should be taken into account even with other interpretations I make.

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26 The full Developer Segmentation Q3 2013 report can be bought for $2 995 at http://www.developereconomics.com/seg13.

5 THE PLAYGROUND

The aim of this chapter is to introduce the context of this study - the Apple App Store and to use the lens of game elements (Järvinen 2008, 85, see also figure 6, p. 46) to see how it might enhance playful entrepreneurship. In this study The Apple App Store refers to: the Software Development Kit (SDK); the iTunes App Store for buying apps and following top-lists and features; iTunes Connect for uploading the software and receiving sales reports; and iPhone Provisioning Portal for certification and provisioning. The actual marketplace visible for customers is the iTunes App Store, which the developers in this study call the App Store.

5.1 Rules of The Apple App Store

The iPhone and the iTunes App Store were introduced 2007, and for one year Apple tried to keep the store closed for third party programmers. However, this did not stop developers: jailbreak programs were readily available and some developers started hacking their own applications. The situation thus was very similar to other arenas, where companies have to decide, how to treat modders, hobbyists, who modify existing software to better fit their own demands (Sotamaa 2009). Apple realized very soon that if it wanted to call a hand-held device smart, there had to be plenty of applications available for it. It adopted a revolutionary approach to content-supply, and opened its store to all third-party developers. The new symbiotic approach was beneficial for Apple, since it offered content to the App Store and accumulated cash flow as well. The developer, on the other hand, got efficient programming tools, access to the global market, credibility, and not only credibility, but also a touch of one of the world's best-known brands (figure 15).

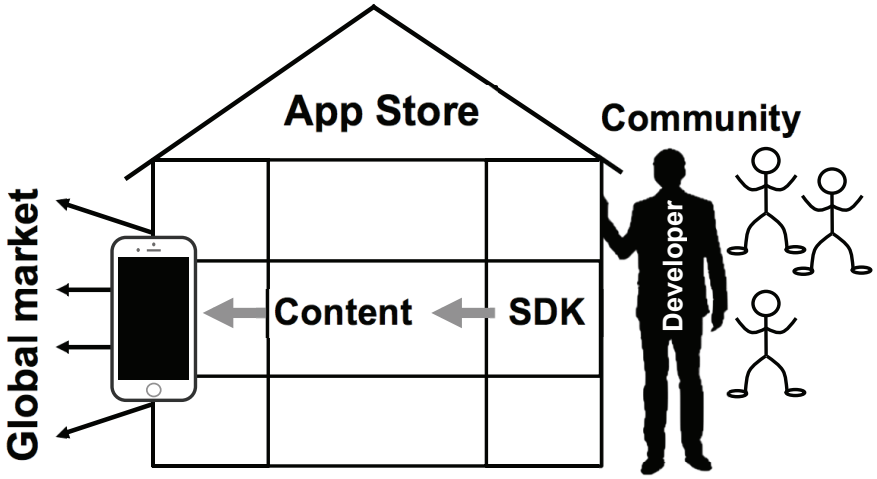

FIGURE 15 Apple App Store offers programming tools, iPhone simulator, and a shop. Developers can make content and sell it on the global market.

Anybody can register the Software Development Kit (SDK) for free. SDK includes software with which one can develop applications (apps) for iOS[27] and test them on a simulator on a Mac computer. For $99 a year anybody over 18 years old can register a developer account. A registered developer gets to test his apps on the mobile device, not just the simulator, and can distribute them through the iTunes App Store. When the application is ready to ship, it is sent to Apple for review. The review process on the one hand enhances the value of the application as buyers can trust that malignant content is not hidden in the application, but on the other hand it is a manifestation of Apple's ultimate control. Certain topics, like adult content, and certain technologies, like Adobe Flash CS5, are prohibited. Apple can freely decide to ban other content as well.

After the approval the application is for sale in the iTunes App Store and can be purchased through iTunes on computers or by One-Click directly from the device. The app is automatically for sale all over the world, but before the developer gets paid his revenue must exceed $250 in one of the seven regional iTunes App Stores. Apple's share is 30%, and 70% goes to the registered developer. Apple provides sales statistics and publishes top-lists in different categories. It also picks up featured applications on arbitrary grounds. The developer can write a description of the application and provide a link to its website, and users can review the apps they have and give stars for them[28].

Some changes have taken place over the years. In-App Purchase was introduced in fall 2009. This makes it possible to sell items like premium content, virtual goods, and subscriptions within paid and free iOS apps. Both freemium games and free-to-play games are free upfront, but it is possible to monetize them by adding in-app purchase. What you buy in freemium games is more content, and in free-to-play games you pay to be able to play without delays (a

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27 The operating system used in iPhone, iPod Touch, iPad, and iPad mini.
28 This is just a very rough overview of the rules of the game in Apple App Store.

distinction made in this study). Game Center opened in 2010. If the game has Game Center integration the players can track high scores on leader boards, invite friends to play a game, and start a multiplayer game. (Touch Arcade 10.15.2009, 04.08.2010.)

The iTunes App Store is not the only store to offer hobbyist developers access to global markets. Most manufacturers of handheld devices have followed Apple's example and offer similar shops. This research is limited to the Apple App Store context for the following reasons:

- Personal reasons: I have followed iOS development since 2008 and know this environment better than other arenas, which were founded later.
- The entry barrier for hobbyist developers is lower in iOS development than in Android development, because there are a limited number of different end-user hardware combinations to consider. The Android world is more disperse; there are numerous manufacturers, operating system versions, screen sizes etc., which make it a more difficult platform to target. However, it is cheaper to start coding for Android: it can be done on any computer, whereas a Mac is a prerequisite when developing for iOS. (Farago 2012b; Vision Mobile 2013 Q3, 31, 34; informant accounts.)
- Apple App Store is more comprehensive and polished than e.g. Google Play, the main shop for Android apps. However, Amazon App Store for Android apps is said to be a close runner up, and even beat Apple App Store in certain areas, like backend. (Farago 2012b; informant accounts.)
- iTunes App Store generates more revenue[29] be it because of the ease of use, as Apple has more experience in selling than Google, or the fact that Apple users are more used to paying for their products. However, Amazon App Store is a close runner-up when it comes to revenue making potential. (Farago 2012b; Vision Mobile 2013, 24.)

iTunes App Store offers several business models, of which five are covered in this study. First, the game can be free, no strings attached. The motivation for choosing this approach can be to experiment with the development process and learn the mechanics of keeping the app alive in the iTunes App Store. Free games can also be used to boost the sales of the developer's paid games or to build her reputation. Second, free apps can come with ads. Ads can vary from small clickable notices to full screens, which totally stop the gameplay, and there are many service providers to choose from. In general ads do not generate enough revenue for a sustainable business, but they can provide some pocket money for a hobbyist developer (Vision Mobile 2013, 30, 46). Freemium is the third business model discussed. When in-app purchase option was first introduced the typical way of implementing it was to allow buyers to upgrade to an ad-free version of the game. The next step was to offer more content. At the

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29 This study concentrates on years 2009 – 2013. However, between Q1 2013 and Q1 2014 Google Play doubled its downloads and narrowed the revenue gap. Nevertheless the Apple App Store still leads in revenues http://blog.appannie.com/app-annie-index-market-q1-2014/

moment it seems that the best revenues are accumulated, not from extra content or power-ups, but from timer-based free-to-play apps. Freemium and free-to-play are both free upfront and allow in-app-purchase. However, their monetizing methods are so different that in this study they are considered two separate business models.

The fourth business model thus is free-to-play (f2p). The idea is that all content is available for free, but in order to access it the gamer has to engage in grinding; that is, performing repetitive tasks. By paying he will be able to continue without these delays. Even buyers who are not ready to pay $5 upfront for a full game may end up paying hundreds of dollars per day inside a free-to-play game. This explains the apparent paradox that Supercell[30] with its two free-to-play games grossed $179 million in the first quarter of 2013 (Strauss 2013).

Fifth, games can come with a price upfront. Free games with in-app purchase dominate the revenue charts, and the price points for paid games have come down during the years. The average small game nowadays costs $0,99, and it has become harder and harder to accumulate revenue with paid games[31].

There are more options if the business model is extended outside the App Store itself. A way to do this would be branding the application, which means that a company sponsors the game and uses it in its own advertising. An example of that is Brio[32], who sponsors official Brio levels for the Labyrinth game. Another model is merchandizing, which Rovio[33] uses with excellent results: it is now possible to drink, eat, and wear Angry Birds, and over 50% of the company's revenues come from merchandizing (Vesterbacka in Slush Conference 2012). It is of course also possible to develop games as a subcontractor, and for some developers the monetizing strategy seems to be to build reputation and hope that a bigger company buys the entire studio or at least starts to publish its games. However, the focus in this research is on the five "native" business models mentioned above. A more fine-tuned and practical presentation on business models in the iTunes App Store can be found in Mobile Game Design Book (Chroma Coders 2013).

5.2 The Apple App Store as a game system

Could game development in the Apple App Store environment be considered a game? I adopt Järvinen's (2008) framework (see figure 6, p. 46) to analyze to what extent the Apple App Store meets the requirements of a game system with game elements like compound, environment, rule set, game mechanics, theme, interface, information, context, and players.

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30 http://www.supercell.net

31 In February 2015 Apple introduced "Pay Once and Play" category with no in-app-purchase, which may diminish the dominance of freemium and free-to-play games.

32 http://www.brio.net/en/

33 http://www.rovio.com

If game development in the Apple App Store were a game, the icons for the apps would be the components. Clicking the icon in the iTunes App Store opens a description page with information on the game features. The customer proceeds to buy the app by clicking the icon. On the computer the top-lists display the icon of the number one app in each category. Icons are also displayed in Featured apps (in categories like New and Noteworthy, What's hot, and Staff Favorites). On the mobile device the icons are featured in all searches and on all top-lists. The app icon is also displayed on the mobile device once the app is purchased. The design of the icon plays an important role, as the choice between to buy or not to buy is often made based on the appeal of the icon. Once the application has been downloaded its icon on the device is a powerful marketing tool: people often show their friends what they have bought, and a catchy icon helps in spreading the word. The developer can also get joy just from seeing his icon on top-lists and on the device:

> I'm hoping that with the 5000 hits that I have on the forums for my upcoming game, when it gets released, there are people, who, when they see the icon, they might give it a second look. (Madpoet)

> At that time, when you opened the App Store, on the front page they'd show the best selling albums, the best selling singles, and the best selling apps, and there, right below Red Hot Chili Peppers with their new album was the icon of my game! (eVp)

> When I'd show it to my friends on my iPhone, they'd go: "Is that really the game you helped to design?" And they wouldn't think I was a nerd or anything, they'd think it was super cool! (Stephen)

When an iOS developer registers his account he gets access to several environments: SDK for developing applications; the iTunes App Store for buying apps and following top-lists and features; iTunes Connect for uploading the software and receiving sales reports; and iPhone Provisioning Portal for certification and provisioning. Some of these environments work well as a game environment, but some do not. Game state becomes evident through the iTunes App Store. This environment is well polished, and the same is true with SDK, but the backend (iTunes Connect and iPhone Provisioning Portal) lacks these qualities:

> I'm a true believer of SDK, and I don't see anything wrong with it. I think it's pretty goddamn awesome. The package is so well done: you edit the code and press command-enter, and it starts the code directly on iPhone, checking the values of every field during runtime. It's obviously like that on desktop, but being able to do that on a mobile is pretty unique. (eVp)

> It's almost as if Apple doesn't care for developers in terms of giving them information. They make amazing products and they make amazing interfaces, yet iTunes Connect is horrible… It is almost like they are giving you hurdles to jump through! (Madpoet)

One of the attributes for environment is Part/Whole, that is, the relation of the environment to possible other environments or to a larger whole (Järvinen 2008, 67). In the App Store only part of the environment is revealed to all players: customers and competitors only see the iTunes App Store, but the developer can

also see his own iTunes Connect and iPhone Provisioning Portal. It is not possible to access competitors' statistics.

Apple App Store has a set of rules the developer has to adopt. They can change during the course of the game; all it takes is a one-sided decision by Apple Inc. This is rather annoying from the point of view of the developer and not in line with Huizinga's (1955, 28) notion that play is performed according to rules freely accepted but absolutely binding. The developers often feel that the procedures are not transparent:

> I've had my share of headache with rejected updates. The new Lite versions went through four iterations before making it onto the store. I think the policy with demo versions is especially vague and in some cases detrimental to the customer…However, the biggest problem is bug fixes. I shipped a version that caused every updating device to crash – perpetually and on start-up – yay for beta testing, right? The fix appeared on the store almost two weeks later thanks to the acceptance delay. There should really be a way for small tweaks to get online faster. (eVp)

Even the developer's perception of a winning condition can change during the game. He can have different goals at different stages. The initial goal can be that of being able to compile an application and get it in the iTunes App Store:

> So, like I said, I was driven by what can I do, what can I make, something cool and interesting. (Madpoet)

Later on it can be gratifying just to see that the application is popular, even if it does not accumulate any income:

> The reporter wouldn't understand why I was so excited about the success of my free app; after all there was no income in it directly. I explained to him that it was really awesome to think that over two million people have played with something that I have created! I mean, take a new band for instance, they could very seldom get millions of downloads even if they made their record available for free. (eVp)

> The really crazy thing was, that it became very popular in Turkey! It actually became number one or two board game in Turkey for free games. (Tony)

Naturally, making money also is one of the goals:

> At some point we had to make money as well, and to do that we needed a company…We took a loan, but we never used it, so we paid it back and we are still running the company on [the income from] our first game. (Adriaan)

> The second day on the App Store the game made 600 €, which, for a student like me, you know, was a lot. Just two years prior I had been working at this place where I made the same in two weeks working my ass off… So, within a week and a half I had made 5 000 €, which was bucket loads of money. (eVp)

All these goals fit in the realm of achievement goals (Järvinen 2008, 70). But also other types of goals can be detected. Instead of viewing making it to the top-list as a goal in itself, it can be seen as an instrumental goal; a position there leads to increased sales. The same applies to getting an Apple feature:

> 16.7.2009 my free game was the #1 free game on the US AppStore. Over 70 000 copies shipped in one day. Full version ended up on the charts as well for the first time. (eVp)

> Just my friends alone got the game to #3 in my country the first day it was released. Then in a couple of weeks we released an update, a Valentine's pack, and then Apple featured us, and it just blew… the sales exploded! We made most money during that week, if not 50% of all the money we have made on the game. (Adriaan)

Through game mechanics the players try to reach the winning condition. In the App Store game mechanics could include making decisions on:

- how you develop the game. Is it in native Objective C, or do you use programs like Unity 3D and Corona SDK? Are you a one-man studio or a team? Do you make graphics, sounds, music etc. in-house, or do you buy them or use royalty-free stuff?
- what your monetizing model is. Is your game free, free with ads, freemium, free-to-play, or is it a paid game? If it is a paid game, what price point do you choose, and why do you change the price along the time?
- how you keep your game alive. How do you track your sales? What marketing tools do you use? What is your strategy on updates? How do you dwell with your audience?

These are discussed in more detail in chapter 6, The Play.

The App Store offers two interfaces, one on the computer, and the other one on the mobile device. The mobile interface is one of the things that works well for the developer and customer alike. Buying new applications with the iPhone has been made easy, and the interface is very intuitive. The apps are bought, sorted, and used by touching, swiping, pinching, tapping, or shaking the device. All of which are gestures that people are familiar with from other contexts. For the developer the mobile interface offers a way to be in touch with his application where ever he is, as long as there is access to the Internet. This enhances immersion.

Availability of information is a weak point in the Apple App Store. Game state is available for everybody in the form of top-lists, but if the app is not in the top 200 in any category, in any shop, it is difficult to accidently find it. The developer gets information of his sales statistics and payment accumulation, but this information is inadequate and comes in text format. That's why developers often employ third party services to get the information they need:

> Getting your statistics out of the App Store is a pain in the bum. So they [Appannie] do it for you. It's funny, cause you actually give them the password to your App Store account, which is a bit of a trust thing going on there I guess. They also pull out a lot of information on where everybody else is. (Tony)

The introduction of the Game Center added some potential for direct contact with the customer, but for the most part information and direct contact with the audience of one's game has to be arranged outside the Apple App Store. For the majority of the developers in this study that means participation on different discussion forums and social media services.

The context in which the App Store is used is very versatile. Browsing the store, reading game descriptions, and buying apps by One-Click can take place while waiting for a train, riding a bus, taking a coffee break at school or work, and other spare moments like that. This is one of the strengths of the App Store. It is typical that people kill time by buying apps, which they then use for killing time! Mobility has totally changed where games are played, for how long, and by whom. This in turn has shaped what kinds of games have a market. Not only the customers, but also the developers can reach the iTunes App Store in the strangest of contexts, and that can enhance immersion in the game of developing the game:

> So, I think I first discovered that it was available on the App Store in a drive-through line at McDonald's, on the free Wi-Fi. I was searching my app in the App Store and, lo and behold, it came up! (Sterling)

The players of the game of developing a game have been discussed in the previous chapter. Here I want to remind how enthusiastically the hobbyist developers talk about learning while developing and marketing their game. This resonates well with players developing abilities into skills in the act of playing (Järvinen 2008; Sotamaa 2009).

Table 6 provides an outline of game elements in the App Store. The approach is based on Järvinen's (2008) analysis of +100 games.

TABLE 6 An analysis of Game Elements in the App Store. The approach is adapted from Järvinen (2008)

Systemic elements	
Component-of-self	App icon
Component-of-other	App icon
Environment-of-system	SDK, iTunes Connect, iPhone Provisioning Portal, iTunes App Store (on a computer and on a mobile device)
Compound elements	
Rule set	Rules governing the Apple App Store. Subject to change by Apple Inc.
Rule set: Goals-of-self	Develop an app that is accepted to the iTunes App Store, get as many downloads as possible to make the different top lists provided by the system, get a feature in the App Store, accumulate sales, make money, learn.
Rule set: Procedures (system)	App review process, acceptance process, payment process, keeping up score on different top lists, picking featured apps
Game mechanics of-self	Developing an app, providing updates, offering info about the app, choosing the business model free/free with ads/freemium/paid, and setting the price.
Theme	n/a in the iTunes App Store itself, although very important in some of the games marketed through the iTunes App Store.
Interface	Desktop and mobile

Table 6, continued	
Information-of-self	Statistics on downloads; game state (top paid, top free, top grossing), searchable in different categories (available to all parties); info on payments (not visible to others). **Additional information is needed** and sought for from third party applications and on forums.
Information-of-other	Game state (top paid, top free, top grossing), searchable in different categories (available to all parties). **Additional information is needed**.
Behavioral elements	
Players - self	Hobbyist developer and his team against others**. Meeting places for (potential) partners are needed** outside the Apple App Store.
Players – other; other as opponent	Other developers
Players – other; other as customer	Game center Inadequate contact between the developer and his customers in the Apple App Store -> **forums outside the Apple App Store are needed.**
Players - system	Apple Inc.
Contexts-of-self	Mobile or stationary Mobile context is very powerful.
Contexts-of-other	Mobile or stationary Mobile context is very powerful.
Contexts-of- system	Various

5.3 Summary of the Apple App Store as a Playground

The Apple App Store has many game-like qualities, but as a whole it does not qualify as a game system. Its most powerful game elements are the mobile interface and the various contexts it enables. When the developer can check his status on the top-lists in a sailboat, or add a few lines of code while sitting on a bus, it is easy to get immersed in the game of developing a game. The partial stream of information and lack of arenas for community building along with the overwhelming dominance of Apple Inc. are its biggest shortcomings. As long as the developer can compensate for the lack of information, can build his communities effectively elsewhere, and is willing to obey Apple in exchange for the irrefutable benefits, then the Apple App Store offers ample opportunities for the playful entrepreneur. For a hobbyist developer the trustworthiness and global markets that the iTunes App Store offers out-weigh the disadvantages, whereas many established content providers are raising loud voices against Apple's high share and arbitrary rules.

Figure 16 depicts the playground. The core is the Apple App Store, which offers most of the necessary systemic, compound, and behavioral elements. These are complemented by the behavioral elements and information elements it fails to serve. The developer needs communities where she can bond with potential partners (Players – self; teammates as part of self) and communities

where she can mingle with her audience (Players – other; other as customer). Family and friends, school, workplace, and internship are important face-to-face arenas for community building, but online forums like Touch Arcade, Mac Rumors, Unity, and Corona are equally important. Showcasing the game is important for marketing purposes, but meeting one's fans can be fulfilling in itself. Getting a feature on a review site like AppCraver, App of the day, 148 Apps, or Touch Arcade is a sub goal on the way to app success, but at the same time it is quite a lot of fun in itself. All these non-pecuniary rewards help the developer to stay focused on his task during the time when monetary rewards alone would not warrant the effort.

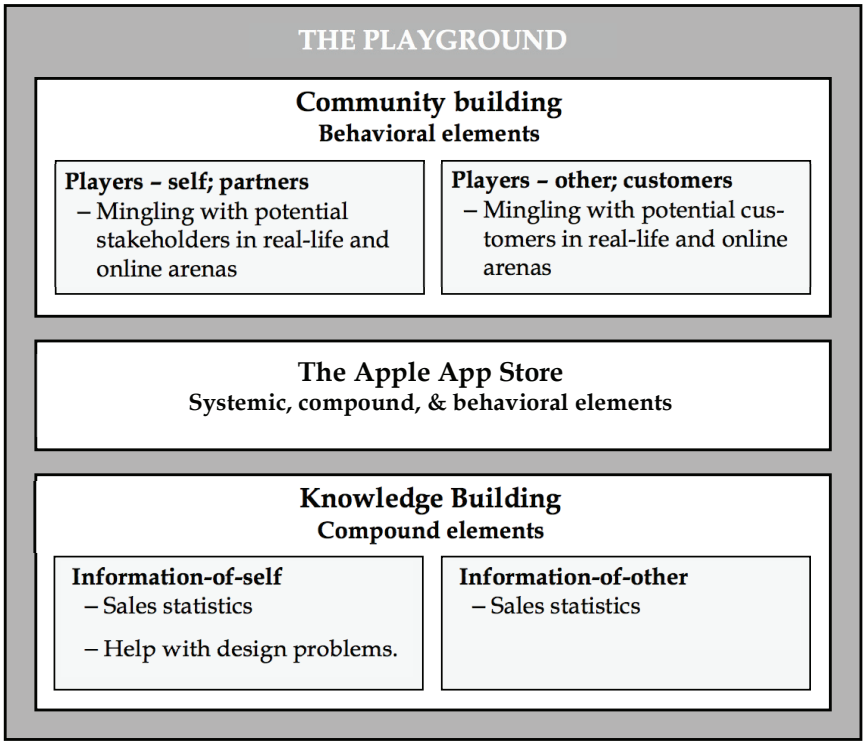

FIGURE 16 The building blocks of the playground: The Apple App Store, real-life, and online arenas for community building and information exchange.

Information inflow and outflow is inadequate in the Apple App Store. Apple does not offer forums where developers could meet and share knowledge in programming issues. Neither do its analytics tools meet the developers' needs. That is why the playground needs to be extended to developer forums and third party services offering sales data. The informants in this study used App Annie, App Viz, and Distimo[34] for attaining sales statistics[35].

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34 App Annie acquired Distimo 04.28.2014

35 For more developer tools have a look at Vision Mobile 2013, chapter 2

6 THE PLAY

The aim of this chapter is to find out how effectuation and play are expressed in the actions of hobbyist game developers. First, the process of developing the game and keeping it alive on the market is depicted on a very practical level. Second, the narrative programs of the five developers are analyzed using a modification of the actantial model.

6.1 Overview of what, how, and by whom

Figure 17 depicts the process of developing and marketing the game as perceived in this study. *What?* puts up a to-do list, *How*? introduces various ways the endeavor can be carried out, and *Who*? suggests different actors taking part in the development. The lists are by no means comprehensive. For instance, none of the hobbyists in this study chose to develop a complicated free-to-play game, thus there was no need to have a design for money play (Shokrizade 2013). There are also lots of other tools available (see e.g. Vision Mobile 2013), but if the informants did not mention a tool it is not included in the outline picture.

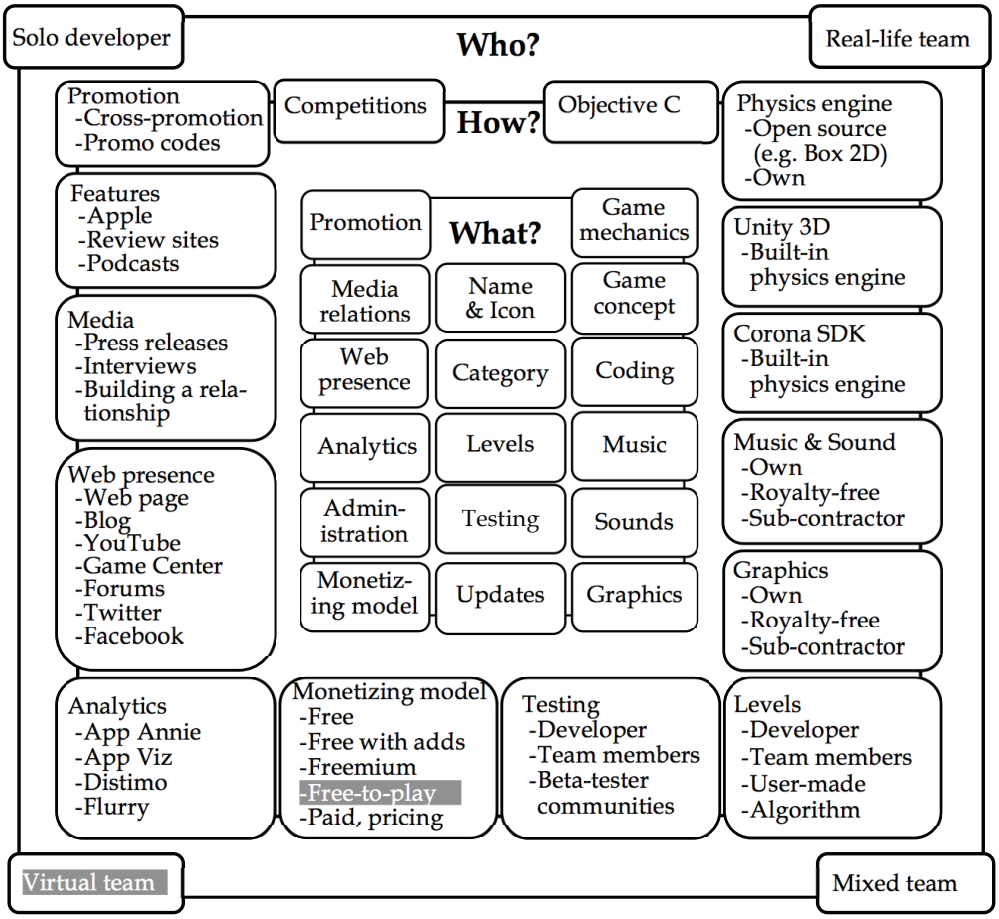

FIGURE 17 Things to do, how and by whom as perceived in this study. Gray indicates that the topic was brought up but not implemented by any informant.

6.1.1 What? - Actions to take

Game design starts with the game concept: the general idea of the game. There are several game genres the developer can target. All the finished games in this study are in broad terms puzzle games where the goal of the game is to solve a puzzle. The puzzles themselves can vary. There is a math puzzle, a word puzzle, a ball-rolling puzzle, a physics puzzle, and so on. Most of the games are single player games, but Adriaan's games are local multiplayer games where two or more players play together on one device. Madpoet's work under development is an online multiplayer game.

Most of the developers in this study got their game ideas from existing games. Childhood toys and tabletop games, flash games, and console games were a source of inspiration for them, and so were other iOS games. All of the informants agree that they would never make a copy of an existing game just to make easy money. They want to have some personal twist in the game. In Tony's word-game his own interest in sci-fi was incorporated into the theme. The

same childhood toy, which inspired eVp, had already inspired a previous mobile game. However, when eVp in his version introduced a 3D view and new game mechanics, like jump and par times for each level, it was a new mobile game, not just a copy of the previous one.

> There is this quote: "Nothing is truly original, because the mind is a social product". So, in a way nothing is really original, but as long as you are inspired by something, and not exactly ripping everything off, that's good. …It's the same in arts, I remember my early years as an illustrator, I'd see styles, and I'd love a style, and I'd try to incorporate it to my own style. … When it comes to my own published titles [in the App Store] I want to do something that's me. I love people to see my stuff, and say, hey, that's you in terms of, how things look and feel. (Madpoet)

Many of the games in this study share this quality of creative copying. However, Adriaan is adamant about making truly original games, and does not seek inspiration in existing games. He allocates some time every working day to doing nothing but brainstorming ideas for games that go beyond the screen. He then makes quick prototypes. Some of the ideas are dropped, but some may be developed further.

When the game concept is clear, the storyline and the mechanics of interaction have to be designed. The game needs graphics, sounds, and music, the different levels have to be designed, and the game as a whole has to be programmed. Before the game ships, it has to be tested. It also needs a name and an icon, and the category in which it will be released. It helps in the word of mouth marketing if the name is catchy and easy to remember, but the choice of name also affects how well the app shows in searches:

> These days the algorithm is kind of screwed in a way that the applications name, if it is exactly correct, gives a lot of points. … So, they [applications, whose name begins with same word as a popular app] get indexed way higher, although they are crap applications that nobody downloads, but they get a lot of free publicity that way. … The search indexing is very much broken. I just kind of wish that Apple fixed the system (eVp)

Also categories should be chosen with care. There are competitive differences between categories, and in some categories it is much harder to get visibility than in others (Liu 2013):

> Another challenge I want to mention is categories and key words for the Apps Store are crucial, are very, very important. I probably didn't spend enough really investigating these things. Well, that'll be a piece of cake. I'll just pick whatever. … But what I find is that the puzzle category, there's a lot of competition in the category. (Madpoet)

When the game is not made just for fun one has to decide which monetizing model to use. This is discussed in more detail under *Marketing the game*. The word *Administration* refers to tasks like acquiring developer license, coming up with a business name, opening a bank account, taking care of contracts of various sorts, having contacts with tax authorities, and submitting the game to the iTunes App Store. It is also necessary to prepare for updates that are made not

just for technical reasons but also for marketing purposes. There is no one order for attending to these tasks, and many of them take place at the same time.

This multitude of tasks calls for partners, or the developer has to be a renaissance person, who has a talent for gaming, arts, coding, taking care of bureaucracy, marketing, and so on. There are two one-man studios in this study, and even those developers are seeking partners. In this study partners typically knew each other in real life prior to developing a game together. There is one mixed team with both real life partners and a virtual teammate (more about this team and themes like homophily and familiarity in chapter 8, The Team), and one developer discusses his attempts to form a fully virtual team.

6.1.2 How?

Developing the game

Programming can be done using the native language for iOS, which is Objective-C. If the code is written in Objective C, it is possible to compliment it with a free physics engine e.g. Box2D, or the programmers can write their own game engines. Objective-C is only used for iOS, and to pick it up the developer should preferably have quite advanced programming skills. Otherwise the learning curve might turn out to be too steep. Tony, eVp, and Adriaan's partner BE programmed in Objective-C. Tony also experimented with Unity 3D, which is the tool Madpoet and Adriaan used, and Sterling made his game with Corona SDK. Unity 3D and Corona SDK make it possible to program the game using scripts. Both of them come with built-in physics engines. There are very active developer forums for both Unity 3D and Corona SDK, and it is easy to get help from other developers in coding problems. One issue with Unity is that it is optimized for 3D, and it is rather slow for 2D games. Also, if most of the code is for the interface, as in Adriaan's game, Unity is not an ideal tool. Both Unity 3D and Corona SDK sell licenses, whereas Objective-C is part of the Apple SDK and is included in the developer license. Objective-C is also available for free for those who only want to learn to program and not put their app for sale:

> Unity required you to pay 1 000 dollars a year for stripping the code. The low cost version creates what you want, but it's very big in terms of how much space it takes up. The code stripping in the pro version will take it back to small again. I try to do this on a budget, so I did not want to keep doing that [pay for the pro version], and the fourth game gave me the option to go back into doing Objective-C. (Tony)

Size matters, as big applications can only be downloaded over Wifi, which is a technology that allows an electronic device to exchange data or connect to the Internet wirelessly using radio waves. Originally the limit was 10 MB, in March 2012 it rose to 50 MB (appleinsider 03.07.2012), and as of September 2013 it has been 100 MB (TouchArcade 09.18.2013). If the game is smaller than 100 MB it can be downloaded using the device's 3G/4G telecommunication network, which makes it possible to buy it on the go. This is important, especially if the game's main marketing channel is word of mouth. When a happy user shows his new cool game to a friend on a school bus it must be possible to download

the game instantly. If the potential buyer has to wait till he is at home and has access to Wifi he might change his mind and not buy the game after all.

Most of the developers in this study made the graphics by themselves using Photoshop and other programs they were familiar with from previous projects outside of game development. Some also mention royalty-free images. The same applies to sounds and music: some made their own sounds and music, and others experimented with royalty-free or low-cost sounds and music.

The developers and their partners mostly took care of level editing. Some developed a specific level editor program for this purpose, but levels were also made with paper and pen. Caroline designed her levels for Sterling's games on a piece of paper, and Sterling transformed them to actual game levels. Two of the developers incorporated user-made levels. When customers were able to make their own levels, they were effectively tied to the fan-base (Sotamaa 2009, 105). When the users showed their own levels to their friends, this increased word of mouth. The free version of eVp's game comes with infinite levels generated by an algorithm.

The developers and their partners, or some friends, mainly carried out the testing, but Tony recruited testers from a beta-tester community. The beta-tester gets a password and downloads the game for free. He then plays the game and reports any bugs. He can also give feedback and suggestions on things that are not actual issues but that would in his opinion benefit from editing. For this effort he is incentivized e.g. with free copies of the developer's other games, or iTunes gift cards.

Marketing the game

The monetizing models the developers in this study use include free, free with ads, freemium *(*=in-app purchase for additional content), and paid upfront (also called Premium or Pay per download). None of the games are free-to-play (f2p) with a sophisticated monetizing design. eVp and Tony discuss this option at length but conclude that even though f2p dominates the charts at the moment, it is not really an option for a hobbyist developer. A f2p game has to have hours and hours of content, and this is too much to accomplish for a solo developer. They also take up the ethical consideration: even though the majority of gamers play f2p games for free, the ones who choose to pay are easily sucked into spending way more than they can afford. eVp even thinks that the f2p monetizing model distorts the pace of the game and makes it boring. Nevertheless, f2p is not something a hobbyist developer can ignore: it might not be suitable for him, but it still affects him as the predominant monetizing model in the iTunes App Store. (interviews with Tony and eVp.)

Pricing is an important decision in every business. However, in the iTunes App Store pricing decisions differ from many real-life arenas where one must consider things like raw materials, production costs, and transportation to name a few. A hobbyist developer in the Apple App Store might make the game using his old home computer. He might do all the programming, graphics, sound, and so on by himself, or he could have a deal with his partners that nobody is paid for their work, and instead they get their share of the eventual sales. That would mean that investment is in terms of time, and the only cost involved is

the developer license. That being the case, the developer has very little fixed costs, and he can freely experiment with the pricing decisions to see how they will affect the sales mechanics:

> You drop your price by, you know, to a third of the original price, and by magic every time you get triple the sales, and your revenue stays exactly the same. … But there is one thing to learn here though: when I dropped to one third of the prize, the sales in the United States doubled, so I was making a net loss in the United States. In Germany, though, the sales went up seven times, and in Italy they exploded to twenty times the original sales. So, it's different in each country. I mean, this is because some countries are poor, right? Or at least more price conscious. So, being able to set the price points by country would be great, but Apple doesn't allow that. (eVp, on a video in 2009)

Although price drops in general do not seem to generate extra revenue, there are still points when they could be very beneficial. If the app is close to making the top-100 list in any of the regional iTunes App Stores, it might be a good idea to put it on sale to drive the sales so that the app makes it into the top-100 and becomes visible on the device[36]. Since 2009 price points have come down. Most of the small games now are free or go for $0,99. The price changes take a form where the game is offered for free for a while to get visibility, and then the price is put back to the original $0,99. However, this is not as effective in terms of boosting the paid app on the top lists, since paid apps and free apps are featured on separate lists, and the free downloads do not directly improve the paid version's list position, only its visibility.

Sterling is the only one who started with a free game. For him, being able to make a game was an end in itself. He did not make the free game to promote a paid game. He was overwhelmed by all the media coverage he received and believes that in the long run the positive effects of the free game surpass the returns he could have received from a paid game.

For half a year eVp had a free version of his paid game to drive the sales of the paid version (that is how freemium worked before in-app purchase was possible). When in-app purchase later became available with an iOS update, eVp incorporated it into his game - one of the few decisions he made based on prediction. Before making the decision, eVp did his research and found that about 5% of his customer-base used devices that were too old to be updated to the newest operating system. If the game were to be updated to allow in-app purchase, these 5% could no longer get the free version. eVp figured that loosing this 5% was not too high a price to pay for the option of having in-app purchase, which could potentially raise the conversion rate from free version to paid version by 50% (eVp, an estimate).

What he did not take into account was how the decision affected the game's ranking on the top lists (the instrumental goal). The free version dropped from #50 in the US iTunes App Store, slid off the top-100 list, and as a result disappeared from the iTunes App Store on the mobile device. The loss of visibility caused a huge decline in downloads. The paid version took an even

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36 At the time of the interview the top-100 apps were displayed on the device, but now it is the top-150.

steeper dive: since in-app upgrades are not registered as sales on the charts for paid games, the ranking of the paid version plunged. A small decision ended up costing over $50 000 (eVp, again an estimate) in the long run. This is not to say that in-app purchase is not a good choice, it just reminds of the importance of correct timing: never try something irreversible, when your list position still has an upward trajectory.

Adriaan and Sterling did not have in-app purchase to begin with. Adriaan was at first reluctant, because he believed that the magical moment with his game is when hand touches hand, and if the player already gets that in the free version then why would he upgrade just to get new levels. These thoughts are in line with eVp's view: he points out that the difference between the free and the paid version of a game must be carefully designed in order to create an emotional need to upgrade. Otherwise, the free version might end up cannibalizing the paid version. However, when Adriaan finally released a version with in-app purchase, he was surprised how well it accumulated revenue. The lesson learned: it is hard to predict the customers' reactions; sometimes they do not see the value of the app the same way as the developer does. With his second game Adriaan switched much quicker from paid model to freemium model. Also Sterling changed his business model from free to freemium. He later introduced a paid version of the game, but the freemium model generates more income than the paid-upfront game. It seems that the customers expect that with mobile games there should always be an option to try the game first for free: they will upgrade to a paid version, and only if they are satisfied with the product.

Updates are something every developer must make to fix bugs and keep the apps available when Apple updates the operating system. However, updates are also a powerful marketing tool. Some games in the iTunes App Store are updated almost weekly to keep the customers hooked (Dave Castelnuovo in Experimental Game Dev Podcast Show 06.06.2010). The developers in this study do not update their games that frequently, but they all agree that updating new features, new levels, new content etc. is fundamental to keeping the game on the customer's device for as long as possible:

> The longer you get the user to play, the more of a chance there is that somebody, like their friend or sister or brother or parent, are going to see and go: "Hey, that's cool, I like that! Where did you get it? What is this? What's it called?" … definitely with kids, you know, they'll go to school the next day, and it will be like: "What are you playing?" And they'll say: "I have this new game, check it out". (Madpoet)

All the informants use a third party application to follow sales. They knew how many copies were sold in each country, how the sales were on a Saturday compared to a Tuesday, what the effect of a review was, and so on. Madpoet not only followed his own sales, but he also monitored how the game genres he might want to target were doing. Still, the developers mainly followed their statistics to satisfy their curiosity and to get joy, not because they needed the data to make important decisions. However, for his customer work eVp used more sophisticated analytics, like Flurry, which are based on tailorable data:

> Well, [I used it] for personal pleasure! There were a couple of sort of decision points that were based on the statistics. I think mostly, really, it did not have any higher

> meaning. You can see you are making sales, yei! You can see that, if there is a blog article, your sales go up, but you don't really need that information, you know it's going to go up, right? There is more exposure, what follows is more downloads. (eVp)

Adriaan planned and built the web presence for his company in advance. He had a blog in which he shared the development process, and later the blog was integrated into the company website. He published *post mortems* of his games, that is, he shared detailed accounts of the development process, the main decisions he made, and their effect on the sales and revenues. Also eVp was very open about the game revenues and reflected on his mistakes on videos, which are freely available in the Internet. This seems to be a small cult thing going on: there are several indie developers who share similar reflections with the developer community (see e.g. Liu 2013). Although other informants in this study did not share their metrics, they still have a traditional company/product website.

YouTube was also actively used. There were two types of videos the developers shared: how-to-play videos and trailers. Also the fans of the game upload video reviews depicting the game mechanics. There are thousands of videos on eVp's game on YouTube, but only a couple of them are made by him or by a team member. The trailers are promotional videos specifically designed to market the game. For Adriaan the trailer videos were very important, not only as marketing tools, but also as a means that helped him to define the visual style for the game:

> That was the vision we had from the start. But it is really difficult to go from that vision to something concrete as the visual style. ... one way to do that is actually to think of the game as a whole, and also think of how the players perceive the game, and … to think how you would actually make the trailer of the game. … I had a friend who was making videos already, and I asked him, let's do this promo video, while I was still working on the game and hadn't finished it yet. We came up with some cool ideas, and those videos really turned out to be super nice. (Adriaan)

YouTube videos uploaded by the fans of the game depict one form of community building, especially when the developer participates in the discussion. On top of that, community spirit and even fan culture can be enhanced on different user forums. Also Game Center offers some functionality in this direction. Nevertheless, none of the developers in this study incorporated Game Center to their games. It presumably makes the game "slow and clumsy", and the developers thought that the upside from the integration was not big enough to compensate for the downside. Tony, Madpoet, and eVp mingled with their audience on Touch Arcade forums (more on eVp & Touch Arcade in chapter 8, The Team). Tony mainly discussed with other developers, but he also published updates whenever he released a new game.

With his first game Madpoet posted a thread about his game when it was available in the iTunes App Store, but for the next game-to-be he opened the thread already in fall 2011. He writes about the game project, posts pictures and videos of the work in progress, asks for peoples opinion, and so on. His aim is to build a following for the game in advance, so that when it eventually will launch there is already an audience for it. By July 2013 the thread had been

viewed over 9 000 times. Also Adriaan has an account on Touch Arcade, but he has not been active there; his target audience differs so much from the stereotyped forum nerd that he sees no point in attending the discussion on Touch Arcade.

Sterling's forum was Corona; there he announced his game releases but seldom engaged in further discussions. He has a direct channel to his fans through community levels: he reviews each community level, which is submitted to him, and gets at the same time contact information. Sterling also tweets about his game. All the informants have a Twitter account either with the game's name or with the company name or both. However, only Adriaan and Sterling are active at the moment. Madpoet and Tony probably will pick it up again if they release new games, but for eVp his game's Twitter account is likely to remain as silent in the future as it has been for the past 3 years. He has moved on, and is not actively promoting the old game, although the long tail is surprisingly effective, and even after 4 years the game still generates some revenue. It seems that each developer in this study has found some channel, be it YouTube, Twitter, or different forums that allows him to have reciprocal contact with his audience.

Adriaan prepared a professional press kit and sent it to more than 300 websites. Others are more skeptical about the effect of press releases. Tony believes that building a relationship with just some journalists might be a more effective approach, and Madpoet wants to concentrate on a handful of review sites and on whatever publicity he can get from newspapers, TV, and radio. eVp was scouted by the journalists already before the ADA, but winning the international competition certainly helped him get attention. Sterling had an avalanche of media coverage from national TV to the Wall Street Journal. All this free publicity was welcome, since none of the developers were willing to invest in marketing.

Some of the informants used promo codes, that is, gave away their game for free in the hope that the recipients would write reviews or post YouTube videos of the game. With a promo code, though, it is not possible to post a review through the official iTunes review. If the developer had more than one game in the iTunes App Store, he attempted to cross-promote them. Also promotional sites like App of the Day were used to some extent. There are several of these sites, but the basic idea is the same: a premium game is offered for free for one day to increase its visibility.

However, they all agreed that the most effective marketing tool is getting an Apple feature in the US iTunes App Store. It was something all the developers hoped for, but which only Adriaan and Sterling managed to get. Apple is unpredictable and hard to influence in its choices. Most of the developers just waited to see what would happen, but Adriaan actively approached Apple with his press kit, and Madpoet believed that making regular updates on the game might have an impact on the algorithm, which prompts Apple in its search for something to feature. There is no evidence that either of these approaches actually had any effect.

A table of the making of the games, and the different marketing moves taken by each developer, can be found in Appendix 4.

6.2 Structural analysis

In the following section the actions of the developers are visualized with diagrams, which are inspired by Greimas's actantial model (Greimas 1966, 207). A game metaphor is adapted: the narrative trajectories of each developer are split into 2 - 3 levels, which depict the competition between the narrative program and its anti-program. The outcome of one level becomes the sender of the next level. The helpers are arranged according to effectuation principles. The acquired helpers are seen as inventory items, and they are listed only in one diagram, unless the way in which they operate changes on the next level.

6.2.1 Adriaan's gameplay

Adriaan's developer career started in a school project where a team of 10 students had to develop a game for a big touch table. The narrative program was to develop the game, and its anti-program was failure to finish the game. Opponents, which were jeopardizing the objective, were uncommitted team members, and the fact that Adriaan was recovering from exhaustion and hyperventilation. Adriaan was the subject, but he was also his own opponent (health issues) and helper (who I am and what I know). He overcame the health issues by taking classes in breathing techniques and by restarting exercising. BE and TH proved to be valuable helpers, and together they were powerful enough to make the narrative program prevail, which lead to an unpredicted outcome that catapulted Adriaan to the next level. Figure 18 depicts Level 1.

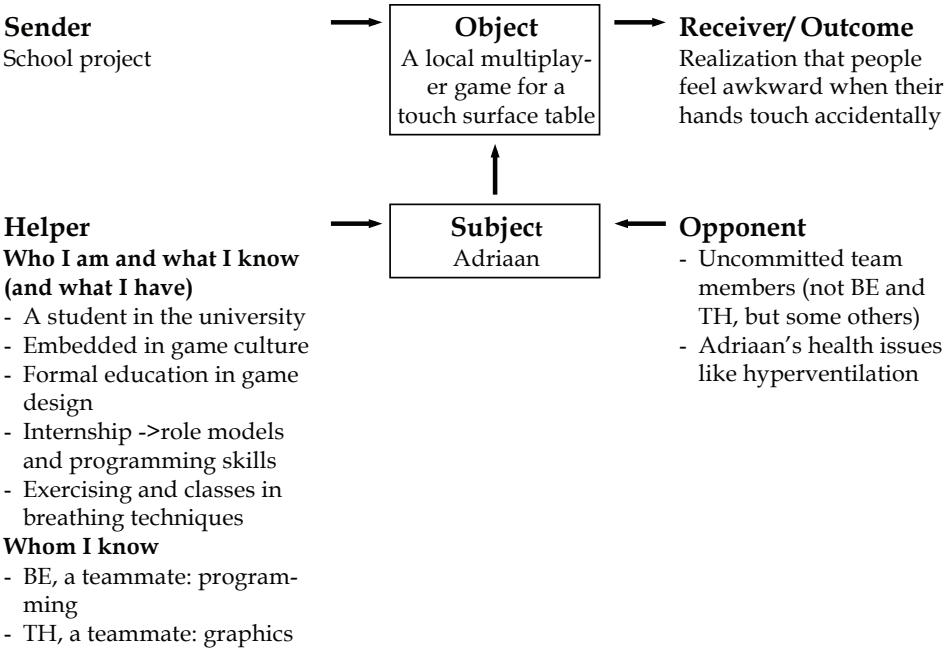

FIGURE 18 Adriaan, Level 1 – The School Project

On Level 2 (figure 19) the narrative program was to develop a paid iPad game based on the notion that people feel awkward when a hand accidentally touches a hand. Adriaan's personal attributes and all the valuable stakeholders he managed to attract into the project offered a good starting point. Still, there were powerful opponents, which had to be overcome.

Unlike the other developers in this study Adriaan did not have a Mac, and he needed money to buy one. Also a developer license was needed. Most of all though, he needed lots of time. He felt that both the money and the time were an affordable loss: as a student he was used to getting by with moderate means, and his time concept was flexible:

> There is not so much to worry about being a student in [my country], as the education is relatively cheap and grants you a lot of spare time… We did not have serious money issues and we did not have full-time jobs that made us work around the clock. (Adriaan)

During his internship Adriaan learned to program on Unity 3D. He made the first prototype for the game using Unity 3D, but it soon turned out that Unity was not the correct tool for the game. BE then built the prototype on an engine he had designed for a previous project (bricolage). The visual style for the game was the next obstacle. The first artist failed to capture Adriaan's vision, and graphics were put on hold for months. At school Adriaan studied game art before shifting his major to game design, and he decided to make a draft himself. Another friend, TH, finally polished the draft to perfection.

Adriaan and BE started as hobbyists, but pretty soon it became evident that in order to sustain the narrative program they would have to start a company. Adriaan's parents are entrepreneurs, and his father helped him with the practicalities and by suggesting the company form "which is the most expensive but also the safest". In order to be able to pay the required equity Adriaan and BE had to take a loan. They managed to get two more partners involved in the venture. These new partners did not invest in terms of money but shared their experience and gave advice.

The game still needed to be finished and all the marketing moves had to be prepared. Adriaan had no previous experience in marketing, but he got help from two other game developers, and two journalist friends helped him with the press release. Another friend made a promotional video. All this took longer than expected, but during those 6 months Adriaan never doubted that the game was doable:

> All these things were perfectly possible because nothing outside of our reach was pressuring us. (Adriaan)

> Seeing how much effort everyone had put in at the end of the line, doing most of the things ourselves would not only have been stupid, but also impossible. (BE)

Level 2 ends when the game is sent for the review process. Level 3 already depicts professional play and is discussed in chapter 7, Going Pro.

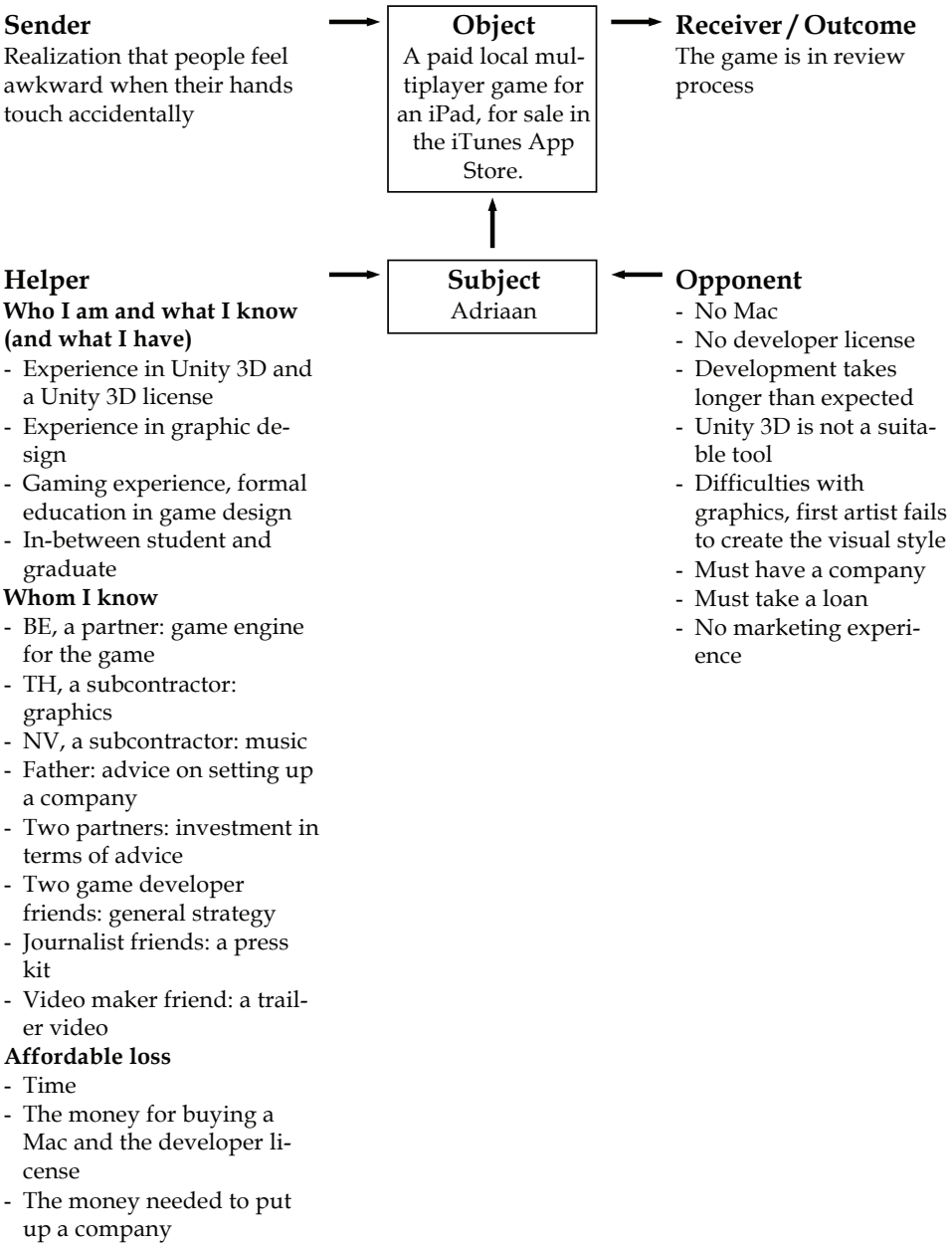

FIGURE 19 Adriaan, Level 2 – First Game Ready for Review

6.2.2 eVp's gameplay

In fall 2008 eVp was at a crossroads: he was about to return to university after a 15-month extended summer job. However, as a longtime Mac user he was aware that the Apple App Store had opened for third party developers, and this flung him along a hobbyist game developer trajectory. His personal background was full of helpers: he had a Mac, knew some programming languages, and was good at hacking code, even though he did not know the language. He enjoyed creative challenges and was competitive. By teaming up with Tabus he was able to beat two opponents: the fact that he did not have experience in sound production nor tools for it. During his study leave he had saved some money and felt that he could afford to pursue a developer career for a year.

The technical obstacles were easy to overcome. A bigger opponent, potentially endangering the narrative program, was the university: could eVp allocate game development all the time it took if he continued his studies? He ended up slowing down the development speed by taking some courses in software law. This decision proved to be a valuable one when he later happened to provoke a strong opponent. The game concept was inspired by an existing real-life coin-machine. Before really putting a lot of effort into developing the game, eVp checked that the association that held the national gambling monopoly did not have a trademark for the name of the game. He figured that there should be no barrier for making an app remotely resembling the original coin-machine. The association disagreed. Instead of backing up after being faced by the threat of this Goliath of an opponent, eVp decided to continue. In this fight he got help from his law professor. The episode was later settled out of court.

On Level 1 (figure 20) there was a constant competition between the narrative program and its anti-programs: first securing the necessary resources, then deciding on time allocation, and finally facing the threat of being squashed when the game was already selling well in the local iTunes App Store. The level ends ambiguously: the game becomes #1 in the local iTunes App Store, but fails to attract a global user-base.

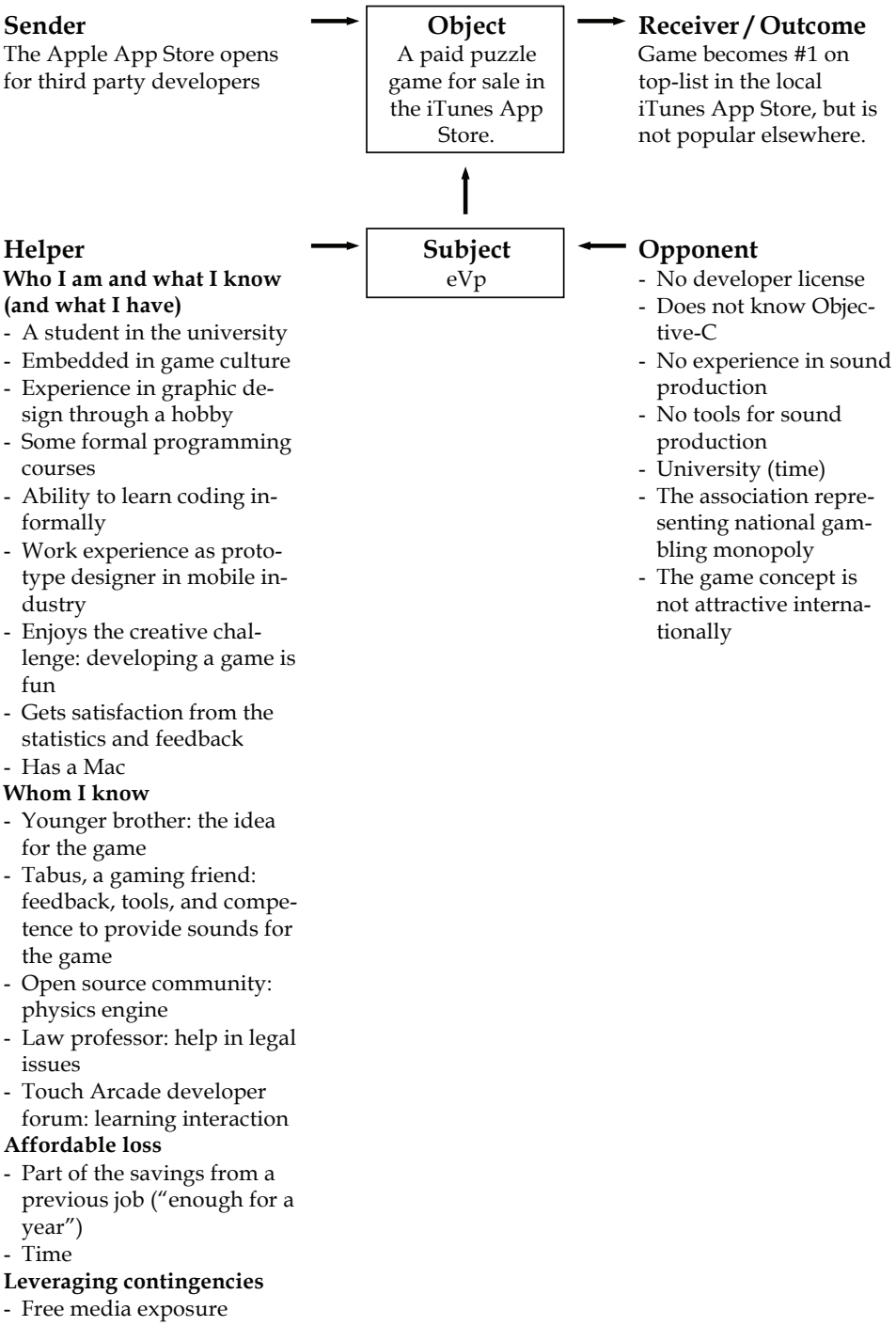

FIGURE 20 eVp Level 1 - First game becomes a local success, but fails to reach global audience

On Level 2 (figure 21) eVp knew that he and Tabus could make a polished iPhone game and decided to develop a puzzle game for a larger audience. He had a hard time convincing Tabus that the new game concept was viable. He kept on developing the game on his own, knowing that the time it took, was a loss, if Tabus did not join. The anti-program almost took over in the very beginning, but when Tabus finally gave in he ended up contributing even more than eVp had bargained for. Tabus recruited his old friends to make music for the game, and unexpected help came from Stephen, a fan of eVp's first game and a truly self-selected stakeholder. Level 2 was very enjoyable for eVp: he got pleasure from the creative process, but he also found that mingling with the crowd on Touch Arcade was fulfilling, and keeping track of the download statistics added suspense to the pursuit.

Even this second game had an element of creative copying, and eVp anticipated that plagiarism claims might arise. This fear never really materialized. The university still was an opponent, although the anti-program, where eVp would return to a full-time student and give up game development, had already started to fade. A new prominent opponent emerged when LT talked eVp into founding a company in a field other than game development. Time became a scarce resource when it had to be divided between developing games and working for the company.

The level ends in euphoria: eVp's game wins the Apple Design Award in Student Category, and Level 3 opens with lots of options, which are covered in chapter 7, Going Pro. Although eVp was the central actor in the development process of this second game, also the voices of the helper-actants deserve to be heard some more. That is why chapter 8, the Team, looks closer at the actions of Tabus, O&J, Stephen, and the user community on Touch Arcade.

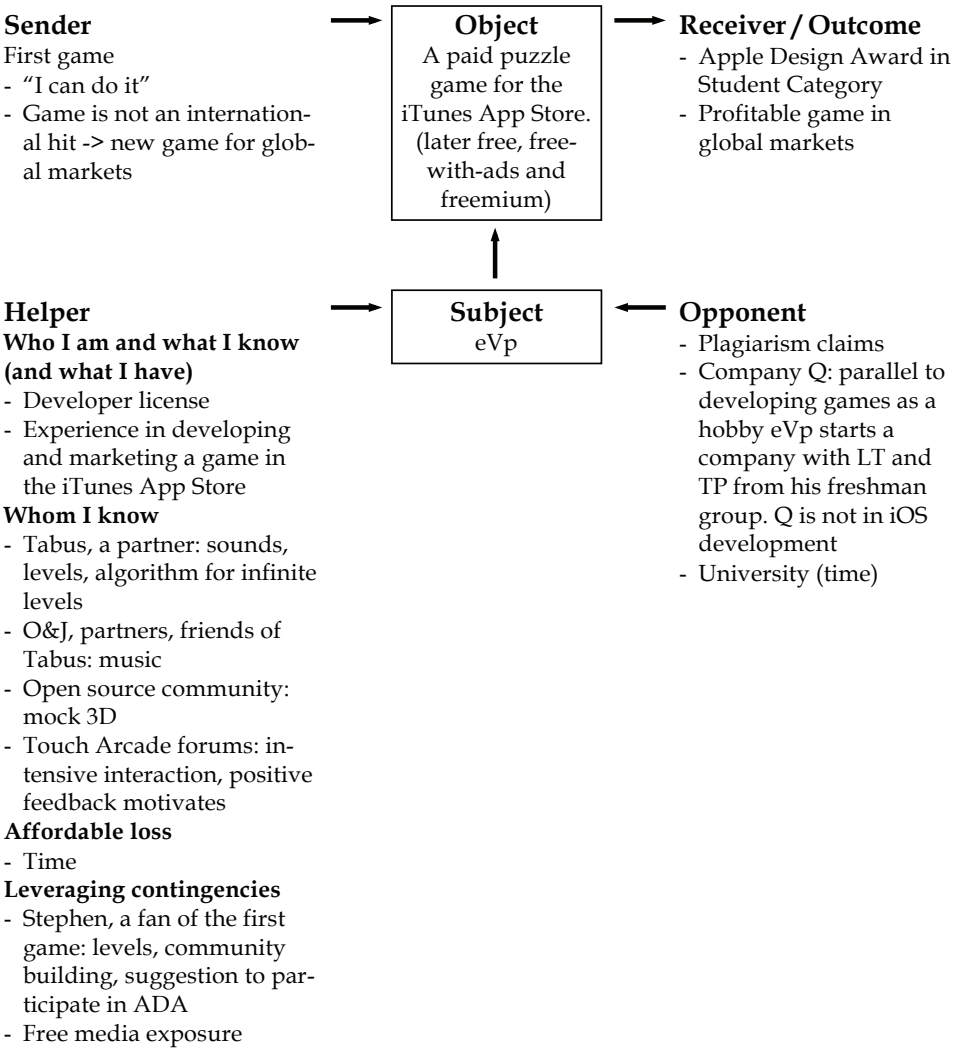

FIGURE 21 eVp, Level 2 – Second game strikes gold

6.2.3 Madpoet's gameplay

Madpoet was a freelance illustrator and animator, who had used Macs for years, and was exposed early to the opening of the Apple App Store. He used to program in the 80s, and always wanted to make games. However, he felt that his programming skills were not adequate, and he started to look for partners through Craigslist and Unity forums. These attempts yielded some cooperation, but nothing really panned out, and for a year it seemed Madpoet would not develop a game. This changed when he decided to rely on the competences he already had and the ones he was able to learn. He picked up Unity 3D. This brought programming closer to animation, which he already knew.

He was thrilled when he was able to create a game by himself. He contacted Experimental Game Dev Podcast Show and got two interviews. He also frequented Unity 3D forums to get help with programming issues and Touch Arcade forum to promote his game. Buying the developer license, spending time learning programming, and creating the game were affordable losses. On the upside was some revenue, but the main plus was the fun of learning to solve creative puzzles, of following statistics, and meeting with people interested in game development. At the end of Level 1 (figure 22) Madpoet has learned a lot, has had a lot of fun, and has added a new color to his freelancer palette, but he still believes that it would be more satisfying to have a partner to work with.

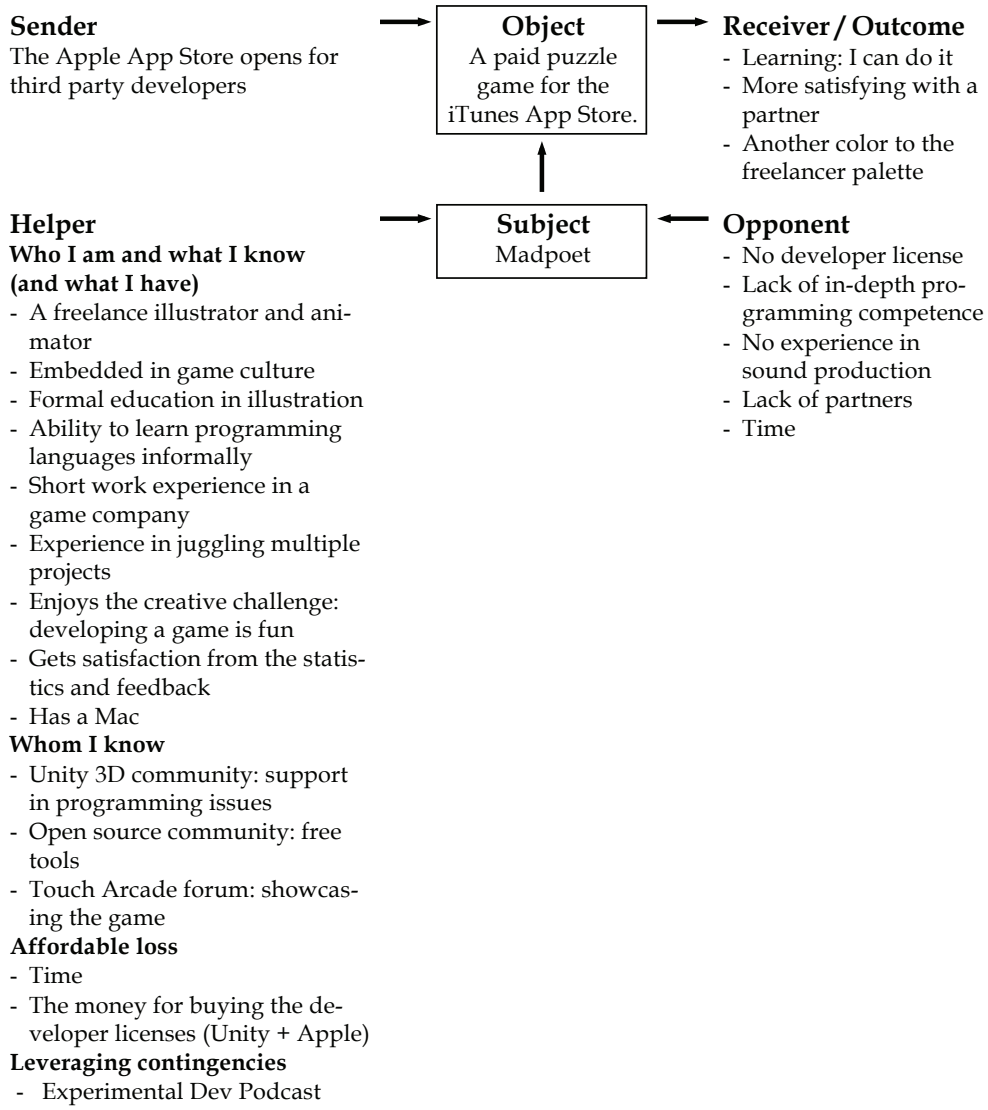

FIGURE 22 Madpoet, Level 1 – First game is a learning process and adds a new color to the freelancer palette

On Level 2 (figure 23) Madpoet was propelled forward with the conviction that he can make a game. He partnered with a friend of his wife's to make a children's book. The book sold better than the first game, but its new age content threw off some customers. Madpoet was ready to explore something more complicated than a simple puzzle game or a picture book. He started a big multiplayer game, and opened a thread on Touch Arcade with the aim of building a fan-base for the game as it was being developed (Autio et al. 2013, 1354). The job was bigger than he had anticipated, and 2 years later the competition between the narrative program and the anti-program still is a tie, and the outcome of Level 2 is unclear. It might be that Madpoet gives up, and the anti-program wins. Or it might be that Madpoet finishes his game and it becomes a hit, or he finishes the game but it flops. Luckily Madpoet is able to continue to Level 3 in any case: parallel to his self-published work he has leveraged his competence in game development to customer work. This will be covered in chapter 7, Going Pro.

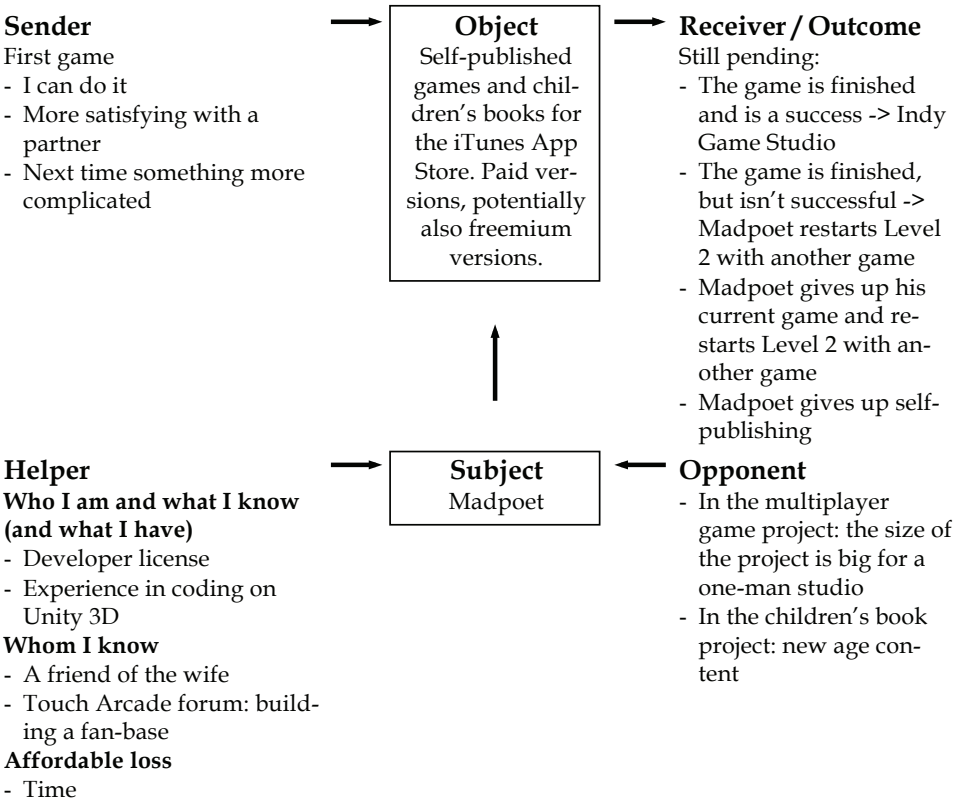

FIGURE 23 Madpoet, Level 2 – Partnering, exploring more complicated game ideas, and building a fan base. The level is not yet finished.

6.2.4 Sterling's and Caroline's gameplay

Sterling was a 14-years old schoolboy with a passion for computers when a friend's father started him on an adventure that would change his life. When Sterling heard the suggestion that he should make a game for the iOS, he first thought of all the reasons for why it could not be done. Nevertheless, he set out to explore the option. From a very early age Sterling had gone to the library with his mother. His first instinct therefore was to go to the library and find books on Objective-C. The family had a Mac, and Sterling could start experimenting with the code. It soon turned out that the learning curve was too steep. However, the seed was there, and when Sterling later accidentally bumped into a discussion on Game Salad he decided to give game development another try.

He made progress with Game Salad but still was not quite satisfied. On one of the forums he heard about Corona SDK and finally found his tool. He still needed a helper: as a teenager he was not old enough to register an Apple developer account, and there was the question of money for paying the licenses. Sterling's mother Caroline was willing to help. She had always been very supportive and wanted to promote her children's learning. She agreed to read the developer license, register the account, and pay for the developer license and the Corona SDK license. What is more, she also took an active interest in the development process and started to design levels for the game. Later she was the one to suggest that Sterling should compose a fanfare sound to indicate a winner.

There still were points when the narrative program could have failed. Sterling defined his game concept and started to code the game in Corona. At first he made progress, but he realized later that the approach he had assumed was not scalable. At this point he had already showed some of the early levels to his friends at school, and their enthusiasm convinced him that he should try and overcome the programming issue. Another obstacle he faced was that Apple announced the review process would have a Christmas break, and the game was not even close to finished. The opponent turned into a helper when the closing of the store gave Sterling motivation to work even harder on the project to be able to finish before the break.

He missed Christmas by a couple of days, but the timing proved to be perfect: when his game was released, the people already had their gift iPhones and iPodTouches and were eagerly searching for something to download. Sterling's free game dominated top-lists. It was featured by Apple, Corona forum, Touch Arcade, and Experimental Game Dev Podcast Show. It also gained publicity on local and national print media and television.

When Sterling started his project his only motivation was to see if he could develop a game. He had no intention to make money with the game, that is why it was released free of charge. At the end of Level 1 (figure 24) he has millions of downloads and huge publicity. It is time to think how this success can be turned into income.

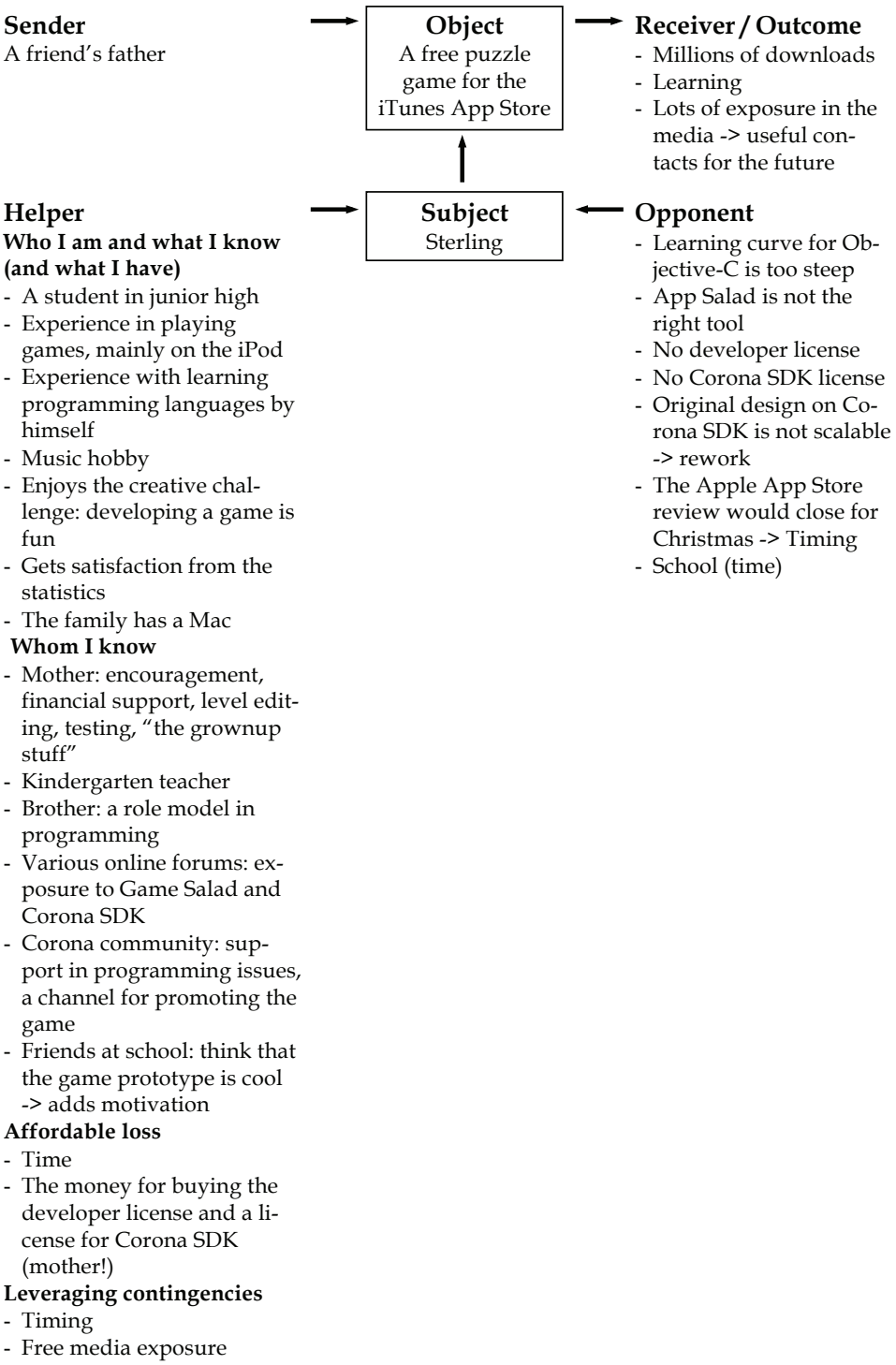

FIGURE 24 Sterling, Level 1 – First game, an instant hit

On Level 2 (figure 25) Sterling leveraged the unexpected fame of the free game. His first step was to add in-app-purchase to the game. He later offered a paid version of the game. He still had to balance between school, other hobbies, and game development. It helped to have mother as a partner; Caroline co-designed the levels, founded a company, and had control over the project as a whole. Caroline thus was a helper, but she could potentially have turned into an opponent if their views of the desired course of action had differed.

That did not happen. They agreed to include community levels to the game. This meant that users could create their own levels and submit them for review. Involving users in content creation helped to make them committed, but it also opened a direct channel between Sterling and his customers. Sterling played all community levels before accepting them. He even made videos of each submitted level. However, he never attempted to take full commercial advantage of community levels, e.g. he did not publish the videos to create a buzz around the game. For him the actions around community created content were more valuable as a source of fun than as a way to promote sales. At the end of Level 2 Sterling has turned his hobbyist project into a source of income, has a wide network of important contacts, and has gained credibility.

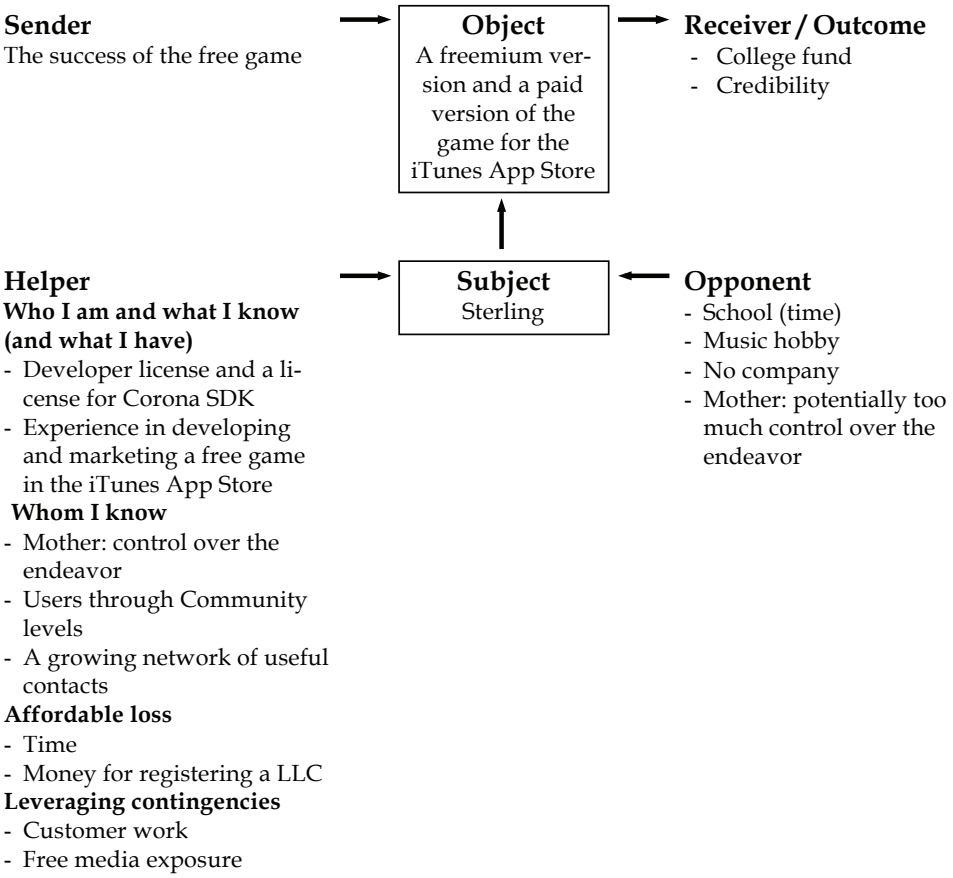

FIGURE 25 Sterling, Level 2 – An update in the monetizing model

In the previous figures Sterling is the subject-actant, and Caroline is a helper. What if the story was told from a different point of view? In order to have a closer look at the motives of this important self-selected stakeholder, figure 26 depicts Caroline as the subject. The object was to let Sterling do what he is good at. Caroline's strategy was intelligent altruism, which is not necessarily assumed in effectuation, but which, nevertheless, often is a rational choice (Sarasvathy 2004a, 522; Sarasvathy & Dew 2008, 729). Her actions were neither opportunistic nor completely unselfish. She got personal pleasure from helping Sterling pursue his passion and from playing with him as she had done in his childhood. It helped that game development also turned out to be profitable, although making money was not her initial goal. Participating in the project opened up an opportunity for Caroline to meet interesting people and get satisfaction from it. Paying the licenses and giving her time were affordable losses.

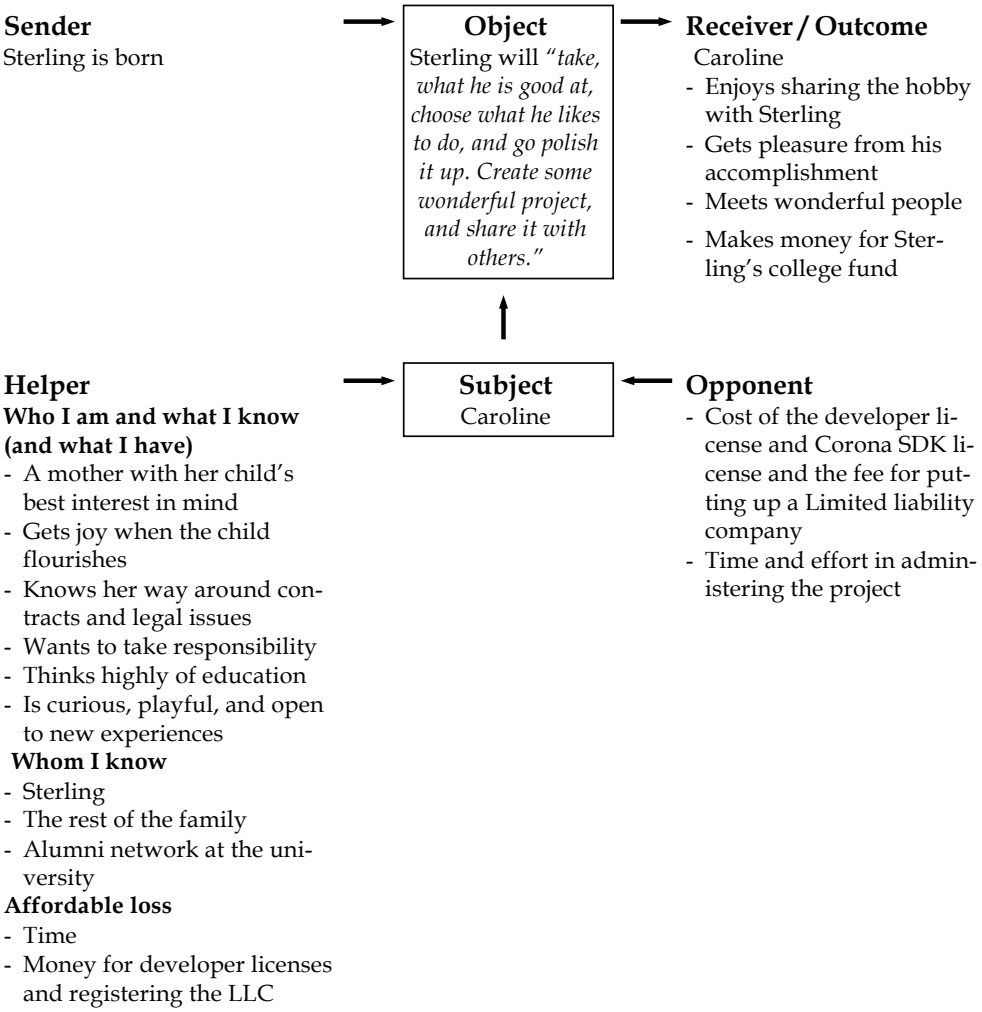

FIGURE 26 Caroline – From Helper to Subject

6.2.5 Tony's gameplay

Tony was bored with his work. Instead of taking a sabbatical, which he had done twice before, when he needed a break, he decided that this time he would bring suspense to his life by starting a side business. Remote controlled tanks, which people could drive over the Internet, seemed like a fun thing to do. Pretty soon he realized that fixed costs for tanks were too high, and it was difficult to create a viable monetizing model. When the Apple App Store opened for third party developers he thought that instead of playing with concrete toys he could develop a digital game. As a long time Mac user he picked up the opportunity early. His academic background in programming made it easy for him to learn new programming languages, thus the fact that he did not know Objective-C was an easy opponent. He was an experienced gamer, and had used game engines in his work.

As his first project Tony chose an old game concept, which he turned into an iOS game. He did not have any partners. This was an opponent, because he did not have skills in graphics design and music design. He overcame the obstacle by using open source graphics, sounds, and music. He was a loner, and did not need partners as playmates to enjoy the process. On the contrary, he felt that alone-time was invigorating and helped him cope with the obligations as a father and a spouse. He did not seek company on the forums and seldom posted any questions. All he was looking for was information, which was there already, as many other developers had experienced similar problems. He got joy from the statistics; it was rewarding to see that so many people liked his game in Turkey.

At the end of Level 1 (figure 27) Tony has learned a lot and is confident that he can make a game for iOS. He decides to study game genres more and aims to target a popular game genre next time.

Tony had used a program for 3D modeling at work and thought that his next game should be 3D. He searched for good 3D programs and found Unity 3D. For that he needed a license, and buying it seemed like an affordable loss at the time. Although Tony attempted to make a game people would enjoy, the project ended up being something he enjoyed making, but few people liked playing:

> I'm definitely not my own demographic! (Tony)

Tony started to develop the next game. This time he chose a popular game genre and added a sci-fi theme. After the two first games he had realized that it was of fundamental importance to get a second opinion from somebody. He tried to convince his wife Linda, but iPhone development was not her hobby. That is why Tony sought help from a beta-tester community. His third game was much more polished than the previous two, but it still was not a hit.

The inspiration for his fourth game came from a real-life competition. He thought of a solution in which he could make use of his interest and knowledge in genetic algorithms. It took him almost a year to code the core of the application in Objective-C. He was no longer willing to pay the full license for Unity

3D, and with the light version the size of the program would be too big, hence a return to the free Objective-C. The core algorithm for attempting to solve the real-life problem was a solid one, but the game logic and the user interface of the game were made in a hurry. The next obstacle was that the game got stuck in the Apple review process for a month. When it was finally released, there were only a couple of months left before the real-life competition would close. However, even before that, it became evident that the game concept once again was too complicated and failed to attract the interest of casual gamers.

At the end of Level 2 Tony does not jump to Level 3. He still is a hobbyist. He explores game development for iOS from several angels, analyzes his own performance, and learns a lot but fails to gain momentum.

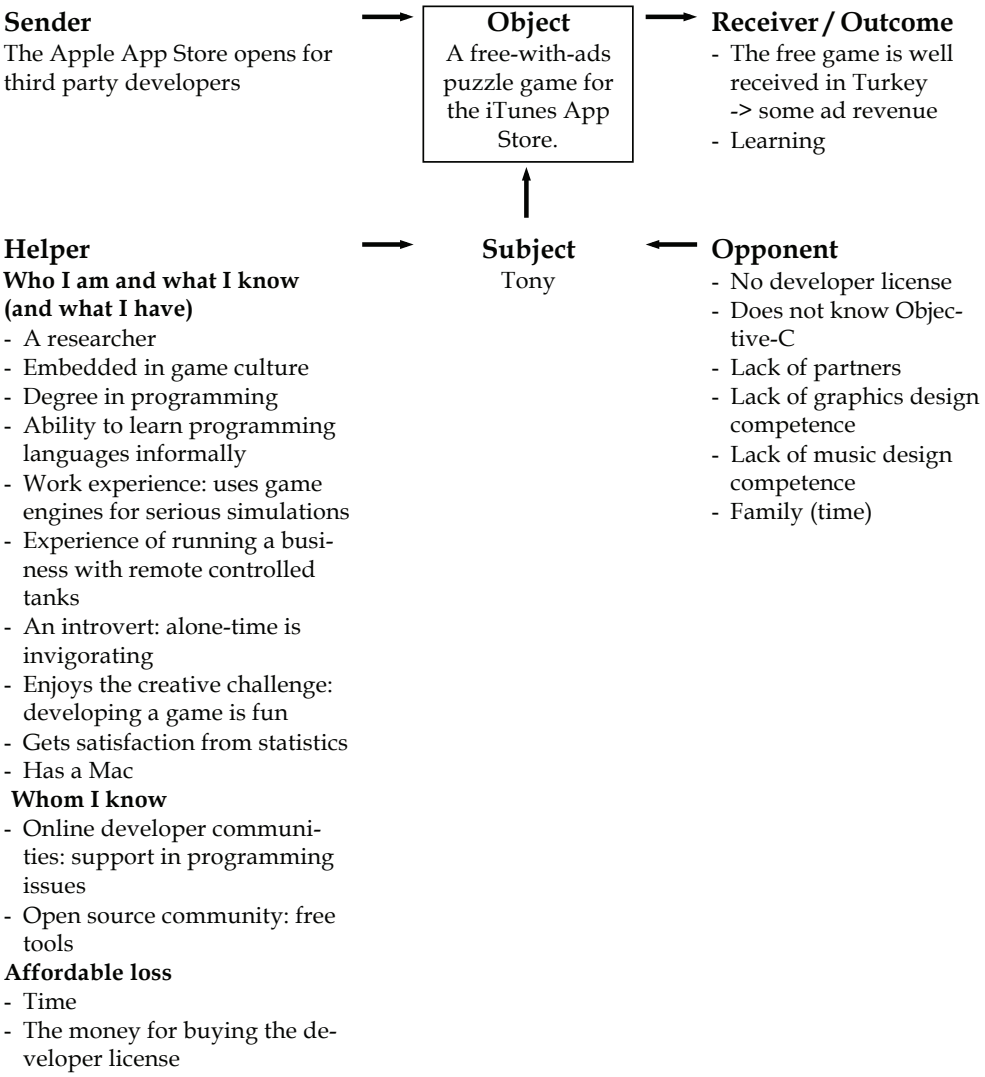

FIGURE 27 Tony, Level 1 – First game is a source of pocket money and a learning experience

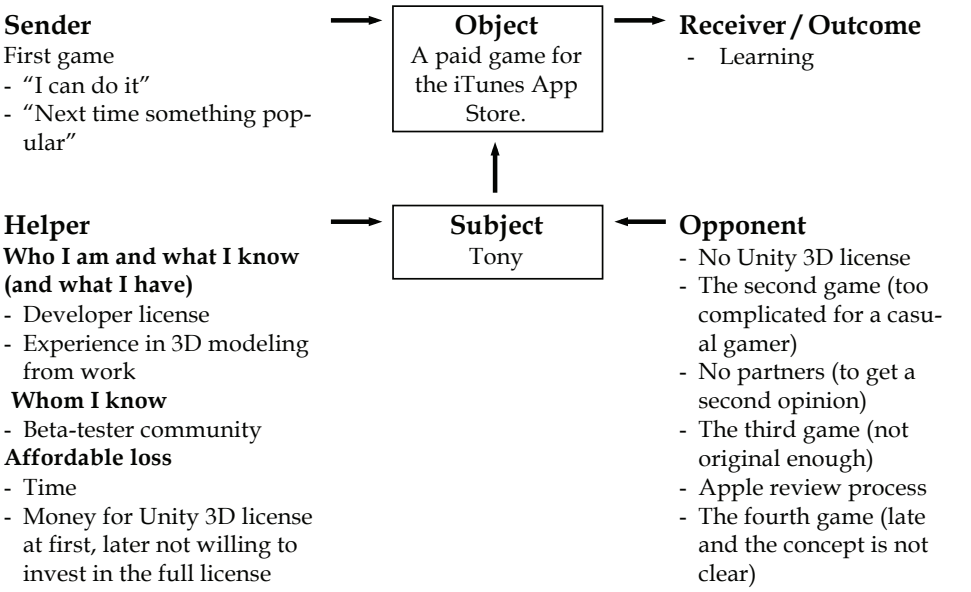

FIGURE 28 Tony, Level 2a, 2b, 2c (3 games) – Practice, practice, practice, no obvious progress

7 GOING PRO

The aim of this chapter is to find out how a hobby grew into a business. The different strategies each developer assumed are analyzed using the modified actantial model introduced in chapter 6. After that, the firm gestation process is discussed.

7.1 From the product to the firm

All five developers acted entrepreneurially in the sense that they created a product and accumulated some revenue. Nevertheless, the extent to which they were able to or even were willing to create a firm varies.

7.1.1 The Gamegardeners – Adriaan & BE

Adriaan and his partner BE founded the company GO before they had a finished product for sale in the iTunes App Store. Their process was the least hobbyist in this study. Once their game passed the review it was quite successful. It got an Apple feature, which coincided with a Valentine's Day update of the game. Adriaan and BE were able to leverage this unexpected luck, and the sales soared. As a result they could pay their loan and hire an office for the company. They seem to have put game revenue into a mental account labeled affordable loss. Otherwise it would be hard to understand how easily they decided to invest all the revenue into running the company. Getting an office in the Game Garden was a big helper. The Game Garden was not just a building; it also offered incubator services. Even more importantly, there were over 40 game-related companies in the building, and the atmosphere was supportive and invigorating. It was easy to find subcontractors in any field of game development. This was a helper and made it possible to assume a business model that is based on subcontracting rather than employing.

Adriaan and BE also got unexpected help from two competition nominations. The game received plenty of free publicity when it won the National Best Mobile Game Award; and nomination for The IFG Nuovo Award offered inter-

national visibility. Success in the competitions also gave satisfaction, which helped the team stay focused when there were technical challenges with the second multiplatform game. Developing it took longer than expected, and money from customer projects was a welcome helper, although at the same time lack of control was an opponent. Level 3 is still going on and the journey to a sustainable business takes more than 1,5 years. The company now has two truly original games on the market, and Adriaan's and BE's reputation as game designers helps them get customer work to get by on those rainy days.

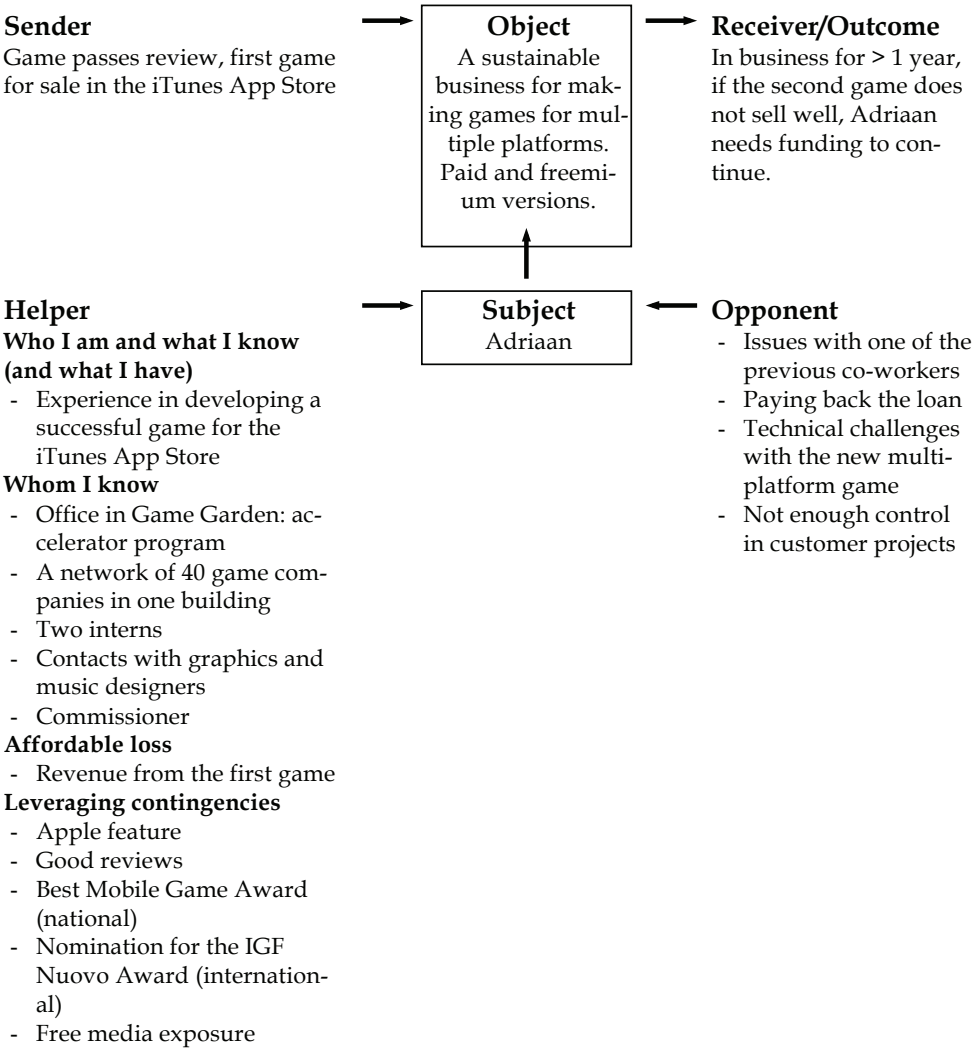

FIGURE 29 Adriaan, Level 3: Going Pro – An independent Game Studio

7.1.2 The prince with one third of the wrong kingdom – eVp & Company Q

The two competing narrative programs for eVp are presented next: the first one did not prevail, the second one did. After winning the ADA, eVp wanted to develop other games together with his team. He had experience of developing and marketing two successful games and enough money to manage for a couple of years. He enjoyed the challenges and was quite sure that quitting university was an affordable loss. He had managed to make some important contacts and had publicity in his own country. These helpers seemed powerful, but the opponents were even stronger. His old partners, most importantly Tabus, were not willing to start a game studio. Parallel to his game development hobby eVp had founded company Q (not in game business) together with two other friends. It was all too easy for him to leverage his personal fame for company Q and offer customer work in iOS development through Q, especially after Company F was willing to buy a major part of the work. As a result Level 3a (figure 30) never pulled through, and instead eVp slipped to Level 3b (figure 31).

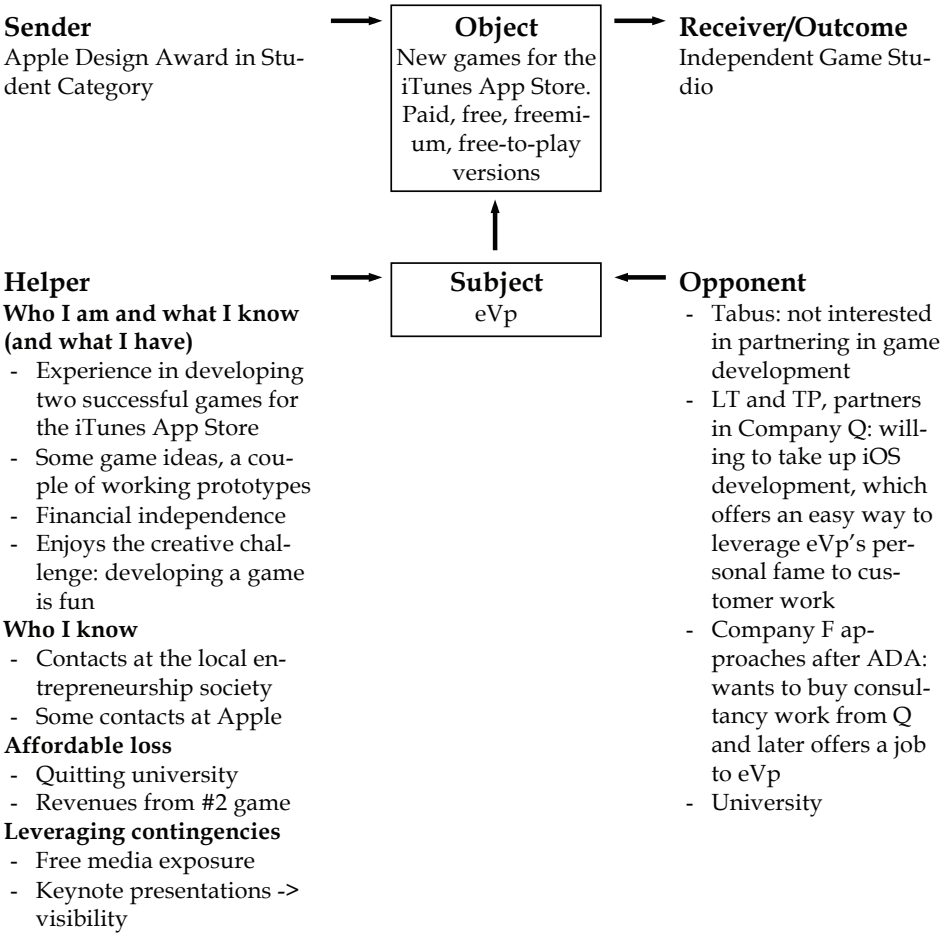

FIGURE 30 eVp, Level 3a: Going Pro – An Independent Game Studio, the dream

On Level 3 b (figure 31) the object was customer work. The biggest opponent was that eVp would instead have wanted to make games and have control over the products he developed. There was both push and pull for him to go for consultancy. Tabus did not want to continue developing games, and at the same time LT and TP were open to shift the focus of Company Q to iOS development. Company F was both a helper and an opponent. A helper when it bought consultancy from Q, and an opponent when it offered to recruit eVp directly. eVp feared that customer work would be boring, but finally losing the fun factor and quitting school were affordable losses: being a founder of any company was better than not being a founder at all.

eVp decided to leverage his personal reputation to Q. For a while he balanced between Q and F, but at the end of Level 3b he again works full time in Q, a nice little company, yet "not my vision of a company". In eVp's case there was a competition between the two narrative programs, and the opponents in one program were the helpers in the other. At the end of Level 3 eVp is the co-founder and chief design officer of Company Q. He develops customer projects and dreams of the time when he could again design his own products, preferably games.

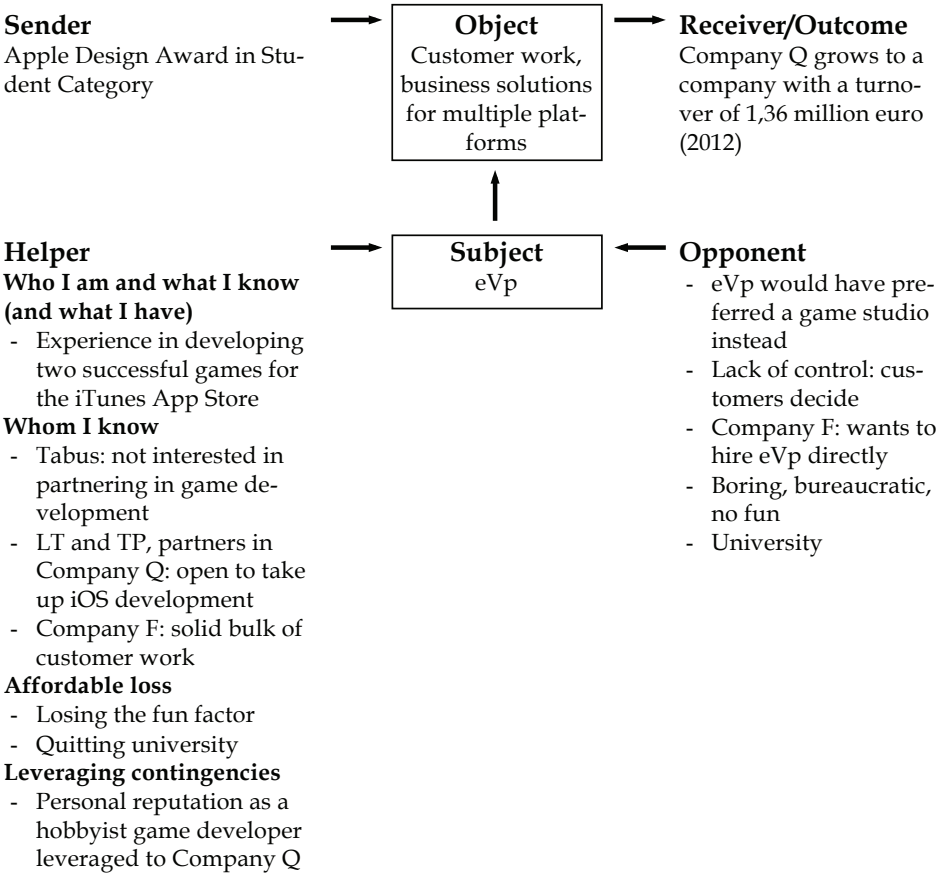

FIGURE 31 eVp, Level 3b: Going Pro – A Consultancy firm, the reality

7.1.3 The artist with a bigger palette - Madpoet

Madpoet assumed a double strategy. During his free time he worked on his self-published game, but he also sold game development as a freelancer to the TV-company, which was a customer for his illustrations and animations. He was not too keen on making games on Zombies, but he decided that lack of control of the customer projects was an affordable loss, as long as he still could make his own game in his spare time. He only had one customer. This was a potential opponent, but he was open to leverage contingencies should another potential customer pop up. At the end of Level 3 he has a steady flow of income from his customer projects, and he still works on his self-published game as a hobby.

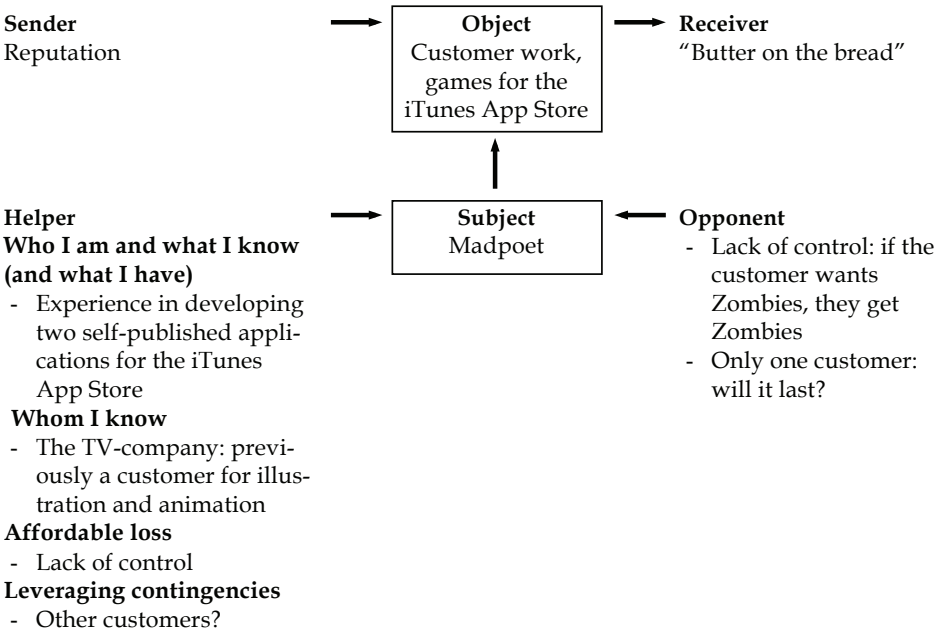

FIGURE 32 Madpoet, Level 3: Going Pro – Customer work as a freelancer

7.1.4 The littlest prince and the fairy godmother – Sterling and Caroline

For Sterling the biggest opponent was his age. He managed to gain credibility as a programmer, and the media was interested in him. In another point of his life he would have been able to leverage this to his company, but as it was, he still had several years of school and college ahead of him before he could fully concentrate on his business. In the mean time, Caroline controlled the company. At the end of Level 3 Sterling's original freemium game still generates income, he gets a customer project, and he also works on some of Caroline's game ideas, but on the whole the company is on the back burner, and school is Sterling's first priority.

7.1.5 The persistent tortoise – Tony

Tony has not made it to Level 3. He is still a hobbyist. Over the years he developed four games for iOS. He experimented with Objective-C, after that with Unity 3D and again with Objective-C. He studied different game genres and tried to target several audiences. Like the persistent turtle, he plods forward (Aesop Fables). He has now reached the point where he is ready to give up his independence and the control of his games and start working for a publisher. He also considers partnering with a content provider. In the old tale the tortoise beats the hare in a running contest when it just keeps on walking while the hare takes a nap. If the end-whistle for the game of turning a hobby into a firm blows in July 2013, then Tony runs out of time and does not cross the finish line. If, however, the timeline is extended, who knows, he might be able to turn his hobby into a company later on. After all, he still has another 20 years before retirement age.

7.2 Gestation

Mauer et al. (2013) build on the early stage venture process model, which was developed for the PSED panel study by Gartner et al. (2004), and depict the gestation process of eight technology startups. In their figure 12 gestation steps are mapped. The steps are chosen based on a literature review, and patterns of differential use of causal and effectual logic in the gestation process are analyzed using the approach outlined in Dew et al. (2009). In this study differences in effectual and causal logic are not analyzed in equal detail, nevertheless, the idea of identifying and mapping gestation steps seems like an attractive one. It can offer visualization on how a hobby solidifies into a firm.

Steps like team, incorporation, funding, facilities, full time, sales, and hired employee are adopted from Mauer et al. (2013). Patent and grant are not applicable in this study. Business plan is also left out as none of the informants mention one. Instead of having a prototype and product as steps, the first round of different monetizing models (free/free with ads/freemium/paid) are mapped. It would have been interesting to include also second and third games as steps in the figure. However, after testing that option, I concluded that it would have added little to the interpretation, yet the figure would have become quite complicated and hard to read. As an additional little curiosity, a step for winning an award was added. The award served as an outside recognition, a little bit like the grant for the technology startups, which Mauer et al. (2013) studied.

Figure 33 depicts the 14 gestation steps. Instead of using ordinal numbers on the x-axes, and measuring gestation speed as a ratio "gestation steps/month" as Mauer et al. (2013) do, I use months on x-axes to indicate how long it took to reach a particular step. It is worth noticing that the rules of the game were not the same from 2008 to 2011. In-app purchase was first introduced in late 2009, which means that freemium model (as it is defined in this study) was not an

option early on for eVp, Tony, and Madpoet. eVp in a way played with two decks of cards: he made his games as a private person, but parallel to that he founded Company Q with two friends. This company was originally a side project for three university students, and its business model did not include iOS development. Later eVp's two roles merged as he leveraged his personal reputation from the second game for the company. In figure 33 the steps eVp took as a private person are without an asterisk, and the ones he took as a co-founder of Company Q are marked with an asterisk.

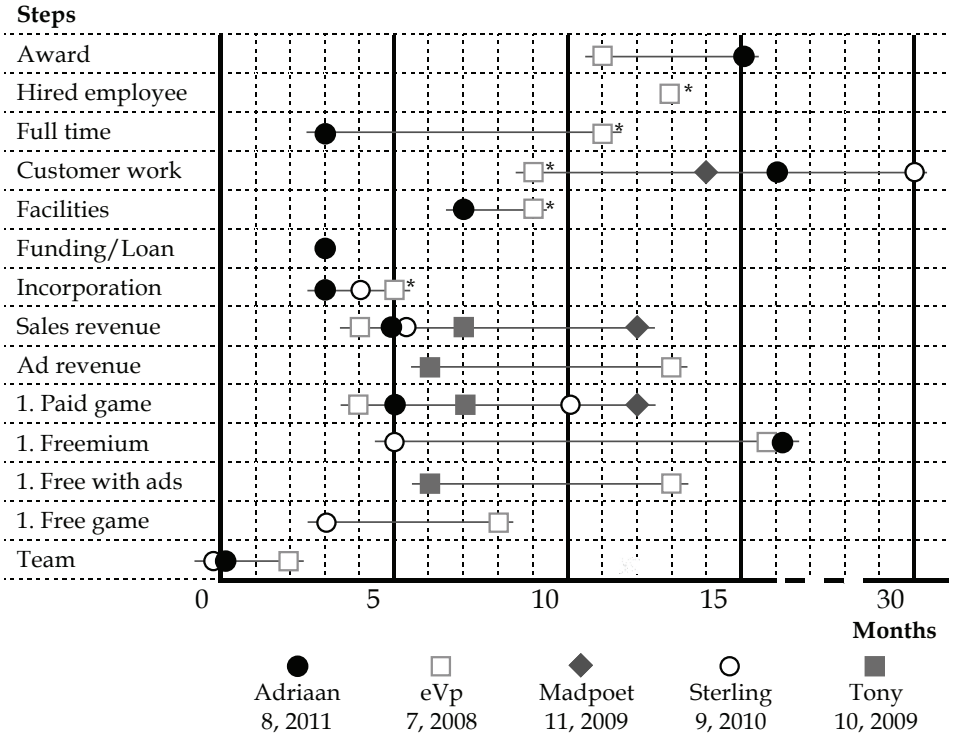

FIGURE 33 Gestation process for the five developers

Takeaways from the gestation figure:

- Developers with a team covered more squares and did it quicker than those working alone. They were also the only ones to go through incorporation.
- The time span from the first time one thought of developing a game to making some money with it was quite short, around 4 – 6 months (except for Madpoet).
- At first paid games dominated, but after the introduction of in-app purchase the freemium model became a good choice.
- Outside funding was not necessary for starting the company.

- Ad revenues helped finance the hobby but were not enough to speed up firm formation
- Customer work was nobody's first choice; nevertheless it offered extra income for four out of five developers in this study, and for eVp consultancy later became the core business
- Experience in game development could be leveraged into developing business applications as a consultant.
- A freelancer could leverage experience in game development into customer work.
- Two out of five developers had facilities and created an incorporated venture where they worked full time. Although the figure shows that both of these developers took the plunge within 3 – 5 months from the start, it should be noted that for eVp the company in question was Q (in another field), and it took about 1 year before the transition was full (=Q offering iOS development from its facilities, eVp working there full time, first hired employee)
- Although two out of five companies grew enough to need more people on board, only one of them hired personnel, the other one used subcontractors.

There are some interesting differences between these findings and the gestation process depicted in Mauer et al. (2013). None of the developers in this study had a business plan, whereas most of the companies in Mauer et al. had. Product and sales occurred quite early for the developers, but toward the end of the process in Mauer et al. (2013).

All of the developers in this study took entrepreneurial action by making their own products. They were able to generate revenue from their games, but only for Adriaan and eVp did the gestation process lead to venture creation. They both work full-time in their companies and have facilities and employees or subcontractors. Adriaan stayed committed to his original idea and runs a game studio, but eVp channeled to consultancy the knowledge and reputation he gained as a hobbyist game developer.

The rest of the developers are still in the process. Madpoet was able to add one more service to his freelancer repertoire and carries on his hobby on the side. Sterling concentrates on his studies, while Caroline runs the company. Their game studio provides cash flow, but it is not a full-blown venture. "Don't quit your day job until you strike gold" is Tony's motto, and obviously the timing is not yet right for him. For Madpoet, Sterling, and Tony the gestation process is at the "in situ"[37] stage: there is an elevated chance that one day they will take the full plunge, but there is no guarantee that this will ever happen.

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37 *Carcinoma in situ* refers to a condition where the mass has not spread to neighboring tissues. It is not a preliminary stage of cancer, but it does increase the risk of invasive cancer (http://www.mayoclinic.com). Similarly even good things can be at the in situ stage: acting as a hobbyist developer does not automatically lead to venture creation, but it may increase the chance of more organized forms of entrepreneurship.

8 THE TEAM

The aim of this chapter is to find out how effectuation and play shape the team-process in hobbyist game development. One point of interest is whether the self-selection process can be understood through pre-commitment and affordable loss, or whether opportunism and trust should also be considered. The chapter starts with a synopsis of the team activity. A longer version of the story, constructed from the team members' authentic quotes, is available in Appendix 5. After that, the lenses of effectuation, bricolage, and play are used to interpret the actions of the team members, and the chapter closes with a summary.

8.1 Synopsis of the team's story

- Tabus, LT, and eVp meet in a freshman group at the university of technology in fall 2004. All of them major in telecommunication.
- Tabus and eVp start going to lectures together and play videogames during intermissions. Neither of them is interested in telecommunication: Tabus takes it because it is the only route to studying audio, which is his real passion; and eVp does not know what else he should take.
- eVp talks Tabus into switching from Windows to Mac.
- In summer 2008 eVp gets an iPhone, learns Objective-C, bumps into open source physics engine Box 2D, and persuades Tabus into making sounds for a game he is working on.
- eVp takes a couple of courses in software law, ships the first iPhone game, co-founds Company Q (NOT in iOS development) with LT and TP, and joins Touch Arcade developer forum.
- eVp makes a prototype of his second iPhone game. He experiments with stereoscopic view by Pangea
- eVp plans to release the game for free to boost the sales of his previous game
- eVp convinces Tabus to make sounds for the game.

- Tabus is not interested at first, but once he starts the project he gets enthusiastic about it and contributes more than eVp asks for.
- Tabus suggests eVp that his friends O&J could make music for the game.
- Tabus suggests that O&J should make an acoustic version of the old song, which they had composed for a competition a few years back.
- O&J agree to make the music.
- eVp, Tabus, and O&J agree on the shares each of them has on the game.
- Stephen finds eVp's first game through Touch Arcade, likes it, makes a review video, and posts it on YouTube. He also contacts eVp about the video.
- eVp thanks Steve and asks if he would want to beta-test the second game. (According to Stephen, eVp first asked if Stephen could make levels)
- Stephen agrees to beta-test the game.
- eVp, Tabus, and Stephen create levels for the game.
- eVp releases the game for $2,99 and writes about it on Touch Arcade.
- Stephen makes a promo video of the game and shares it on YouTube.
- Touch Arcade and iLounge publish a review of the game.
- eVp, Tabus, and Stephen post in the discussion on the Touch Arcade forum.
- Stephen spreads the word in his real-life communities and floods game forums with his posts.
- eVp releases the Lite version of the game for free to promote the sales of the paid version (gets the suggestion from Touch Arcade forum).
- eVp makes several updates.
- Tabus creates the algorithm for infinite levels.
- Stephen suggests that eVp should submit the game to the Apple Design Award competition
- eVp follows Stephens advice and the game wins ADA in the student category.
- eVp is in the media, and Company F gets interested.
- Company Q starts selling eVp's developer work to Company F and other customers.
- eVp starts discussing concepts for a new game. The rest of the team is not interested: Tabus and O&J concentrate on their PhD studies, Stephen starts high school and has more schoolwork than he had in middle school
- eVp decides to monetize the existing game. He experiments with pricing ($0,99 – $4,99), includes ads in the Lite version, and adds later in-app purchase when it becomes available.
- In-app purchase causes the paid version to drop from the charts.
- The game (paid version and Lite version) has over 11 million downloads and sells for over 600 000 €.
- Company Q leverages eVp's reputation and concentrates on iPhone development (consultancy), 4 years later it employs 23 people

8.2 One interpretation of what happened

One way to look at teambuilding is the instrumental approach. A founder team can possess a richer set of skills and resources than one person alone (Aldrich et al. 2004, 300; Forbes et al. 2006, 227). If the industry is very complex, it might be necessary to have several founders in order to start a successful venture (Gartner 1985, 703). Both eVp and Tabus were embedded in video game culture; they were familiar with Macintosh computers, and they shared a background in coding. eVp had computer graphics as a hobby, and Tabus had a long history in music and sound, both as a hobby and also as a field of research. Although Tabus knew more about sounds, and eVp dominated in graphics, this small difference does not warrant the resource-dependence interpretation for teambuilding: at the core their competences were overlapping. For some developers game development might be too complex to master alone, but that was not the case with eVp and Tabus.

The homophily principle could offer another explanation for team composition. It claims that contacts happen between people with similar characteristics rather than between people with dissimilar characteristics. It is easier to understand and trust someone who is like oneself than to trust someone who is very different. (Aldrich et al. 2004, 302; Forbes et al. 2006, 231.) Tabus and eVp had a lot in common, and it could be argued that their relationship portrays the homophily principle. What is more, they studied together in the university and were even members of the same freshman group. This would qualify for familiarity principle, which claims that people who are associated with each other under certain conditions are more likely to associate in other circumstances as well. (Aldrich et al. 2004, 302). Homophily and familiarity often go hand in hand. In the case of eVp and Tabus the entrance examination to university served as a kind of homophily filter.

However, homophily and familiarity alone fail to explain the dynamics: what is the mechanism by which people, who know one another, get started in a venture together? The Bird-in-Hand principle states that effectual entrepreneurs start with who they are, what they know, and whom they know (Sarasvathy 2008, 74). It says nothing about what the entrepreneurs should be like and how they should know the people they know. Their relationship can be based on homophily and familiarity, but it is equally fine that it is not; what counts is the dynamic process.

Tabus and eVp had already experimented with game development by making another game, which was successful in the local iTunes App Store. They were close friends and had played computer games together for several years. They had learned to get emotional support from each other, and they had learned to trust each other's judgment in hectic situations. These social psychological benefits could offer another explanation for preference for teambuilding instead of working alone (Aldrich et al. 2004, 301). They also serve as a link to the joy of playing together (Huizinga 1955, 48).

During his extended summer job eVp had managed to save some money, and felt that he was free to experiment with iOS for a year. Neither eVp nor Ta-

bus had to invest money into the venture as they both already had a Mac to work on, and eVp had a developer license. In the worst-case scenario, what they would lose was the time they put into the effort. When other stakeholders came onboard, even they made their pre-commitment based on what they could afford to lose (Sarasvathy 2008, 81). Although O&J had a share in the game, they were more like sub-contractors providing music than real partners. eVp, Tabus, and Stephen on the other hand were committed to the transformation: none of them knew in advance what the final game would be like and what its market would be. Their actions followed the Crazy-Quilt principle where an effectual stakeholder network is built commitment by commitment based on affordable loss and the shared understanding that the co-created artifact is transformable (Sarasvathy 2008, 88; Dew et al. 2010, 236). It should be noted that in the recent literature on effectuation scales the Crazy-Quilt principle is understood differently than here. In the scales only outsiders, like customers and suppliers, qualify as stakeholders when pre-commitment is measured (Alsos et al. 2013; Chandler et al. 2011, Fisher 2012). In this study also initial teambuilding and online communities are regarded as stakeholders.

Table 7 depicts the escalating stakeholder commitments. First eVp tried to talk Tabus into the project but could not convince him that there is enough novelty in the game idea. He then started to code the game anyway and precommitted to making a workable prototype. If Tabus would not have wanted to join, even after seeing the demo, the effort would have been in vain, but eVp saw the time it took to code the prototype as an affordable loss. The prototype convinced Tabus, and he agreed to make the sounds. By making the sounds he was sucked into the game of developing a game and ended up contributing more than eVp had bargained for. When Tabus suggested that he could create an algorithm for infinite levels, eVp was reluctant at first. It was Tabus's turn to start coding to convince his partner, and eVp's turn to agree, when he saw what Tabus could offer. This bouncing around depicts effectuation: further commitments were negotiated around a real artifact, not around a mere plan (Dew & Sarasvathy 2003, 19).

Stephen's serendipitous appearance could potentially have been a constraint. At that point the production team had already agreed on their shares of the game, and the structure could have been too rigid to accommodate Stephen (Sarasvathy & Dew 2005a, 549). But as it turned out, in this story there was room for the Lemonade principle: the original founders leveraged the contingency and welcomed Stephen to the team (Sarasvathy 2008, 90). Stephen did not mind that there was no equity involved. One reason for the lack of friction can be that Stephen's participation only needed to be negotiated with eVp, not the whole team. Throughout the process it was evident that although Tabus and O&J had equity in the game, they demanded no control. O&J were happy with the revenue and did not expect any say in the further development of the game, and even Tabus accepted that eVp was "the owner of the game" and had the right to decide.

TABLE 7 The escalating stakeholder commitments

	eVp	Tabus	Stephen	O&J
Original commitment (eVp by himself)	- Experimenting with mock-3D, not planning to release a real game. A free version at the most.			
Pre-commitment on team level	- Designing the game concept - Doing the graphics and coding - Administering the game at App Store	- Making the sounds	- Beta testing	- Composing the music
Further commitments	- Participating in the forum discussions - Making a level editor - Making a light version of the game - Making numerous updates to the full version and the light version of the game - Applying for Apple Design Award - Giving interviews - Making numerous keynote speeches	- Suggesting that music should be added - Introducing a band, who could compose the music - Providing levels - Participating in the forum discussions - Providing friction control for the physics engine - Creating an algorithm for infinite levels	- Making a YouTube demo of the game - Providing levels - Flooding forums and YouTube - Contacting reviewers for features - Word of mouth marketing in real life networks - Suggesting participation in Apple Design Awards	- Providing some levels

Interestingly, eVp talks about the development process in the first person, whereas Stephen always refers to the actors as "we". For him "we" equals himself and eVp. He does mention the original soundtrack, but not its composers, and there is no reference to Tabus. Tabus on the other hand gives credit to "the

guy from the US", but continues that he does not remember the guy's name, because they never had direct contact.

An open source physics engine and a tutorial on how to make stereoscopic views were not something eVp was searching for or planned to use in the first place. He found Box 2D and Pangea accidentally and ended up using them in his project as a means at hand. Likewise, the song O&J made for the game was a modification of a previous song, and when Tabus designed the algorithm for infinite levels he took advantage of some old code he had originally made for a school project. All these are examples of making do with what is at hand (Baker et al. 2005, 334). Teambuilding in this game project relied on an existing network: eVp knew Tabus, who knew O&J. Although Stephen was a new encounter, he brought with him his pre-existing YouTube networks and real-life friends. All this portrays network bricolage, which refers to using pre-existing contact networks as a means at hand (Baker et al. 2003, 265).

Figure 34 depicts the stakeholder relationships. It is based on the pictures the team members drew in Task 2 in the first round of data gathering. The arrows indicate the relationship: the thicker the arrow, the stronger the tie. Double arrows indicate two-way communication. The ovals depict three important communities, and the boxes are two open source game engines that were vital for the development process. The picture shows that relationships are not equally distributed: eVp and Tabus form the core and also the tie between eVp and Stephen is strong, but all the members of this small team did not have direct contact with each other; eVp was the spider in the middle of his net.

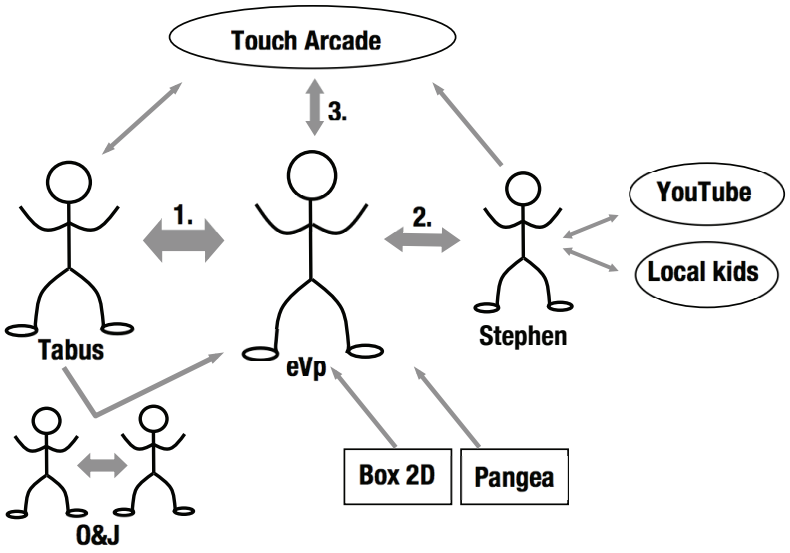

FIGURE 34 The stakeholders of the game project

I will next look at junctions 1 – 3 to find out whether pre-commitment, affordable loss, and the fun factor offer adequate interpretation for a developer's ac-

tions, or should homophily, familiarity, bricolage, over-trust (Goel & Karri 2006, 480), and opportunism (Dew & Sarasvathy 2003, 5) also be considered.

Junction 1
For Tabus and eVp game development was a continuum of their previous gaming history:

> Tabus, being my best friend, ended up at the receiving end of all the iPhone development spam I desperately wanted to send. (eVp)

They enjoyed the creative challenges, got pleasure from the recording sessions, and loved the suspense, which was inherent in the process. Instead of trying to predict the upside of their venture in monetary terms, they seemed to settle for the non-pecuniary rewards as an upside. They were clearly playing a game of developing a game. Although they did not mention any precautions, it does not imply that they were over-trusting (Goel & Karri 2006, 479). As long-time friends they did not need to feel that they were exposed to the risk of vulnerability (Chopra & Wallace 2003, 2; Aldrich et al. 2004, 301; Siakas & Siakas 2008, 61).

Junction 2
Networks may form through random encounters, and that is exactly what happened between eVp and Stephen. When two strangers meet, one could assume a need for trust building. Was Stephen over-trusting when he agreed to start beta-testing and edit levels without knowing the partners and without having any contract? Was eVp an opportunist (Dew & Sarasvathy 2003, 5) exploiting Stephen's eagerness when he recruited him with no promises of any money? There is no evidence of either. Stephen based his decision on a feeling that he actually had nothing to lose:

> I had an opportunity that not many 13 year olds get. So, why not? There is no reason not to. (Stephen)

eVp's motive for keeping up the correspondence was personal pleasure: it was easy to get addicted to the positive strokes that a fan can offer. Neither of them knew that this relationship would lead to the most remarkable twist in the story: from a hobbyist developer to an Apple Design Award winner, and eventually to the creation of more than 20 new jobs. Both of these turns are examples of the Lemonade principle. When Stephen suggested entering the competition, eVp already knew that Stephen was only 13 years old, and it would have been very easy to bypass a teenager's suggestion. However, he did not do that, which could suggest that in virtual networks age is not as discriminating a factor as it is in real-life networks. Or else, it at least demonstrates that homophily was not a necessary ground for action in this team.

What was there for Stephen, after all, he did not even get money for his efforts? First, it was great to be taken seriously at the age of 13. Second, it was great to be part of a winning team (Huizinga 1955, 50). Third, it fulfilled Ste-

phen's competitive instinct, the desire to be better than others, and get honor for that (Huizinga 1955, 51). In his account Stephen discusses also several other competitions he has attended, which suggests that he enjoys competition. Fourth, the game gave him a nice showpiece and respect among friends:

> And not even for the money … I'll have people, you know, hear that I helped to design an iPhone app. People will go, oh, which one, and I say [the name of the game], and they'll have a glow on their face, and they'll go: "Oh my god, you really helped make that app! It's my favorite game, I have it on my iPhone". And they'll show it to me, and they don't believe me that I helped to make levels and market in eight grade. So then I show them in the credits: Stephen! (Stephen)

Fifth, it was not just about getting kicks from being appreciated; it was also a worthwhile learning experience (Harhof 2003, 1756) for somebody who plans to major in business at college. Plus, in Stephen's words: there is very little to do in middle school, which leaves a lot of time to fill with other activities.

Junction 3

The Touch Arcade forum was the arena where the developers had direct contact with the users. It was potentially a place where they could get ideas for improving the game, and also an arena where they were exposed to demand-side information. This in turn could reduce demand uncertainty (Hienerth & Lettl 2011, 196; Autio et al. 2013, 18). Indeed, the first suggestion for improvements was posted on the forum only 30 minutes after eVp announced the release of the game, and two more suggestions were posted within the next 2 hours. Altogether the thread gathered 26 suggestions for improvements:

> Just another thought I had on another possible feature to add to the level-editor, and that is an optional grid overlay...So we could tick it to be on or off, depending on whether we do want to see it or not. (BrettArchibald on TA forum)

Touch Arcade was also an important arena for spreading the word on the game among early adapters, and thus it was a way to improve the game's diffusion in the market (Hienerth & Lettl 2011, 188).

> I think that [word-of-mouth to distribute that this game is really good] is probably one of the most important things for, for App Store games. So, yeah, you have to get, to get the ball rolling, and when you get it, then you do get some, you do really get some sales and, and stuff. (Tabus)

Stephen was active on Touch Arcade but even more so on other forums. On Touch Arcade he posted one-way entries, more like marketing announcements than conversation, hence his arrow only points one way. Tabus both listened and talked on Touch Arcade. He gave advice when users had difficulties with the controls, argued for the choices he had made on his levels, told in advance what to expect in the next update etc. Of the three team-members who were active on Touch Arcade, eVp built the strongest personal presence on the forum. He showed his competence by giving detailed technical explanations and conveyed his positive intentions by chitchatting with the community and by answering any questions within 15 minutes for three days in a row. In addition,

he defended his moral principals against plagiarism claims, and to strengthen prediction he offered a roadmap for the next updates and kept it. While trust did not appear to be an issue within the development team, on the virtual forum it was important to enhance the trustor's perception of the trustee's competence, benevolence, and integrity (Spaulding 2010, 40). Tabus's and eVp's actions were in line with Chopra's and Wallace's (2003, 4) findings that competence, positive intentions, ethics, and prediction enhance trustworthiness on virtual arenas:

> But it was not the videos (which are great), nor the great reviews here, but eVp's roadmap and his posts in this thread, which finally convinced me to buy. (Crypton)

Although effectuation is a non-predictive logic, it does not imply that there are no plans. The goals are loosely formulated and open for contingent information to shape them (Wiltbank & Sarasvethy 2010, 8). Making roadmaps of future actions thus is in no way contradicting effectuation. Promoting sales and crowdsourcing concrete ideas for game improvements were good motives to participate in the forum but probably not the most important ones for eVp personally. For him, Touch Arcade forum provided the audience. Feedback and positive strokes indicating appreciation were an important source of inspiration for him:

> I'm overwhelmed by the positiveness, thanks guys! (eVp)

In all, eVp started nine threads on the game on Touch Arcade. Together they have been viewed 36 957 times (by 08.02.2013), and there are 445 entries in the threads. A closer look at the first opening thread tells that 49 members of the Touch Arcade community participated in the discussion, and there are a total of 156 entries in the chain, which has been viewed over 12 000 times. The themes of the discussion can be roughly divided into six categories: for the game, for the competitor's game, for the developer, against the developer, suggestions on improvements, and chitchat (see table 8). Interaction on the forum could potentially have been a source of user-generated ideas. However, for this project engagement in the forum provided mainly enjoyment and boosted the team's intrinsic motivation (Franke & Shah 2003, 159).

When the team released the game, there already was a previous, very popular game with a similar game concept, and eVp anticipated that people would argue for the previous game and raise the question of plagiarism. Indeed, there were comments that support the competitor's game and question eVp's right to pursue the same game idea. Nevertheless, the majority of the posts express a strong support for the game and also for the developer. The game is a team effort, but on the forum the rest of the team is bypassed and attention is focused on eVp.

TABLE 8 Discussion-themes in a thread on Touch Arcade forum

For the game	For the competitor's game	For the developer	Against the developer	Suggestions on how to develop the project	Chitchat
43	5	12	3	26	78

Notable is the amount of entries labeled as chitchat. These entries are not directly connected with either the game or the developer. They are conversation between the participants or between eVp and the participants. Autio et al. (2013, 26) filter away this kind of noise in their extensive study on a user community and only consider relevant the posts requesting information or helping to solve a technical problem. Nevertheless, in the context of this study, also the informal discussion has value. Promoting informal communication builds trust (Siakas & Siakas 2008, 64) by bonding, which refers to an emotional relationship between the trustor and the trustee (Chopra & Wallace 2003, 6).

The game never got an Apple Feature in the iTunes App Store, but it won the Apple Design Award in the student category. As a result money and fame started rolling in. It is interesting to see that while all the team members were pre-committed to the project to begin with, the financial success of the game did not strengthen their commitment. On the contrary, after a while eVp was the only one willing to continue game development. Tabus explains that he is not motivated by money; rather he wants to do things he is passionate about, and at the moment he is more interested in acoustics than game development. While giving his time to developing the game was not an issue for him at the beginning of the project, he later felt that time was no longer an affordable loss. He wanted to concentrate on his research in acoustics and get a PhD instead. Stephen started high school and had less free time than he had had in junior high. He also got interested in politics. O&J made it clear from the beginning that they wanted to keep music just as a hobby.

Left alone eVp still experimented a while with other monetizing options. Some of the decisions proved to be wrong. It is surprising how calmly eVp and the team as a whole took the consequences of the ill-timed decision to include in-app purchase. People have a tendency to carry out mental accounting of their resources (Read et al. 2011, 102). Typically time is considered to be an affordable loss, but money is looked upon differently depending on which mental account it belongs to. The team seems to have put real and potential revenue from the game into a mental account where losses are tolerated. Learning the mechanics of the iTunes App Store was valuable, and the price eVp and the team paid for it was an affordable loss for them.

When eVp failed to engage the team in the development of the next game, he applied the Lemonade principle and leveraged his knowledge and reputation to Company Q instead.

8.3 Summary of the Team actions

> The "entrepreneur'' in entrepreneurship is more likely to be plural, rather than singular. (Gartner et al. 1994, 6)

Entrepreneurial action was not eVp's prerogative; the entire team was acting entrepreneurially. They had the knowledge, skills, and motivation to discover the opportunity, recognize it, and exploit it (Shane 2004). Nevertheless, their process was not linear. They did not conduct market surveys and gather means to reach predetermined goals. Original teambuilding relied on existing networks and portrayed network bricolage (Baker et al. 2003). The team exploited serendipitous combinations by leveraging open source code, and chunks of previous own code, and music in unexpected uses (Baker et al. 2005, 335). When a new self-selected stakeholder appeared, there was room for his commitment (Sarasvathy 2008).

In the process who I am and what I know quite naturally turned into what I can do. Action preceded knowledge. The team committed to forming the game action by action, not by planning it in advance. Their affordable loss was the time they put into game development, and when they ran out of it the cycle of constraints clogged. The central developer did, however, leverage contingency and use the publicity of the game to boost another firm he was involved in. As a whole the game development process followed the dynamic model of effectuation. (Sarasvathy 2008, 101, 109; Sarasvathy & Dew 2005a, 543.)

I appreciate Sarasvathy's logic that in the effectual process trust is not an issue if one only commits what one can afford to lose. Nevertheless, in an observer's role it is difficult to tell which action is based on ignoring the importance of trust and which one is based on over-trust. The outcome might look the same in either case. Judging from the actions, I am not able to say whether they were based on over-trust (Karri & Goel 2006). What I can say is that none of the informants mentioned trust as an antecedent to team formation. Although trust was not necessary in the stakeholder commitment, building trustworthiness in the online community was important (Chopra, and Wallace 2003).

The game was not developed just for money. It was a voluntary activity, which the team performed together, and it had an aim in itself (Huizinga 1955). I originally anticipated that game elements would be present when the game already was on the market. It is true that forum activities and following download statistics provided suspense and joy for the team, and winning the Apple Design Award was ecstatic. Nevertheless, the most enjoyable moments seem to have taken place during the development phase. Solving the creative challenges together, learning from actions taken, having no obligations, but a lot of options, having the freedom to decide when and for how long to work on the project all this added the quality of different to the ordinary. So, although points and leader boards were important, on the whole it was more about play than about game.

> It was a fun ride! (eVp)

9 THE AFTER-PLAY

The aim of this chapter is to draw together the findings, and it provides a model for the entrepreneurial process of the hobbyist game developers as perceived in this study. At first a synthesis of the themes arising in the chapters The Play, Going Pro, and The Team is offered. After that the model for the hobbyist developer's entrepreneurial process is depicted. The model incorporates elements of third-person and first-person opportunities, but unlike McMullen and Shepherd model (McMullen & Shepherd 2006; Shepherd et al. 2007) it does not assume that uncertainty must be overcome before entrepreneurial action is taken. Feasibility and desirability are seen as triggers for action, but instead of interpreting the mechanism in terms of uncertainty reduction, effectuation, bricolage, user entrepreneurship, passion, and play are used as lenses. The approach to first-person opportunity is procedural: on the first level a game is created; on the second level a venture is created. At the end of the chapter the model is embedded in the framework of this study.

9.1 Synthesis of Themes in The Play, Going Pro, and The Team

In qualitative research it is an established tradition to theorize across cases by identifying common thematic elements in the cases (Riessman 2008, 74). That is why I find it fitting to include a chapter on the themes that arise from all stories in this study, even though thematic narrative analysis is more suitable for theorizing within cases than across cases (Riessman 2008, 53).

Entrepreneurial opportunities

The five developers in this study all created their own games, put them for sale in the iTunes App Store, and made revenue utilizing various monetizing models. Nevertheless, the initial entrepreneurial opportunities, and the way in which each developer grasped them, were not identical. The Apple App Store disrupted the existing ways of developing and distributing software (Schumpeter 1934). As long-time Mac-users and gamers Madpoet, Tony, and eVp knew early that the Apple App Store was to open for third party developers. Their

prior knowledge (Shane 2000; Shane 2004) acquired in the domain of a hobby (Ardichvili et al. 2003, 119) helped them discover the opportunity (Kirzner 1973) to develop and sell games in the Apple App Store. Their actual game ideas followed only after the revelation that a new ecosystem was about to open. Both eVp and Tony developed their games within months, whereas Madpoet first tried to look for partners, and only when that failed did he develop his game a year after his initial exposure to the Apple App Store.

Adriaan noticed that people feel awkward when hand accidentally touches hand. For him discovering this game idea was the initial opportunity discovery and preceded the choice of environment. A friend's father gave Sterling the hint about the Apple App Store, and his game idea was a modification of a game with somewhat similar mechanics. When he first attempted to learn Objective-C he noticed that the learning curve was too steep. He did not give up but stayed alert and discovered later Corona SDK, which became his programming tool. For him the biggest personal discovery was neither the environment nor an original game idea but the tool for programming the game.

There thus was an element of discovery in all five processes, but were the hobbyist developers just alert, or were they engaged in active search (Alvarez & Barney 2007, 13)? Adriaan described his method for coming up with new ideas as "doing nothing for one hour per day". He deliberately allocated time for creativity (Ardichvili et al. 2003, 116). It was more about becoming aware of what he already knew without knowing that he knew than searching for missing information. eVp, Madpoet, and Sterling circulated actively on different forums and played mobile games of different genres. Carolyn even referred to playing games as a homework Sterling must do to be able to develop his own games. Yet, I do not interpret these actions as search. Rather, they demonstrate how important it is to go to places and to be exposed to things, which may turn out to be important later on. By being open to surprises in various environments, one gives alert discovery a chance.

Tony, on the other hand, was conducting a deliberate search. He analyzed each of his games carefully to find out what was missing, and why it was not a success. As a result, he ended up studying different game genres to be able to target a popular one; he compensated his lacking skills in graphics and sound design by searching for free images and sounds; and when he did not have real-life partners to do the beta-testing he searched for help on the web and found ibetates.com.

The informants emphasized that they created their opportunities rather than discovered pre-existing ones. They all made something out of nothing and developed games. In that sense they were creators. Games were not the only thing they created either. They built their fan base and personal reputation and leveraged it to a variety of entrepreneurial action. They created new market opportunities by mingling directly with their audience (Ardichvili et al. 2003, 115). They shaped their business model so that it would fit the scene. All this depicts a more active role than that of an alert or searching discoverer. The hobbyist developers in this study thus both discovered and created their opportunities (Kirzner 1973; Ardichvili et al. 2003; Alvarez & Barney 2007; Sarasvathy et al. 2014).

Uncertainty

> I love it! And I accept it. (Adriaan)

If the informants did not take up risk or uncertainty in their accounts, I introduced the theme by asking the following: "What is your relationship to uncertainty"? I hoped that the open question would trigger stories, which could tell me 1) whether the informants perceived game development in the Apple App Store as risky or as uncertain, 2) whether uncertainty was an impediment to action, and 3) what personal strategies they applied to overcome uncertainty. It turned out that the question was not ideal for finding out those things. The informants did share their strategies, but the question invited even more discussion on what kind of feelings uncertainty elicited in them. Answers to the first question were not explicit. The word the informants used was mostly risk, even when they referred to uncertainty. Only eVp distinguished between the two when he regretted choosing a path that was neither risky nor uncertain:

> The only thing that I sort of look back on and regret, is not taking more risk, settling with lower risk and lower uncertainty. After making the game we got a lot of offers to contract stuff, and we did that. So, there is little uncertainty or risk in that compared to making your own stuff. (eVp)

Implicitly the informants seemed to take for granted that the Apple App Store is a boiling pot of true uncertainty, and there is no point in trying to predict what will happen next. Although they all subscribed to download statistics to get information not otherwise available, they rarely described how they used the information in decision-making. Exceptions were eVp's story of his inability to predict the consequences of a response choice he made (Milliken 1986, 138), and Madpoet's and Tony's accounts on how they searched on the lists for which game genres were popular and worth having a closer look at.

Below some of the quotes are viewed through the lens of Milliken's three uncertainties (Milliken 1986, 137):

> **State & Response**
> Also I really acknowledge this fact that everything is super uncertain, and that, you know, you have to try a lot. … What I do believe is, in the end you need a lot of luck, but I am definitely working hard to make sure that we are trying to go over all the possibilities. Just trying a lot of things. (Adriaan)

> **Effect & Response**
> Well I think, after leaving school and going to work for a year, I had, what seemed to me enough money to like, do nothing for a year. I was very open to trying out the iOS development, see how it worked. And ever since I have always been in the position, where I don't really have to stress about things, they can all go horribly wrong, and it won't really drive me to a crises. So, I think one should try things and not be too afraid. (eVp)

> **State & Response**
> The reality is that companies are looking after themselves, budgets change, plans change, and my relationship to uncertainty is that it is something that is always around me… Maybe because I have been through that, so I am used to it, no, I should not say I'm used to it, I'm never used to it, but I am aware of the situation that

> everything could change in a matter of weeks or days…like I always have something on the go on the side, because you never know, when that can end. And I think that is a healthy thing to do, just keep active. (Madpoet)

> **State & Effect**
> Well, I guess, like you are never going to know, like exactly what is going to happen. So I think uncertainty is like necessary, like if you always knew what was going to happen, it wouldn't be exciting. Because part of the excitement is when you don't know, what is going to happen. (Sterling)

> **Effect & Response**
> Uncertainty is good and bad. It is bad in the sense that you don't get any guarantee. You know, you add a+b+c and you get what you are after. That's nice in a sense, but it's also dead boring! So, you want to embrace a certain amount of risk, because if you are not risking, you are not learning. … Well, one of the things that I have come across is just follow you passion. Don't worry about the master plan..., just do what you love to do, and finally enough things will sort themselves out! (Tony)

Everything is super uncertain, things can go horribly wrong, companies look for their own interests, you can never know what happens next, but so what! On the level of the state of uncertainty the informants were not interested in predicting what will happen next. The effects were perceived both as good (excitement, not boring, an opportunity to learn) and bad (could lead to a crises). Interestingly, the informants were not afraid of effect uncertainty. On the contrary, they seemed to enjoy it. How is it possible to get pleasure from uncertainty? All the hobbyist developers told somewhere in the story that as long as the downside was covered they had freedom of action. They were open for surprises, and many of them felt that they were very lucky. A closer look at those lucky moments revealed that the informants were not passively waiting for a fortunate strike; instead they helped to create their good luck by leveraging contingencies to new uses (Sarasvathy 2008). With a hope and trust for positive payoffs the developers preferred the uncertain to the predictable (Einhorn & Hogarth 1986, 237). Their strategy was not to predict but to control uncertainty. They all emphasized the importance of trying out many things: if one thing failed there was something else to fall back on. They were quite confident that they did not have to worry about the consequences of their own responses. They could afford to embrace the excitement uncertainty provided, as long as they tried a lot of things and only played with what they could afford to lose.

Control

Effectual strategy assumes control over the unpredictable future (Sarasvathy 2003, 208). The informants in this study mentioned control several times, but instead of attempting to have control over the whole future they discussed two specific items: control over the product and control over their time:

> I think the thing behind game developers, and this must be the case, I know it is for me, but if you think that you are someone who likes control, it's the ultimate kick, right? Because you have absolute control about everything in this little world, and I think that's what makes people want to make games. In a way that they are playing god in a way, making this little universe: they control the sounds, they control the gravity, they can control the look of things…You now, I think that must be part of the desire to make games. It's the idea that you can control things. (Madpoet)

All five hobbyist game developers thought that control over the products was crucial, especially in the beginning of their developer career. Sterling and Adriaan were able to maintain control. Madpoet balanced between the lack of control in customer projects and control in his self-published games. For eVp the lack of control over the customer products was the biggest reason for contemplating a spin-off to leave consultancy. Only Tony was ready at the end to give up editorial control and start working for a publisher.

Developing a game is time-consuming. What is more, it demands large undisturbed chunks of time, and it may be difficult to squeeze that into the daily routines. Control over one's own time was an ambition all the informants shared. Madpoet and Tony both have a family, and they had to balance their time between work, family, and programming. Also Sterling was very disciplined with how he allocated time for programming. Adriaan and eVp on the other hand had the luxury of indulging fully in coding. However, Adriaan learned the hard way that there are limitations to what the body can take. Programming was addictive and it gave him pleasure, but when he programmed 16 hours a day and gave up exercising he got serious health issues:

> I would do my paying stuff during the day, and then in the evening it'd be like, yes, me-time. And then, I'd actually work till 1 at night… what I would try and do is just try balancing time. You've got your time for work. Then, you've got your time for family. And then, you've got your time for coding… I don't think you can make a game by just doing it one hour a day. That's not going to happen. (Madpoet)

> I mean, Linda asked me, because I haven't made any real money out of this stuff, she said, you waste so much time doing this stuff, and not so much money, but more about time, don't you want to spend the time with your family and children? I'm going: no! It's a time away from all that. Just because I'm more of an introvert, it gives me some of the energy to spend the time with the children, because it's recess to me in a sense. (Tony)

> Whenever he had a moment to spare, he'd take his laptop out, and he was just working on it every spare minute he had… He always does his schoolwork and he practices music, and he gets his other things done, but when he has free time he is on the computer and he is doing the programming… And he works really hard on that, and he just keeps working. (Carolyn)

> I've had the best time of my life when I was alone doing my game. I mean I had no obligations. I woke up when I wanted to, I did code when I wanted to, I went to sleep and played video games on my computer. I mean, that was the living. (eVp)

> I think during those four weeks I was really programming all the time...I kind of got a burnout...And I had to learn a new way of living basically, because what I really wanted to do, what I really thought was fun, was programming, making my own stuff, making my ideas come true. And now it suddenly turned out that there were physical boundaries to that. (Adriaan)

Networks – Communities - Stakeholders – Playmates

The partnership of people can be interpreted through several lenses. In network bricolage pre-existing contact networks are seen as the means at hand (Baker et al. 2003, 265). User entrepreneurship prefers the term community rather than network, because the distinct social structure of the group motivates cooperation (Shah & Tripsas 2007, 130). Effectuation is interested in the dynamic pro-

cess of stakeholder commitments (Sarasvathy 2008, 88). Nevertheless, the delicate difference between any networking activity and a self-selected commitment to a transformable artifact can be difficult to detect and even more difficult to operationalize (Perry et al. 2012, 827). Also, theories of play recognize the importance of others either as playmates or opponents participating in the act of play, or as spectators, whose presence elicits the joy one gets from accomplishment (Huizinga 1955; Caillois 2001).

The hobbyist developers interacted with real-life and online communities and networks. Family, school, and friends were important sources of contacts for most of them. On top of that Adriaan benefitted from the contacts he got through the incubator/accelerator where he had his office. The role of school was most interesting when it comes to Adriaan's and eVp's pre-existing networks. Both met their future partners at the university in random teams put up by the staff. Although self-selection was not part of the original team formation at the university, it was central when Adriaan & BE, and eVp & Tabus (later also eVp & LT) started projects together. They negotiated their pre-commitments when they took the plunge together into game development (Dew & Sarasvathy 2003, 19). Madpoet did not succeed as well in his first team-building attempt:

> My first attempt was to partner with other programmers to, to make something to put on the store… there were couple of experiences, where I had [xx] to work on something, and even though it was a good process and even though, you know, our harts were at right place, the thing is, unless you actually have money to pay someone to help you develop something, it's hard, like I said, it's hard for them to stay committed. (Madpoet)

Sterling's primary network was his family, and Madpoet later leveraged his game development competence through his freelancer business networks. Only Tony did not utilize any real-life networks and was not able or willing to tie partnerships.

Online forums offered the hobbyist game developers help in programming issues, information on customer needs and game trends, ideas on what free open-source components are there to be picked up, feedback on projects under development, and a direct marketing channel. On some forums the developers just followed discussions in the shadows, but on others some of them spent a lot of time and became embedded in the social structure of the community (Shah & Tripsas 2007):

> I have learned so much about computer programming from going online and connecting with other people that are on forums … if you have a question, you can post it in the unity.answers website, and within hours you can have an answer to your most difficult problem when it comes to programming. (Madpoet)

> Looks like you're making good progress! With the fog, I noticed a novel way of doing this in a demo project I came across. Basically it used a number of 2 poly planes with an animated sprite texture that mimicked fog. In the sprite animation the fog went from transparent to opaque and the planes also rotated a bit. Perhaps something like this may work for you too? (A comment to Madpoet in Touch Arcade developer forum)

The online communities also served another purpose: they offered an audience for the hobbyist game developers and enhanced their feeling of joy (Huizinga 1955, 28). It was a two-way street: when the developer shared his success on the forum he got positive strokes from the rejoicing crowd, but also the fans got their reward when they had a chance to be part of the game's success (Huizinga 1955, 50). For eVp "for fame/respect" was one of the motives for developing games, and he also was very active on the forums and had the most active fans.

Money

Effectual entrepreneurs base their plunge decision on the downside of the venture rather than on the expected returns. That was also true with the hobbyist game developers in this study:

> The game had a budget of zero dollars. (Sterling)
>
> I'm doing this on a budget. (Tony)
>
> I could afford to try a developer career for a year. (eVp)

Their investment was mainly in terms of time, not in terms of money. However, although they did not have to use much money on investments, time allocation indirectly required money. Both Adriaan and eVp who plunged full time into their game development project early on, had in common that they seemed to tolerate higher affordable loss in certain mental accounts (Dew et al. 2009, 114; Read et al. 2011, 102). For eVp the savings he had made during his extended summer job were in a mental account that allowed high affordable loss. Later, also some of the revenues from the second game were put into that account. This allowed him to freely experiment with different monetizing models and learn from his mistakes without any regrets. For Adriaan the revenues from the first game made it possible to work on the next game.

The importance of the monetary upside was toned down because the hobbyist game developers could get other rewards in the process. They enjoyed the challenge of making a game; they had fun with their teammates while making the game and with their fans once it was finished. They all thought that making money was only one of the goals:

> It just felt really good to see, like, even if I made no money on this game, honestly, the idea of other people playing my game, it's just a huge feeling. It's like, well, they're actually enjoying this. (Madpoet)
>
> I have to be interested first. I want to make money of it, that's the point of doing it, but I wouldn't write an app that I am not at all interested in, just for money. I would not do that. (Tony)
>
> I didn't necessarily start out as an entrepreneur, I didn't want to make a lot of money, I just wanted to make a really good product. (Adriaan)
>
> When I released it, my goal was just to get an app up there. And I thought maybe get a couple of hundred downloads. But then when it did start getting millions of downloads, people were suggesting I should put ads on it or in-app purchase or make a

> paid version. So I thought, yeah, that'll be a good idea, I could get some money from that. (Sterling)

> I had millions of downloads, millions of downloads. I was thinking to myself that ok, I'm never going to get millions of downloads on any other application than this one, most likely. So, I should probably concentrate on making money with this one, and forget about all the rest. So, that's when I added advertisements to the application, and in-app purchasing, which turned out to be a huge mistake, and all sorts of ways to monetize the application through different means. (eVp)

Emotions

Passion and suspense are the two emotions that deserve to be discussed. Cardon et al. (2009) define entrepreneurial passion as:

> consciously accessible, intense positive feelings, which are experienced by engagement in entrepreneurial activities associated with roles that are meaningful and salient to the self-identity of the entrepreneur. (Cardon et al. 2009, 515).

They build a conceptual model for the experience of entrepreneurial passion where three goal-related cognitions and three entrepreneurial behaviors mediate the relationship between entrepreneurial passion and entrepreneurial effectiveness. Entrepreneurial effectiveness is looked upon in terms of opportunity recognition, venture creation, or venture growth. In the model each of these measures corresponds to a specific entrepreneurial role identity (Cardon et al. 2009, 519).

The building blocks of the model are:

1. Three role identities:
   - An inventor with a passion for identifying, inventing, and exploring new opportunities.
   - A founder with a passion for exploiting opportunities and establishing a venture.
   - A developer with a passion for nurturing, growing, and expanding the venture. (Cardon et al. 2009, 516 – 517.)
2. Three goal-related cognitions:
   - Goal challenge, which refers to the difficulty level of the goals set
   - Goal commitment, which refers to the extent of determination an individual has to attain a set goal
   - Goal striving, which refers to planning action, monitoring progress, and adjusting action plans based on impediments encountered during goal pursuit. (Cardon et al. 2009, 523 – 524.)
3. Three entrepreneurial behaviors:
   - Creative problem solving, which is defined as the production of novel and useful ideas or actions
   - Persistence, which is defined as the continuation of effortful action despite failures, impediments, or threats, either real or imagined
   - Absorption, which is defined as being fully concentrated and deeply engrossed in one's work. (Cardon et al. 2009, 520.)

The narratives of the five informants in this study are too few, and therefore they cannot serve as an empirical test for the model. Nevertheless, some of the concepts can easily be identified in the developers' accounts. They all talked a lot about passion. A closer look at what their passion was for shows that most of them were passionate about developing the product, not about creating a venture or expanding it. In line with that, their role identity was that of an inventor. Interestingly eVp and Adriaan, who actually created a firm, also discuss other role identities. Being able to call himself a founder directed eVp's choices and gave him pleasure. His passion was more toward venture creation than venture growth. When things turned into business as usual in Company Q he started to feel uneasy and began to contemplate a spinoff: another fresh, boiling, and adrenalin-filled start.

Although Adriaan said that his first priority was to make a great product, and he really did not feel like an entrepreneur, his story provides evidence that there was more to his role identity than inventorship. He was adamant about getting an office at the Game Garden, not only for the space itself, but also because it enabled networking possibilities with other game companies and made it possible to participate in the incubator/accelerator program offered by Game Garden:

> Also, I don't want to call myself an entrepreneur, because it just wouldn't be fair to my product. There is always these business people that start the company and realize, shit, I don't have any resources and no development power to make a game. For me personally it is so immensely cool that I can make, I can come up with and I can make games that have not been thought of before.

> They [Game Garden] want to make the industry grow up, so that every company doesn't just think of making the best game, but also making the best game that sells well… [After discussing with the accelerator guy] you have thought about revenue streams, and who are your best partners, you know, that business model canvas thing. It just makes you think about everything. (Adriaan)

While I would not interpret this as an example of entrepreneurial passion toward venture growth, it shows that Adriaan was, at least to some extent, focusing on venture growth, which is more than can be detected in any of the other stories. The setup of this study does not allow for a closer look into the mechanisms, that is, how the three goal-related cognitions and the three entrepreneurial behaviors work in the entrepreneurial process of the five hobbyist game developers. Nevertheless, empirical testing of the model in hobbyist game development context seems like a fruitful area of future research.

Järvinen points out that in an engaging game emotions oscillate between hope and fear combined with uncertainty, and all this elicits the feeling of suspense (Järvinen 2008, 134). The informants repeatedly mentioned that knowing everything in advance would be boring. Part of the charm of game development was derived from exposure to uncertainty. Table 9 follows Järvinen's guidelines in an attempt to find out the embodiments of suspense at various points in the process of making and marketing the game. The process is split into two "games": the game of creating the game, and the game of competing in the market.

TABLE 9 Embodiments of suspense in The Game of Developing the Game, table structure adopted from Järvinen (2008, 414)

Game	**Suspense**			**Game element(s) embodied into**	**Culmination points**
	Hope	**Fear**	**Uncertainty**		
	What the player hopes to achieve?	What the player fears that will happen?	What are the factors that make hope and fear uncertain?	The game elements which take part in constituting the eliciting conditions	A game state, which introduces a crisis goal, or intensifies emotions
The Game of Creating the Game (prior to launch)	- A fully functional game launched for sale in the Apple App Store.	- Inability to finish the game.	- Performance-of-self (oneself and the team), when applicable. - Performance-of-system (Apple Inc.)	- Component-of-self. - Environment (SDK & other development platforms). - System procedures.	- Approval/ rejection of the game for the Apple App Store.
The Game of Competing in the Market	- The chosen monetizing model and/or price-point are a hit. - A feature in iTunes. - Features in other relevant forums. - Lots of positive word of mouth. - High position on top-lists. - Lots of downloads. - Money.	- The chosen monetizing model is a flop. - Poor visibility. - Poor reviews. - Poor sales. - No money.	- Performance-of-self. - Performance-of-system. - Performance-of-others (reviewers, fans, competitors, customers).	- Component-of-self. - System procedures. - Component-of-others. - Inadequate information in the game system -> need for additional sources.	- Effects of own actions on the statistics (e.g. pricing, freeware, new game features, in-app-purchase) - Positive/negative feedback on the forums. - Features (iTunes, review sites, other media). - Issues with the review process. - Time issues. - Upward/ downward trend on lists.

Learning

Both Adriaan and eVp were quite dissatisfied with the way things were taught in formal higher education:

> In the first two years I did not learn a lot. We did a lot of assignments, but they were not too much game related. Actually, they were super boring. I did not get a lot of pleasure doing them. (Adriaan)

> Well the first point was that it [university] totally killed my motivation. … perhaps the problem was really, how the courses are built. At least back then in the university, you are not making actual programs that do stuff. You are not making UI's that you can present, and you are making terminal applications that you can write into a couple of words and then you show a number, you know, just like numbers and strings and what not, on the terminal. But that is not, what people use in their, when they use computers, or when they use smart phones, they don't see the terminal. (eVp)

Although Tony ended up getting a PhD, he also had his share of school troubles. Madpoet and Sterling, on the other hand, were quite pleased with their school experience. Nevertheless, it is fair to say that internship, summer job, work experience, and other exposure to the industry offered more meaningful prior learning for most of the informants than school did.

All informants discuss the immense learning opportunities game development offers them. Their accounts on how they learn resonate well with experiential learning (Kolb 1984), reflection-in-action (Schön 1983), and communities of practice (Wenger 1998). Kolb's cycle of experiential learning consists of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Experiential learning thus requires both experience and transformation. Kolb (1984) argues that experience alone is not sufficient for learning unless it can be put to use. Likewise, transformation alone is useless for learning; there also needs to be something that is transformed, an experience one can act upon. (Kolb 1984, 42.)

The role of reflection is very central in experiential learning. Schön (1983) extends the concept of reflection to include not only reflection on the outcomes of action and the action itself but also "the intuitive knowing implicit in the action"(Schön 1983, 56). He criticizes technical rationality, which according to him depends on an agreement about ends. Technical rationality assumes that professional practice is a problem-solving process where one chooses from available means the ones that are best suited for established ends. In the real world problems are not given; the practitioner must first make sense of an uncertain situation and construct the problems to be solved. The process is often improvisational and involves thinking about the action while taking the action. This is called reflection-in-action. (Schön 1983, 40).

9.2 The model for the hobbyist developer's entrepreneurial process

The transformation from a gamer to a hobbyist game developer and to a playful entrepreneur is depicted in figure 35 (for reference to Shepherd et al. 2007, 78, see figure 4, p. 41). At the attention stage a third-person opportunity for somebody is discovered through alertness (McMullen & Shepherd 2006). If both "Yes I can" and "Yes I want" are true, a first-person opportunity is created through effectuation. The first outcome of entrepreneurial action is a product (a game). While developing and marketing the game, the hobbyist developers learn how to act in The Apple App Store ecosystem. On the next level, if both "Yes I can" and "Yes I want" are true, they leverage this knowledge to venture creation. Uncertainty is not an impediment to action in effectuation; therefore it is not necessary to overcome uncertainty before action is taken, and instead the hobbyist developers accept and even embrace uncertainty (Mauer et al. 2013).

The Magic Circle (see also figure 5, p. 43) separates ordinary from different and defines the boundaries of play (Huizinga 1955). In the model the circle is drawn with a dashed line to indicate that the playful entrepreneurs can move between "different" and "ordinary": at times they are immersed in the game of developing the game, at others they are more serious in their actions. In the figure The Magic Circle is positioned over the game creation phase, because in the developer accounts play is mainly present at that point: developing the game gives joy and playfulness accounts for motivation. However, The Magic Circle can float over the whole Effectuation area, and even venture creation can be within its boundaries if the focus of entrepreneurial passion shifts from creative problem solving to venture creation (Cardon et al. 2009). The following sections discuss the reasoning behind this model.

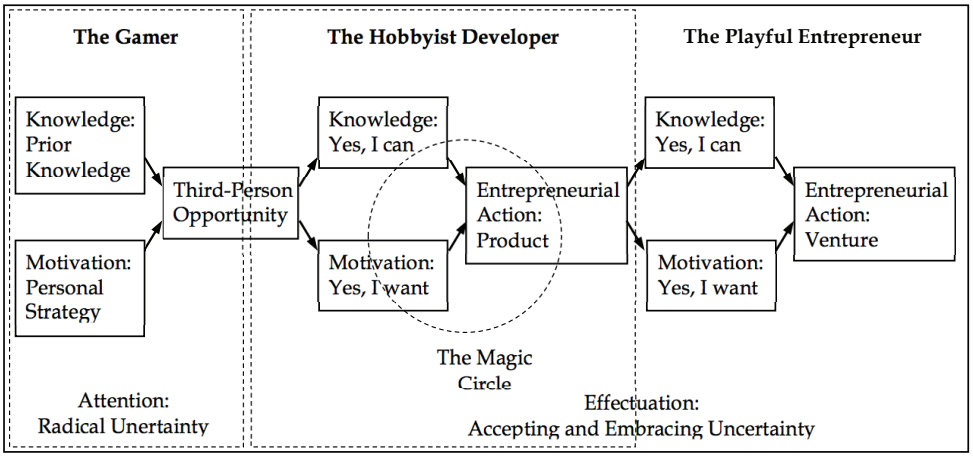

FIGURE 35 The hobbyist developer's entrepreneurial process in the Apple App Store

9.2.1 The Gamer perceives an opportunity

The opening of the Apple App Store profoundly rocked the way in which games were sold and delivered, but what is more, it also changed who is able to develop games and who plays them. The Apple App Store qualifies for a Schumpeterian innovation (Schumpeter 1934), or it can be seen as an exogenous shock to the industry (Alvarez & Barney 2007, 13). Nobody could predict in advance how the market for games would evolve in the iTunes App Store. Although the actions of the developer community as a whole contributed to the evolution, one cannot claim that an individual hobbyist developer created the market, and with it, her own entrepreneurial opportunities. Rather, the first exposure to the opportunity was through alertness and discovery (Kirzner 1997). According to McMullen and Shepherd prior knowledge and personal strategy heighten alertness and as a result third-person opportunities for somebody are discovered (McMullen & Shepherd 2006, 133; Shepherd et al. 2007). Tony, eVp, and Madpoet had prior knowledge of the opportunity, because they were long-time Mac users and frequented forums where the opening of the Apple App Store was speculated about months in advance. This is in line with Autio et al.'s (2013) argument that technological probing provides informational advantages, which facilitate the recognition of technological opportunities. As gamers, Tony, eVp, and Madpoet also saw that The Apple App Store offered an opportunity to develop games; something they all had wanted to do for years. That boosted their willingness to take action.

Sterling did not discover the Apple App Store on a discussion forum; nevertheless, he learned about GameSallad and Corona SDK through discussion forums. Thus, for four of the five developers in this study the third-person opportunity, which they discovered was the marketplace itself or a tool, could be used in coding for that arena. They gained prior knowledge of the phenomenon by being exposed to conversations on online forums, and their motivation was heightened through their embeddedness in the game culture. Adriaan's chain of actions started from an accidental discovery of a genuinely new game idea, and only after that did he choose the iTunes App Store as his delivery channel. He did not start with a third-person opportunity; instead he went directly for a first-person opportunity.

9.2.2 The Hobbyist Game Developer creates a game

In the McMullen and Shepherd model (McMullen & Shepherd 2006, 133) the attention stage is followed by the evaluation stage where the potential entrepreneur evaluates the third-person opportunity and takes entrepreneurial action only after he is convinced that the idea is both feasible and desirable for her. The model assumes that uncertainty must be reduced before action can be taken. Bricolage, on the other hand, implies a bias toward action (Baker & Nelson 2005, 334). In the improvisational approach design and execution converge (Baker et al. 2003, 255). Effectuation assumes a non-predictive strategy where uncertainty is made irrelevant through action (Sarasvathy 2004c). Opportunities can be made as well as found (Sarasvathy et al. 2014). Mauer et al. argue that in regard

to Milliken's three uncertainties means-based heuristics of effectuation (Bird-in-Hand principle) accept state uncertainty, contingency-based heuristics (Lemonade principle) embrace effect uncertainty, and commitment-based heuristics (Crazy-Quilt principle) endegonize response uncertainty (Mauer 2011, 184; Mauer et al. 2013).

Also user entrepreneurship addresses entrepreneurial action. Users identify opportunities by becoming aware of their own unmet needs (Shah & Tripsas 2007, 124). They can start developing a product for their personal use without evaluating its commercial potential. User entrepreneurs are often embedded in user communities. These communities can be an important source of information on user needs. Members of the community can also help to develop the product further, and the community can serve as an initial market for the product. (Shah & Tripsas 2007, 129.) User communities thus are important from both demand and supply point of views. Shah and Tripsas (2007, 133) acknowledge that non-pecuniary rewards are important for user entrepreneurs, and passion is an effective driver for their action.

Cardon et al. (2009) explore the role of entrepreneurial passion in the entrepreneurial process. They argue that passion influences the level of goal challenge, the entrepreneurs' commitment to the chosen goals, and their striving toward goal attainment. Entrepreneurial passion is directed toward activities that are relevant for the entrepreneur's self-identity. Some can be passionate about the creative challenges of designing a new product, for some the thrill comes from the founding stage, and some are passionate about the further growth of the venture. (Cardon et al. 2009, 519.)

What then would be the best way to interpret the hobbyist developers' actions?

Yes, I can

All five defined themselves as experienced or casual gamers. They knew from own experience what games they would like to play, and they also learned on the forums what kind of games others would want to play. They had some experience in programming, and they were able to learn more coding informally and get help from peers on developer forums. Most of them also had other skills related to game development, such as skills in graphic design, animation or music, and/or they knew people who have these skills. Only Tony felt that his own skills were inadequate, and he did not know anybody who could help. Nevertheless, he was able to compensate for this by knowing how to get access to free or low-cost graphics, music, and sounds.

The developers used their own person in promoting their games. They all had a story to tell. Adriaan and eVp gained publicity after winning developer awards. eVp also built a fan base on Touch Arcade, and so did Madpoet. Sterling exploited his fame as a child prodigy, and Tony introduced himself to reporters: "I have a PhD in artificial intelligence, and my new game attempts to solve healthcare problems in the same manner that SETI searches for extraterrestrial intelligence. Would you like to hear more?"

On the surface it looks like their demand-side knowledge and credibility as a developer helped to diminish demand uncertainty, product uncertainty,

and supplier uncertainty (Autio et al. 2013). Nevertheless, the developers did not attach the meaning "impediment to action" to uncertainty. Instead they said that knowing in advance what is going to happen would make life boring. That being the case, there is no point in trying to interpret their actions in terms of uncertainty reduction. Instead, feasibility can be looked upon through the lenses of effectuation and user entrepreneurship.

Effectuation strategies are means-driven: whoever comes onboard brings along his tastes, traits, abilities, education, experience-based, and other types of prior knowledge and his social and professional networks (Sarasvathy & Dew 2013). Demand-side knowledge and credibility as a developer can be seen as manifestations of Bird-in-Hand principle (Sarasvathy 2008). The hobbyist developers are also user entrepreneurs: they are gamers who start to create games, and they are members of gamer communities. These communities offer them access to information about user needs and help and support when they face problems in developing the game. (Shah & Tripsas 2007, 131.) Instead of pondering uncertainty, they base their actions on affordable loss (Dew et al. 2009b). When they only commit what they can afford to lose, they do not have to worry about uncertainty. For effectual entrepreneurs uncertainty is a resource, not a threat (Sarasvathy 2008, 90; Sarasvathy 2004a, 525).

Yes, I want

> Part of the excitement is when you don't know, what is going to happen. (Sterling)

Motivation to work on the game stemmed from a number of non-pecuniary rewards, such as excitement and passion. Järvinen (2008, 360) argues that the emotion of suspense is fundamental for a satisfying player experience. He continues that suspense is modulated through a dynamic between hope, fear, and uncertainty. Uncertainty elicits suspense and is thus a positive emotion for a gamer. Is suspense also an emotion that an effectual entrepreneur appreciates? The idea of suspense seems to resonate well with effectuation: the Lemonade principle welcomes both good and bad surprises (Sarasvathy & Dew 2005b). Perhaps uncertainty is not irrelevant in effectuation after all, but instead of looking at it as an impediment to action one could focus on how suspense can help sustain action?

Shah and Tripsas (2007, 133) propose that user entrepreneurship will be more likely in industries where use provides enjoyment, as opposed to providing pure economic benefit. The game industry qualifies for that: playing games, but also solving the creative challenges in game development, provide enjoyment for the hobbyist developers. Madpoet referred to game development as the ultimate puzzle, Sterling said that programming "lets me do more", and although Adriaan admitted that developing games itself can be a struggle, he continued:

> Games are only fun when they are built. (Adriaan)

Active participation on different online forums not only provided information but was also a source of joy for the developers. In user entrepreneurship the importance of collective social processes and voluntary participation is emphasized (Shah & Tripsas 2007, 135), and voluntary activity together with others is also a core quality in play (Huizinga 1955, Caillois 2001). The icing on the cake were the positive strokes the developers got from the top-lists and download statistics. Intrinsic motivation was the core, but extrinsic motivation helped to keep the momentum. Motivation to stay focused in game development evolved from play-like and game-like elements. The upside was not only perceived in terms of money; the opportunity to engage in a fulfilling action within the sphere of different (Huizinga 1955) was even more important.

9.2.3 The Playful Entrepreneur creates a venture

Entrepreneurship is a process of organization creation that occurs over time (Gartner 1985, 698; Gartner et al. 1992, 15; Gartner et al. 1994, 7), and "the locus of entrepreneurial activity often resides not in one person, but in many" (Gartner et al. 1994, 6). Also the process of user entrepreneurship is emergent and collective. The user takes many steps toward starting a firm, such as making prototypes and products for personal use, without any formal commitment to entrepreneurship. (Shah & Tripsas 2007, 126, 129.) The dynamic process of effectuation creates firms and markets through transformation by the actions of the self-selected stakeholders, who leverage contingencies and only commit what they can afford to lose (Sarasvathy & Dew 2005). Both approaches have in common an entrepreneurial process, not an on-off event, and the process involves more than one person.

Previous studies in effectuation and causation as strategies for firm creation offer somewhat contradicting results. Garonne and Davidson (2010) argue that while effectuation as a "fuzzy and boiling environment" may provide a favorable approach at the early stages of venture creation, it can also increase the time it takes to progress to the next stage. That is why they assume that effectuation prolongs the still trying stage for nascent entrepreneurs (Garonne & Davidson 2010, 328). However, their findings show that while causation speeds up gestation process for nascent firms with lower level of newness, effectuation helps firms with higher level of newness become operational (Garonne & Davidson 2010, 330). Mauer et al. (2013, table 4) find a positive relation between performance rate (gestation speed) and effectuation. Both Garonne and Davidson (2010) and Mauer et al. (2013) agree that effectuation is beneficial in the early uncertain stages of venture creation, but when the firm matures and the environment becomes more predictable causal strategies become useful (Garonne & Davidson 2010, 327; Mauer et a. 2013).

All developers in this study took the first step on the entrepreneurial action ladder and developed products, but only Adriaan, eVp, and Sterling took the next step and founded a firm. Tony is the clearest example of someone in the still trying stage (Garonne & Davidson 2010). He explored the scene meticulously: he learned about different game genres; he understood the finesses of different monetizing models; he mastered several programming languages; he

participated/lurked[38] on various forums; and he was familiar with services like beta-testing sites, review sites, and analytics sites. Yet this knowledge was not enough for him to make a break. One reason for this could be that he had no partners (Gartner 1985, 701). But even more interesting than the question of why he did not make it, is the question of what still keeps him going. Why has he not given up this hobby? The keyword here could be time. Time is his affordable loss, but it is also playtime, a reward in itself. Tony could endure the still trying stage by going in and out of the Magic Circle: outside the circle there was the cash flow from his games, which was enough to pay for the hobby; inside was fun derived from creative alone-time. Entrepreneurship occurs over time (Gartner et al. 1994, 7). Who is to say how long it should take?

Some other 14-years old kid in some other part of the world might have taken the plunge after millions of downloads and coverage on national TV and in The Wall Street Journal. Sterling did not; he is still in school. Caroline started Sterling's story by telling how the entire family loved to read, and throughout Sterling's story the importance of education was brought up. Although both Caroline and Sterling recognized what an amazing opportunity game development was for him, they never considered the option that entrepreneurship could by-pass education. They did go through incorporation, but the firm was seen as a side project, a way to collect experiences and some money for college. User entrepreneurship is accidental and emergent (Shah & Tripsas 2007). It can emerge at unexpected times. For Sterling the time was not right: he had the knowledge, and he could potentially have built the venture in an effectual way, but he did not have the motivation. In his and Caroline's value-system formal education was too important to be overlooked. Nevertheless, the experience and the learning that game development provided him is there, and it might be that in the future Sterling will build a venture on who he is, what he knows, and whom he knows (Sarasvathy 2008). If that ever happens, part of the thanks goes to what he learned through hobbyist game development.

Madpoet did not commercialize his self-published game, but he did commercialize his competence by offering game development as part of his consultancy services. He was self-employed before he started his hobby as a game developer, and he is self-employed now, so technically no new firm was created. Nevertheless, it could be argued that a new organization saw the light of day. For several years Madpoet has had a new profit center in his freelancer business. To make it happen he had to acquire expertise in products, processes, markets, and new technology. He was a new market entrant for his competitors, and his customer(s) got a new source of supply for iOS-games. (Gartner 1985, 698.) Also, it is still possible that the self-published game he develops on the side will one day evolve into a new business entity.

Adriaan started his company before his game was finished, and his process was the most intentional of the five developers in this study (Krueger et al. 2000). He had a clear vision of what kind of games he would want to make, he knew early on that he wanted to start up a company and get an office in the

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[38] To lurk = check the forum very often without ever posting anything

Game Garden. This goal orientation does not automatically imply that he implemented a causal strategy. He did not make a business plan. He did not base his actions on evaluation between different options, and he did not predict the upside of the venture. Instead, in an effectual way the firm was built on affordable loss, which was the revenue from his first game. He utilized well his existing networks and new partnership potential, which opened up for him in the Game Garden. He did not plan in advance that his business model would be based on sub-contracting rather than employing; instead he leveraged the fact that he was surrounded by all these companies and negotiated with the stakeholders. (Sarasvathy 2008.) Adriaan was the only one in this study to take advantage of incubator services (Gartner 1985, 700).

When it comes to game development eVp was a hobbyist, although parallel to this hobby he also founded a firm together with two friends. The first effectual step, creating a game, depicted all effectual principles, but when the original partners did not want to continue in game development the converging cycle of constraints clogged. When life gave lemons, eVp made lemonade by leveraging his competence to the company he had co-founded. By negotiating with his founding partners, who agreed to add iOS development to the services they offer, he was able to stitch another quilt. When he took a detour to Company F the decision was based on learning opportunities, not money, and when he later returned full time to Company Q it was not for money either: he weighed up between a good salary and the possibility to have control over a venture of his own, and he chose the latter. (Sarasvathy 2008.) Besides, he got pleasure from being able to call himself a founder.

The entrepreneurial process of each of the five hobbyist developers in this study did not follow exactly every step in figure 36. Nevertheless, the figure offers the big picture where opportunities are both found and made, uncertainty is embraced, and firm creation is an emergent process, which involves learning and passion (Sarasvathy 2008; Shah & Tripsas 2007; Cardon et al 2009). Like entrepreneurship (Gartner et al. 1994) and play (Huizinga 1955), also game development is an activity that does not reside in one person but in many. In figure 36 the process model is embedded into the framework of this study.

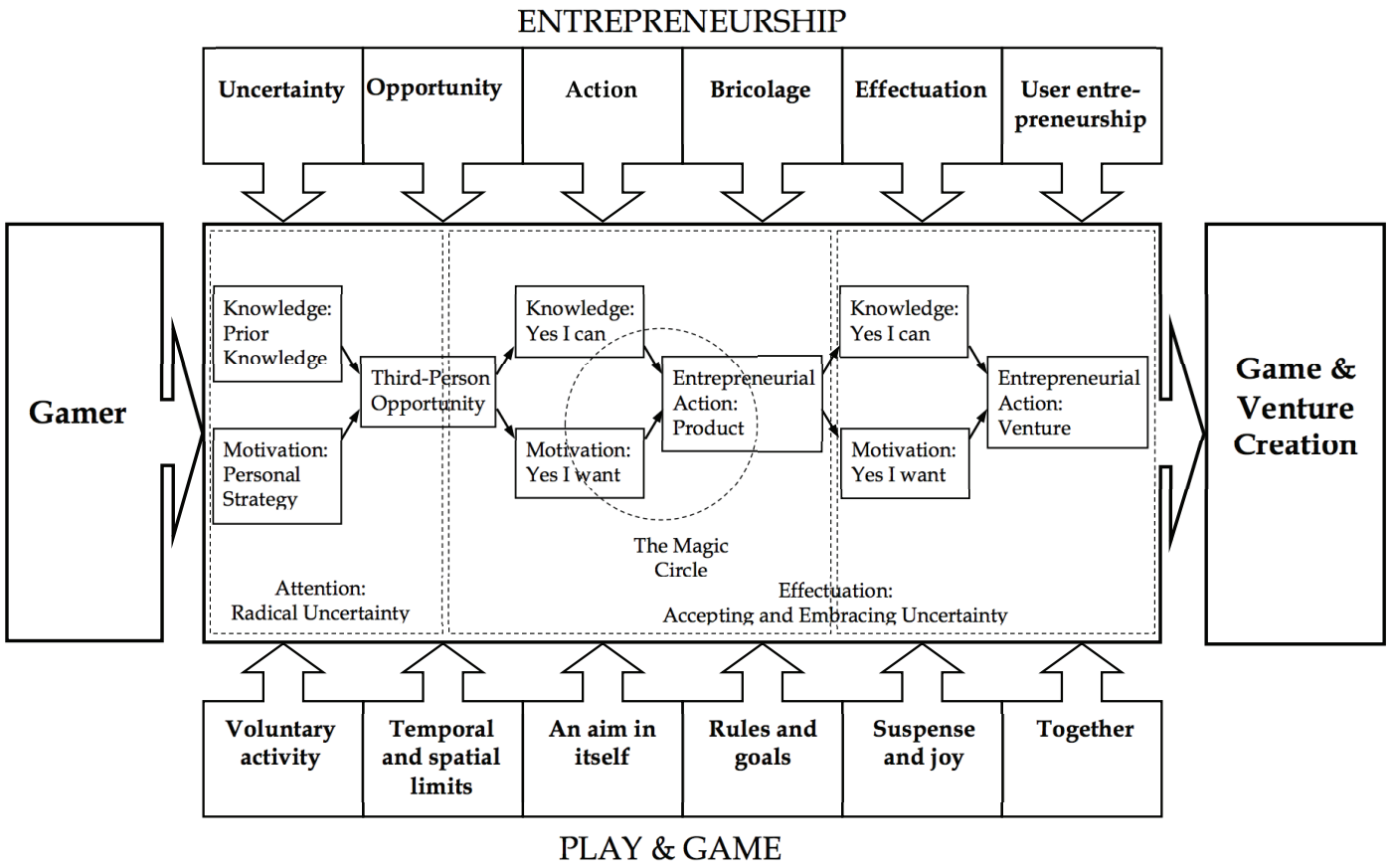

FIGURE 36 The hobbyist developer's entrepreneurial process embedded in the framework of this study

10 CONCLUSION

10.1 Summary of the answers to the research questions

I set out this quest with the following question: How do hobbyist game developers pursue entrepreneurial opportunities and take entrepreneurial action in the Apple App Store? This main research question was divided into the following sub questions:

1. Who are the hobbyist game developers targeting the Apple App Store (in this study)?

2. How does the Apple App Store as an environment enhance playful entrepreneurship?

3. How is effectuation expressed in the actions of hobbyist game developers?

4. How is play expressed in the actions of hobbyist game developers?

5. What is the hobbyist game developers' venture creation process like?

Hobbyist game developers
The question about who the hobbyist game developers are is not asked in order to construct a prototype of a developer to distinguish her/him from the non-developer. This study does not aim to predict who ends up being a hobbyist game developer. Nevertheless, who one is and what one knows affects what kind of opportunities one is readily able to discover and create. That is why the question is relevant for the overall aim of the study.

All the hobbyist game developers in this study are male. Also the secondary sources offer predominantly male accounts. Although mobile gaming is gaining popularity among women and girls, it is still the men who make the games. The age span of the developers is from 14 to 41 years. They represent roughly three age groups: the two oldest ones started gaming in the early 80s when the first home computers arrived; the next two are Internet natives, who

started gaming in mid 90s; and the youngest developer started gaming on an iPod Touch. One has a PhD, two were Master's students at the time when they started game development (one graduated, one quit school), and one holds a BA. The fifth is still in high school, but has definite plans to go to college. Also the secondary sources corroborate that game development is popular among academic, logically inclined men.

However, the hobbyists are not only interested in math and programming, they are multifaceted in their talent and enjoy creative hobbies like music and graphics. They know how to program and how to learn new programming languages by themselves. Three of them are Mac users and perceive that as part of their identity. Most of the hobbyist game developers in this study have relatively little industry or startup experience. On the other hand they are experienced gamers, and all of them are embedded in game culture. They know their way around the Internet, and finding information and online communities is easy for them. They are willing to put a lot of time and effort into developing a game, and they get pleasure from the challenges this offers. They work on a budget and only commit what they can afford to lose if the endeavor fails. They appreciate independence, and perceive that they have a high need for achievement and medium risk-taking propensity. Only one of them perceives high self-efficacy, although I would interpret that all of them have a high task-specific self-confidence. They say that they make games because it is fun.

Play in the Apple App Store

A hobby is a form of play. It is not pursued for wages; the action is taken for pleasure (Caillois 2001, 32). Hobbyist game developers thus at least start their venture within the realm of different. But do they still play when they turn professionals? My original exposure to hobbyist game development made me think that developing a game in itself resembles a game: the top-lists and download statistics looked like just another form of leaderboards and scorecards. Now, after 5 years, I perceive that the play element is actually more important for the hobbyist game developers than the game element. Statistics and ratings give pleasure, but they are just the tip of the iceberg. What matters more is the fun and suspense that takes place at the stage when it is still uncertain whether the hobbyists can solve the challenges of developing a fully functional, visually appealing game that the market will appreciate.

The Apple App Store has many game-like qualities, but it still is just a marketplace, not a game. Its mobile interface is a powerful game element, because it offers a multitude of contexts where the hobbyist game developer can slip into his game world. On the surface this seems to dilute the idea that play is always spatially separated from the ordinary life (Huizinga 1955, 10), but what it really tells is that the mobile interface has a power to open a back door to a parallel space.

A well functioning game provides enough information, its rules are not arbitrary, and it is more fun to play it with others than by oneself. In these areas the Apple App Store fails as a game system. However, the ecosystem around the Apple App Store is extensive, and the hobbyist game developer can easily find other service providers for the missing behavioral elements and infor-

mation. What he cannot compensate is the dominance of Apple Inc. Nevertheless, for a hobbyist developer the trustworthiness and the global markets that the Apple App Store enables out-weigh the disadvantages. This offers ample opportunities for the playful entrepreneur, although the Apple App Store game is undeniably broken at certain points.

Game development in the Apple App Store is not an example of gamification. In gamification somebody from outside injects game elements and mechanics to a non-game environment for her own purposes (Werbach 2015). Even though the hobbyist developers applied some game mechanics while developing games, an outsider did not deliberately plant them, they were assumed by the developers themselves. Perhaps there never was a game of developing a game after all! Nevertheless, there was plenty of fun and playfulness in the pursuit!

Effectuation

The actions of the hobbyist game developers depict all five principles of effectuation. The developers start with their identity, their informal and formal knowledge, and the people they know (Bird-in-Hand principle); they are more interested in the down-side of the venture than the uncertain revenues it may bring along in the future (Affordable-Loss principle); who comes on board is negotiated based on pre-commitments (Crazy-Quilt principle); the hobbyist game developers are willing and able to leverage sweet surprises like awards and publicity, but also bitter ones, like the inability to keep the partners focused in the venture (Lemonade principle); and they want to have control over their projects (Pilot-in-the-Plane principle) (Sarasvathy 2008). The principles that matter the most vary at different stages of the entrepreneurial process. It seems that in order to advance from creating a product to creating a venture, the hobbyist game developer needs to face contingencies and must be able to leverage them.

Effectuation is not only known for its five principles but also for being learnable. In line with this, all the informants discuss learning. For them the ability to learn new things is often a more important driver for action than direct revenues. The ideas of reflection-in-action seem to resonate well with effectual learning (Schön 1983, 40).

Unambiguous goals are necessary in games, but in effectuation goals are flexible. This fundamental difference would suggest that applying effectual strategies is not within the realm of game. On the other hand, being able to choose different sub-goals and strategies to reach the overall goal is characteristic of games. Creative pursuit of sub-goals also takes place in effectuation. Playfulness can be the common attribute in effectuation and in games, even though effectuation grasps emergent goals instead of fixed ones (Malone 1981, 358).

Venture creation process

The venture creation process of the hobbyist game developers is interplay of opportunity discovery and opportunity creation. The opening of the Apple App Store is a third person opportunity, which three of the informants discover. They are all Mac users, who follow news about Apple and know in advance

that the store is to open. Their motivation to explore the opportunity is heightened because they have earlier wanted to make games, and the new platform now allows them to do just that. This is in line with Shepherd et al. (2007).

All the informants have in common that unlike McMullen and Shepherd (2006) they do not presume that uncertainty must diminish before action can be taken. Instead, first person opportunities are created through effectuation. The informants take the plunge when both "Yes, I can" and "Yes, I want" are true. The first level in the process is creating a product, and on the second level a new venture sees the light of day. Playfulness is strongly present especially in the game development stage. Only two of the informants advance from creating a product to creating a full-time venture, two carry out game development as a profitable side project, and one is at the *still trying* stage (Garonne & Davidson 2010; Gartner et al. 1994).

10.2 Theoretical contribution

One could wonder what contribution this small narrative study could make to entrepreneurship research as a whole. After all, the study addresses a small niche, and there are only ten informants (five developers and five team members) telling their stories. I see an analogy to a situation where a new ingredient is first detected in a concentrated liquid, and only after that discovery does the researcher knows to look for it in a more dilute liquid. Play and game and the emotions they elicit can be more relevant for the hobbyist game development process than for an entrepreneurial process in general. Nevertheless, the context of hobbyist game development may offer just that "concentrated liquid" that is needed to detect the connection between effectuation and play, and afterwards it might be found in other contexts as well. The findings of this study suggest six contributions to entrepreneurship literature:

1. Effectuation is not only a set of learnable heuristics but also a set of transferable heuristics.
2. Possible reasons for why the operationalization of effectual stakeholder commitment has failed can be the narrow view the measurement scales have taken on stakeholders, and their inability to capture the mechanism, which ties together affordable loss and pre-commitment.
3. Effectuation coincides with play.
4. Uncertainty is not always an impediment to entrepreneurial action. It can also drive action.
5. The venture creation process of the hobbyist game developers is interplay of opportunity discovery and opportunity creation, and first-person opportunities are created through effectuation in two stages.
6. Actantial model and its applications can be usable tools to analyze qualitative data in effectuation research.

Prior studies have shown that expert entrepreneurs use effectual strategies. The interpretation offered is that effectuation is learned in the process of becoming an expert entrepreneur (Sarasvathy 2008). It is argued that expertise has a generic component, which applies in different domains, but each domain has a set of domain-specific heuristics, and experience in one domain does not transfer into expertise in another (Dew et al. 2009, 290). The hobbyist game developers in this study use effectual strategies in venture creation. They are all nascent entrepreneurs but expert gamers. This finding suggests that effectuation is not only a set of learnable heuristics as argued before but also a set of transferable heuristics, which can be learned in a kindred domain such as gaming and later on transferred to entrepreneurial action.

Recent scales, mainly based on Chandler et al.'s (2011) groundbreaking work, operationalize effectual stakeholder commitment by statements that are rooted in the causal discourse. It is no wonder that pre-commitment/alliances therefore seem to be a component shared by both causation and effectuation (Chandler et al. 2011, 386). The stakeholders, who are mentioned by name in the scale, are customers and suppliers. However, in the app economy new types of stakeholders, such as global developer and user communities, have an important role in co-creation. Furthermore, the scales do not capture how the mechanism of effectual stakeholder commitment differs from any other form of networking. It seems that at present the scales interpret well the impact of the expanding cycle of resources, but that they fail to capture how the converging cycle of constraints works in effectuation (Sarasvathy & Dew 2005a, 543).

Previous studies (McKelvie 2011; Mauer et al. 2013) have shown that effectual entrepreneurs are less likely than others to view uncertainty as an impediment to action. Game studies, on the other hand, argue that the emotion of suspense is fundamental for a satisfying player experience. Suspense is modulated through a dynamic between hope, fear, and uncertainty, and for a gamer uncertainty is a positive emotion. (Järvinen 2008, 360.) As a non-predictive logic effectuation welcomes suspense: when actions are based on affordable loss and both positive and negative contingencies are leveraged, the entrepreneur can afford the luxury of suspense. Desire for suspense can thus be one attribute that helps effectual entrepreneurs to embrace uncertainty and keeps them focused on creative actions for shaping the future (Mauer 2011, 174). This study suggests that uncertainty is not an impediment to action when the venture is based on affordable loss and the developer enjoys suspense. Suspense ties together effectuation and play.

Prior studies (McMullen & Shepherd 2006; Shepherd et al. 2007; Cardon et al. 2009) have shown that motivation and passion direct entrepreneurial action. The hobbyist game developers in this study take action on first-person opportunities in two stages. Depending on how they perceive "Yes I can" and "Yes I want" they first create a game, and sometimes proceed to creating a venture.

The qualitative research tradition in effectuation is rooted in experimentation and think-aloud protocols. While this method is very good in capturing the informants' reasoning in real-time without any retrospective sensemaking, it also is a heavy approach. The actantial model and its applications could be usable, light tools in small research projects.

10.3 Practical implications

The Apple App Store has undergone a transformation since 2008. Hobbyists, like other user entrepreneurs, have more breathing room in the dawn of an industry when embeddedness in the field offers them knowledge of an opportunity that is not yet evident to the established companies. They can compensate for the lack of capital with the time they put into making things. When the market later matures, big actors with more resources easily overwhelm the hobbyists. At present the dominant model for offering games in the Apple App Store is Free-to-play. For this monetizing model to work, the games must have hours and hours of gameplay; something that is out of reach of most hobbyist developers. Nevertheless, even though the scene has changed, there still are some practical takeaways from this research.

This study suggests that the affordable loss principle is beneficial for hobbyists. It allows quick action, and in emergent markets speed is what counts. It is good to be among the first ones to explore the new territory. There is an opportunity for revenues, but even if the original business idea fails, the entrepreneur does not have to fail. She can later leverage the experience to other uses. It is beneficial to have many hobbies, which can be combined in various ways. The founder can seldom concentrate on only one thing, like coding; instead she must be able to contribute on several aspects of game development. However, even when the founder is multitalented, it is better to have team members than to work alone. Team members not only take some tasks off the founder's shoulders, they also serve as playmates and add to the fun.

It is a good idea to join developer forums and to subscribe to Developer Economics and App Annie or whatever media later replaces them. Forums and publications offer insights into current trends in the app economy and discuss new tools that can speed up development process and provide more accurate information on, how and by whom the games are played.

Online communities are important channels for mingling with one's customers. One-way push of marketing information is no longer enough; the consumers want to be in dialogue with the developers. That is why even in small ventures somebody should take the role of a community manager. This new job is becoming increasingly important in tech companies.

10.4 Implications for education

During the years when I was involved in entrepreneurship education I often thought that it was not just about what was studied; it was even more about how the studies were implemented. It often seemed to me that actionable entrepreneurial competencies actually were learned in courses other than entrepreneurship. That is why I perceive that this study has implications not only for entrepreneurship education but also for education in general.

The hobbyist game developers in this research each created projects, and many of them had team members. They put plenty of time and effort into each project and learned a lot in the process. The obvious takeaway for education thus is: run the courses as project-based teamwork. However, this study also offers other, more fine-tuned cues on how exactly this could be implemented.

As teachers we should be more interested in what the students already know and are good at. What is more, we should help the students themselves to become aware of the knowledge and skills they have learned in other walks of life, such as hobbies, and make them realize that this competence is valuable also in the context of the course we teach. When the course is tied to something the students are passionate about the chances are they will get passionate about the course as well.

Building on the prior knowledge quite naturally extends learning outside the classroom. Family, communities around the hobbies, networks at the students' workplaces, and the companies where they take their internship should all be seen as extended resources. Just like the extended enterprise approach acknowledges that a company does not operate in isolation, and instead its success depends on a network of stakeholder relationships. Reaching out for new networks should also be encouraged. Game development is not the only industry that can benefit from participation on online forums and communities. The course structure should be designed in such a way that the students can take action based on their strengths, their existing networks, and the new networks they create during the course.

Some students have an instrumental approach to studies; all that matters is the grade. Taking bigger risks could deepen the learning experience, but if taking risks jeopardizes a good grade these students choose the safe path rather than the more uncertain one. And to be honest, this often is quite rational behavior! If we as teachers believe, and I think we should believe, that school should offer students an environment where they can safely experiment, iterate, and even fail, we should rethink the assessment methods we use. Is the end result all that counts? If not, how do we take into account the learning that takes place during the process? Adriaan and eVp reflected on their journey openly in blog entries, YouTube videos, and public presentations. Also many other hobbyist developers (not the informants in this study) publish public *post mortems* where they share and analyze their actions in game development and when the game is launched in the marketplace. Similar process documentation/reflection could be included in the coursework. Well-analyzed failure could be as valuable as good performance also when it comes to grades.

A practical problem we as teachers always face when implementing team projects is how to form the teams. Should the teacher appoint the teams, and if so, should they be random, homogenous, or heterogeneous? Or should the students have the right to form the teams the way they please? It was interesting to notice that both Adriaan and eVp learned to know their future partners at school in teams that were randomly chosen. This could suggest that in the beginning of the studies it is good to mix students in order to give them an opportunity to work and meet with a lot of different people, not just with their friends. Although Adriaan mentioned that many times teamwork with random partners

did not work well, even that was a valuable learning experience. Toward the end of the studies, when students already may start projects targeting real markets, self-selection might be a good option.

No matter how the teams are formed, one challenge always remains: how to ensure effective teamwork? One takeaway from this study is to introduce the idea of pre-commitment to school projects. There are many pre-commitments the team members could make to create constraints against sloppy teamwork in the future. One concrete pre-commitment could be setting up time and space for each team meeting at the beginning of the course. When appointments are marked in the calendar in advance, it is more difficult to opt out.

It is a standard pedagogic practice to define the learning outcomes at the beginning of the course. If they are very detailed, there is little room for surprises. The study suggests that the goals should be open enough to allow unanticipated outcomes to emerge. In opportunity-based education the students should be encouraged to not only discover opportunities but also to create opportunities and leverage contingencies.

Timing sometimes becomes an issue. The courses usually have tight schedules with explicit submission deadlines. The stories of the hobbyist developers on the other hand show that the creative entrepreneurial process has a rhythm of its own. Instead of squeezing an entrepreneurship course into 6 weeks, I would welcome the possibility to stretch it at least over a whole semester and let the teams come up with their own check points. From the teacher's point of view this would mean that she should be able to tolerate the chaos of unsynchronized processes. Instead of controlling each process, she should give guidance and counseling and help the teams to gain autonomy. Some might need a lot of support in taking responsibility and creating disciplined work habits, but ultimately it is the students' duty and prerogative to take control of the projects and of the learning that follows.

Although external rewards like game statistics are meaningful for developers, I do not take this as proof of the need to gamify education. Learning does not need to be funified, learning is fun (Järvilehto 2015). Providing challenging tasks for different kinds of learners strengthens their intrinsic motivation and diminishes the need for extrinsic rewards. The methods we use should give room for playful experimentation, co-creation, and joy. The assignments should have a purpose for the learner, and they should provide an opportunity for mastery. One takeaway from games is the need for immediate, or at least timely, feedback.

In the strictest definition play should be an aim in itself, and it should not have real-life consequences (Huizinga 1955; Caillois 2001). Passing a course, gaining a diploma, learning to take entrepreneurial action etc. all have real-life consequences. It is also true that sometimes attempts to inject learning goals to games totally ruin the mystery and fun. Would this imply that there is no room for play in education? In this research the magic circle is drawn with a dashed line to indicate that it is possible to travel between the ordinary and the different. The take-away for education could be that while the students are still within the magic circle the play should not have too obvious and fun-killing learn-

ing aims, but once the play is over they should be invited to reflect on what took place.

One difficult question related to the use of games in education is their inherent competitiveness. As teachers many of us are reluctant to enhance competition between the students. At the same time we know that experiences of winning and losing are good training for any entrepreneur-to-be. Adriaan, eVp, and Stephen discuss the meaningfulness of the different competitions in which they have participated. The teacher does not have to initiate competitions herself. Instead she can outsource the task to different organizations, which organize competitions, and encourage her students to participate in them with their school projects.

Although the mobile app stores have over the years become tough spaces for a hobbyist to be successful, I still think every coding teacher should introduce these arenas to her students. Developing an application is not just about programming. Students with different competencies should have an opportunity to cooperate across disciplines. When the final product is launched in one of the stores the developer team is exposed to a whole new learning experience. They learn about the app store mechanics, how to promote the app, how to use analytics etc. What is more, the team members get immediate feedback and joy from the inbuilt statistics. This in turn means that the teacher no longer needs to be the only source of feedback.

10.5 Limitations of the study

The research interest of this study is to interpret the actions of hobbyist game developers. The stories of the five developers and their five team-members together with the secondary data offer sufficient empirical evidence for that purpose. However, a different approach should be adopted if the aim were to find more generalizable results.

More concerning than the small amount of informants is the fact that while the study gives a description of the developers' actions and suggest connections between the constructs, it does not offer proof of any causal relationships. Nevertheless, this broad interpretive approach helps to identify topics for future research that can focus on the mechanisms in more detail.

One of the informants is my son. This is a strength in the sense that it allows me to have direct access to information, which could otherwise be unattainable. On the other hand it is also a possible limitation: it can be hard to distinguish between what I have learned as a researcher and what I know as a mother. Our relationship may also have affected other informants in chapter 8, The Team. I am aware of this issue, and have done my very best to keep integrity at all stages of the study.

Another issue regarding the informants is the fact that they all come from industrialized, western countries. At the time when I started the study it was not very common to be a hobbyist game developer from Africa or Asia, but

times are changing and it now is a limitation that none of the informants are from the emerging economies.

Using play and game as a lens to study entrepreneurial action is a novel approach. The study would have benefitted from a deeper insight into the theories of play and game. As it is, in this study the impact of play and game is still theoretically sketchy. I welcome future studies carried out by teams of play and game scholars and effectuation researchers.

The structure of the report follows the hermeneutic circle, as I perceived it. While the approach served well during the research process, the reader might have welcomed a less repetitive and winding manuscript.

10.6 Suggestions for further research

This study suggests that hobbyist game developers can learn effectuation by gaming. Also Neergard and Krueger (2012, 8) discovered that prior expertise in sports, a form of play, offers dormant potential, which the entrepreneurs can put into action in their businesses. This calls for research that focuses on the transferability of effectuation, particularly from play and game to entrepreneurial decision-making.

Effectuation principles are based on research on expert entrepreneurs. Sarasvathy's original research instrument is a set of decision problems, which arise in the context of building a new company for a serious game (Sarasvathy 2008, 309). This would offer a delicious opportunity to replicate the original study, this time with expert gamers with no experience in entrepreneurship.

The study suggests that rational choices and monetary rewards offer too narrow a view on drivers for entrepreneurial action, and the impact of emotions deserves to be studied more. The role of emotions is an emergent theme in entrepreneurship research (Entrepreneurship, Theory and Practice Special Edition 2012). Furthermore, Astrachan and Jaskiewicz's (2008) study on the effect of emotions in the family entrepreneurship context show that emotional returns and emotional costs together with economic returns and economic costs affect how family entrepreneurs perceive the total value of the family business. Also user entrepreneurship literature (Shah & Tripsas 2007, 133; Chandra & Coviello 2010, 230) states that the actions of consumers as entrepreneurs are driven by things like the following: satisfaction, autonomy, enjoyment from interaction with others, reciprocity, desire to help, joy of learning something new, reputation, and the over-all 'love-factor'. Nevertheless, the impact of emotions has not yet been profoundly researched in effectuation, and research in that area would be in place.

In the light of this study, one emotion which deserves a closer look is suspense. The hobbyist game developers might be more prone to enjoy suspense than nascent entrepreneurs in general. Nevertheless, it is possible that even other entrepreneurs, who base their venture on affordable loss, can grant themselves the luxury of enjoying suspense while taking entrepreneurial action.

Both hobbyist game developers and established companies benefit from the social and participatory practices common in different global online arenas. To compliment the current effectuation research, where pre-commitment/alliances are mainly operationalized in terms of customer and supplier participation, this study invites further research on the operationalization of the mechanisms of effectual stakeholder commitment in the tech domain.

Taxation and the like are out of the boundaries of this study. However, during my research I learned that although the Apple App Store is a global marketplace, the terms of making business in it are not identical in different countries. It seems that this new economy has taken many countries by surprise, and the guidelines regarding the app economy are sometimes vague. It would therefore be interesting to carry out research on how different countries arrange the taxation of app revenues and what impact this in turn has on the entrepreneurial process.

YHTEENVETO (FINNISH SUMMARY)

Viime vuosikymmeninä yrittäjyystutkimus on käynyt läpi paradigman muutoksen: huomio ei enää ole yksilön piirteissä, vaan keskeiseksi on noussut mahdollisuuksiin tarttumisen prosessi. Tosin tutkijoiden kesken ei edelleenkään ole yksimielisyyttä siitä, miten yrittäjyysmahdollisuudet syntyvät. Riittääkö, että yrittäjä seuraa valppaana ympäristöään ja löytää ne, vai pitääkö hänen luoda omat mahdollisuutensa? On myös tarpeen ymmärtää paremmin, miten yrittäjän kokema epävarmuus vaikuttaa hänen haluunsa tarttua toimeen.

Työni kiinnittyy tähän keskusteluun. Tutkin harrastajapelinkehittäjien yrittäjämäistä toimintaa Apple App Storessa. Raportissa kuvataan ja analysoidaan taivalta pelaajasta (Homo Ludens) pelinkehittäjäksi ja leikkisäksi yrittäjäksi, joka ei luo pelkästään tuotetta, vaan luo myös organisaation.

App Store –yrittäjyyttä voisi tutkia monesta näkökulmasta. Minun valintani on keskittyä harrastajiin, jotka aloittavat pelien tekemisen vailla tietoista yrittäjyyspyrkimystä. Mikä alkaa pelkkänä hauskanpitona ystäväporukalla, voi myöhemmin saada organisoituja muotoja, kun harrastajapelinkehittäjät oppivat uuden markkinapaikan toimintatavat. Akateeminen uteliaisuuteni heräsi, kun pääsin läheltä seuraamaan yhden harrastajatiimin toimintaa ja näin, ettei kehitystyö edennyt systemaattisesti suunnitelmista toteutukseen ja toiminnan arviointiin. Sen sijaan niin pelin kuin yrityksenkin kehittäminen näytti ajoittain muistuttavan pelaamista. Siksi yhdistän työssäni yrittäjyyden ja pelin ja leikin teorioita pyrkimyksenäni tulkita, mitä tapahtuu ruohonjuuritasolla nykyisessä peliliiketoiminnan murrosvaiheessa.

Tutkimuskysymys on:
Miten harrastajapelinkehittäjät tunnistavat ja luovat yrittäjyysmahdollisuuksia ja tarttuvat toimeen Apple App Storessa?

Alakysymykset ovat:

1. Keitä App Storessa toimivat harrastajapelinkehittäjät ovat (tässä tutkimuksessa)?
2. Miten App Store ympäristönä edistää leikkisää yrittäjyyttä?
3. Miten effektuaatio ilmenee harrastajapelinkehittäjien toiminnassa?
4. Miten leikki ilmenee harrastajapelinkehittäjien toiminnassa?
5. Millainen on harrastajapelinkehittäjien yrityksen perustamisen prosessi?

Kysymyksessä on tapaustutkimus, jossa on tulkinnallinen tutkimusote. Viiden harrastajapelinkehittäjän ja viiden tiimiläisen tarinat koottiin Skype- tai Facetime-haastatteluin. Puhutut tarinat nauhoitettiin ja analysoitiin narratiivisin menetelmin: tapauskohtaisissa analyyseissä käytettiin aktanttianalyysiä, ja tapausten yhteistä antia analysoitiin teemoittain. Luotettavuuden parantamiseksi haastatteluja täydennettiin muista lähteistä kerätyillä tiedoilla, kuten seuraamalla keskustelufoorumeita ja podcasteja sekä tilaamalla aihetta käsitteleviä verkkojulkaisuja.

Tutkimuksen keskeisimpiä tuloksia ovat:

- Epävarmuus ei aina ole yrittäjämäisen toiminnan este. Se voi myös kannustaa toimintaan silloin, kun pelinkehittäjä nauttii epävarmuudesta ja hänen päätöksentekonsa perustuu effektuaation "varaa hävitä" –periaatteelle.
- Effektuaatiota ei opita pelkästään yrittäjänä, vaan sille ominaisten heuristiikkojen käyttöä vai oppia myös pelaamalla.
- Nykyiset effektuaatiomittarit näkevät sidosryhmät liian suppeasti eivätkä riittävästi tavoita ”varaa hävitä”- ja ”ennakkositoumus”-periaatteiden välistä dynamiikkaa
- Harrastajapelinkehittäjän yrittäjyysprosessiin kuuluu vaiheita, joissa hän tunnistaa yrittäjyysmahdollisuuksia, mutta myös hetkiä, jolloin hän itse luo nuo mahdollisuudet. Prosessi on kaksivaiheinen: osalle riittää pelin tekeminen, toisten intohimona on jatkaa yrityksen perustamiseen

Käytännön kannalta tärkeä huomio on, että harrastajapelinkehittäjälle on tärkeää olla mukana verkkoyhteisöissä. Samoista asioista kiinnostuneilta vertaisilta saa paljon apua pelinkehitykseen. Yhteisöt ovat tärkeitä myös siksi, että niiden kautta kehittäjällä on suora yhteys asiakkaisiinsa. Tutkimuksen perusteella vaikuttaa lisäksi siltä, että effektuaation ja leikin periaatteita olisi syytä hyödyntää laajemmin myös koulutuksessa.

Avainsanat: effektuaatio, harrastaja, leikki, peli, yrittäjyys

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Talks

Emeritus Professor Matti Bergström: Black and white play 08.09.2011

PhD Lauri Järvilehto: Playful learning 03.27.2015

APPENDIX 1 MY RESEARCH JOURNEY

	Theory	Practice
2008	Course work: – Introduction to scientific thinking – Research process and research plan – Research, a path of choices – Philosophy of Science Conferences: – Entrepreneurship Education (YKTT), Mikkeli, no presentation Attended PhD defenses: – Jussi Pihkala (entrepreneurship) – Hannu Nyyssölä (entrepreneurship) – Pirjo Takanen-Körperich (entrepreneurship) – Arja Rankinen (entrepreneurship) – Maria Suokannas (marketing)	I followed, how my son developed his first iPhone game. At this time I just had a purely non-academic interest in the iTunes App Store
2009	Course work: – Entrepreneurship Education – Innovativeness and Intrapreneurship – Entrepreneurial marketing – Academic Writing and presenting – Analysis of Research Ideas – Entrepreneurship in Service Sector	I started to follow discussions on Touch Arcade developer forum, http://forums.Touch Arcade.com
2010	Course work: – Academic Writing 2 – Narrative analysis – Narrative workshop Conferences: – RENT XXIV, Maastricht conference and doctoral consortium Attended PhD and Licentiate defenses: – Petri Lankoski (game design) – Mariitta Rauhala (entrepreneurship) – Teemu Leinonen (pedagogy) Serendipic encounter: – Helle Neergard	– Continued to follow Touch Arcade developer forum – Collected data on a single case from YouTube, Vimeo, blogs, web pages, newspapers etc. (for my "bridge Master's theses").
2011	Course work: – Entrepreneurship as Making, Kolding Professor Saras Sarasvathy and Professor William Gartner Conferences: – USASBE, Hilton Head Island conference and doctoral colloquium – ICSB, Stockholm conference attendance with paper presentation	– Participated in discussions, and made a small survey on "Who you are" on Touch Arcade developer forums – Started to follow Experimental Game Dev Podcast Show, http://www.indiegamepod.com – Collected data for the paper on team building (eVp, Tabus, Stephen, O&J)

	Theory	Practice
2011 continues	– Entrepreneurship Education (YKTT), Lappeenranta conference attendance with paper presentation – Effectuation Conference, Lyon conference attendance with paper presentation, workshop with Professor Saras Sarasvathy and Professor Stuart Read Attended PhD defenses: – Leni Kuivaniemi (entrepreneurship) – Outi Hägg (entrepreneurship) – Auli Pekkala (entrepreneurship) Interview with Professor Matti Bergström (play) Turned in my Master's theses (a single case study)	– First contacts with Tony – Contact with OvO, who soon dropped out
2012	Course work: – 22nd European Doctoral Summer School on Technology Management "Organizing Innovation and Entrepreneurship", Twente – Reading course in entrepreneurship and innovation, Aalto University Workshops: – Entrepreneurship Education and Central Baltic Networks, Helsinki and Riga Attended PhD defenses: – Kimmo Mäki (entrepreneurship) – Jari Luomakoski (entrepreneurship)	– Touch Arcade developer forum – Experimental Game Dev Podcast Show – Interviews with Adriaan, Madpoet, Caroline and Sterling
2013	Conferences: – USASBE, San Francisco conference attendance, participation in developmental paper roundtable – Effectuation Conference, Lyon conference attendance with paper presentation Attended PhD defenses: – Maija Suonpää (entrepreneurship) – Raija Niemelä (entrepreneurship) – Seppo Salo (entrpreneurship)	– Touch Arcade developer forum – Experimental Game Dev Podcast Show – Subscribing Vision Mobile – Interviews with Tony and eVp
2014	Course work: – EDEN Doctoral seminar 'Current themes and research in Entrepreneurship' Attended PhD defenses: – Reija Sandelin (entrepreneurship)	– Writing the thesis

The table depicts the interplay of theory and practice during my research journey. I did not finish all the course work listed in the table: some of the early courses I just attended for fun, but didn't submit the assignments. The conferences were very important: it is easier for me to understand, what I hear than what I read. I have also included all the defenses I attended because they were a meaningful transition ritual from everyday life to the academic world.

APPENDIX 2 TASKS FOR THE INFORMANTS - Team building, Chapter 8

Four tasks were delivered consecutively to add a playful element. The tasks were delivered using Dropbox, a cloud computing service that allows file sharing for free. The timeline template was available on Google Documents (now Google Drive). If the informants had questions regarding the tasks, we discussed them in Skype. There was an option of audio chat, but all informants preferred text chat. The four tasks were:

Task1, **Profile Card**
Design a profile card for an indie developer; include all the competences, experiences, contacts and so on, that you think are relevant. Fill in the card with your own data. Save the card in our Dropbox folder and wait for your next task. Thanks!

Task2, A Picture of Your Team
Draw a group picture of all the people involved in your App-project (including yourself!), give a short explanation of their role and their contact information. Save the picture in our Dropbox folder and wait for your next task. Thanks!

Task3, Your Story
Tell your story as an indie developer and record it. Start by telling, who you are and when you were born, and continue by telling about events and people that where of importance "before, during and after" your game project. Try to share anecdotes instead of only listing facts. Save the audio in our Dropbox folder and wait for your next task. Thanks!

Task4, Timeline
Draw a timeline of "your actions" and "their actions" + the effects these actions had. Your actions refer to you and your teammates, their actions to Apple, competitors and other outsiders. Use the template I have provided on GoogleDocs. Congratulations, you have now fulfilled all the tasks! Thank you!

APPENDIX 3 THE INTERVIEW THEMES

Welcome to this interview. First some practical issues. I have uploaded a letter of consent to your Dropbox folder. I suggest that by agreeing to talk to me now, you also agree that I can use your interview in my research as described in the letter of consent. Is that ok with you? (One of the interviewees was a minor, and from him and his mother I collected a signed form).

Next thing is your nickname. What is the name by which you want to be referred to, when I quote you in the manuscript?

I see this interview like a play with four levels. The first level is, what happened before you ever thought of becoming an iApp developer: your childhood, hobbies, friends, school work experience and so on. The second level is the making of the game. Third level is, what you did to keep it alive in the App Store, marketing and such things. The fourth level is, what happened, or what you wish will happen, after the game. Is this clear?

I hope that I can stay quiet as much as possible, so that I won't interfere with your story too much, but occasionally I'll add some questions, so that you can elaborate, what you already said. During the interview I may also make some small summaries of what has been discussed, just to check that I haven't lost your point. Also, if you get stuck, feel free to ask, how to continue.

My first question then would be: tell me your first childhood memory and from there on continue to talk about your childhood.

This is how I started the interviews. Most of the informants were comfortable with these open instructions, but Sterling and Caroline would have preferred to get more concrete interview questions in advance. That is easy to understand from the point of view that Sterling was only 16 at the time of the interview, and telling his story was not quite as easy for him as it was to older informants, who already had more life experience. I didn't send a list of question in advance to them either; nevertheless, my role in the dialogue was more dominant than in the other discussions. That is, I asked more direct questions from Sterling and Caroline to help them through the four levels.

There was one theme I took up with each informant. It was: what is your relationship to uncertainty? Most of the informants somehow touched that subject themselves, and all I did was ask them to elaborate on it, but some only discussed it after I asked this direct question.

On the whole during level one I was fairly silent, during level two I picked up the topics the informants discussed and participated in the dialogue, during level three I even added some questions they didn't bring up (technical question about the third-party services) and during level four I again participated in the dialogue on the topics they brought up.

APPENDIX 4 MAKING AND MARKETING THE GAME

The making of the game

	Adriaan + Team	**eVp + Team**	**Madpoet**	**Sterling + Caroline**	**Tony**
Inspiration	"I saw how touching each other's hands in a school project made people feel awkward" Concepts that go beyond the screen	Real-life coin machine. Childhood toy	Something I could do Something I'd like to play myself	Something I'd like to play myself	Childhood game 3D simulation from work "Wordgames seemed like a genre with a large audience" Real-life competition
Game concept	Adriaan	eVp	Madpoet	Sterling	Tony
Coding How? By whom?	BE's own engine BE, the partner	Objective-C and Box 2D, Pangea eVp	Unity 3D Madpoet	Corona SDK Sterling	Objective-C Unity 3D Tony
Graphics	TH & FJ Subcontractors	eVp	Madpoet	Sterling	Tony, royalty free and low-price third party
Sound	NV Subcontractor	Tabus Partner	Royalty free sounds	Sterling	Royalty free sounds
Music	NV Subcontractor	O & J Partners	Royalty free music	Sterling	Royalty free music
Levels	Adriaan and BE	eVp, Tabus, Stephen Infinite levels, algorithm by Tabus User-made levels	Madpoet	Sterling and Caroline Community Levels (=user-made levels)	Tony
Beta-testing	Adriaan, BE	Tabus, Stephen, eVp	No outsider, Madpoet	Caroline, Sterling	Tony, ibetatest.com
Forums (as source of information)	No mention	"The Web"	Unity forums	Corona forums	Unity forums

Marketing the game

Marketing	Adriaan + Team	eVp + Team	Madpoet	Sterling + Caroline	Tony
Monetizing model	Paid Freemium	Paid Free -> Free with ads Freemium	Paid, occasionally on sale for free	Free Freemium Paid	Free with ads Paid Free
Forums (as an arena for crowd sourcing and mingling with the audience)	An account on Touch Arcade, not active	Touch Arcade, active discussion for a while -> fan base Macrumors Stephen	Touch Arcade, promotion in advance -> fan base?	Corona, release updates	Touch Arcade, release updates
Press release	Yes	-	Yes	-	Yes
Updates (as marketing tool)	Yes	Yes	Yes	Yes	Yes
Prizing campaigns	No	Yes	Yes	No	Yes
Media coverage	Web, podcast, print, radio, TV	Web, print, radio, TV, one book	Web, podcast, print	Web, podcast, print, radio, TV	Not much
Videos	Trailer by GL (subcontractor), user-made review videos	Review video by Stephen, user-made review videos	Trailers by Madpoet	Trailer by Sterling, user-made review videos	Trailers by Tony
Features	Apple, Touch Arcade, several other review sites	Touch Arcade, iLounge, several other review sites	Apple (for client project, not for own game), some review sites	Apple, Corona Forum, several other review sites	Some review sites
Competitions	Game Award for Best Mobile Game IGF Nuovo Award nomination	Apple Design Award in student category	-	-	-
Social media	Twitter, Facebook	Twitter, Facebook	Twitter	Twitter, Facebook	Twitter

APPENDIX 5 THE STORY OF THE TEAM

The following story is compiled by combining direct quotes from six original interviews.

Background

eVp

eVp's story in chapter 3, page X.

Tabus

Basically when I was six years old, or maybe five years or something around that, my brother who was like 14 years older than I am, played with computers quite a lot. And we had this Commodore 64 at our home, and he was playing the games and I was watching with certain enthusiasm, when he was playing. And at some point when I was like six years old, I started also playing with the computer, and the games became quite important part of my life.

I think at high school level I became also interested about programming. It wasn't really that serious interest, but I met a guy at my high school and we had kind of like same ideas, what games should be.

I ended up picking music hobby as a real hobby. I had been doing some kind of like music at already early in my life, like twelve, thirteen years old, but in high school my parents bought me an electric guitar when I asked it, and I ended up in singing in a choir, and that, those two things ended up being kind of like jumpstarting my musical carrier. And that's the one reason I'm nowadays interested in audio and, or basically everything audio related.

Then the most important thing that happened was coming to University of Technology for university studies. I came to the university with interest in audio signal processing and acoustics. And that was my sole interest in starting there… And basically what happened is that in the freshman group, which we had, I met LT and eVp … it was something that clicked between eVp and me. We became quite good friends quite fast, so it was like only three months, and we ended up going to the lectures at the same time. And I had a laptop with me and we ended up playing games there.

O&J

Since I was born in the 80's I am very much part of the first video game generations. Having a interest into video games obviously added the excitement to take part in making one (although just a small part) and seeing the process at first hand. … I had been taking guitar lessons since I was 7 years old from the same teacher as O, through which we first started playing together. First mainly classical duets and then later our own songs.

Stephen

I've always been into technology starting around the age of 11 or so. Really got into it, and I've always been an Apple fan. I got my first iPod Nano back at around 2005 or so, and ever since I've been a huge Apple junkie, bought a Macintosh computer, and when the iPhone came out around 2007 I was in line first day it came out and tried it out, I didn't buy it the first day, though.

Making the game

Tabus

I was converted to Apple by eVp who had been using Apple computers for, well, most of his life. And I had been using PCs, or Windows-based computers.

When eVp got his iPhone, … he was just fiddling with the physics engines and stuff. …he was really interested in programming software. I didn't, I'm always probably more interested in algorithms and kind of, like more abstract level, and I really don't want to program anything, if I don't have to. … I offered to do the sounds for the game, because I have always been, due to music hobby and everything, been kind of interested in doing sounds for games. … At work, I'm in the acoustic lab, I just went and recorded a few sounds in the silent room, and basically got the necessary sound. … I think that I got quite a good set of sounds for the game.

What we really did get with that software is kind of like eVp got hang of the program, I got some experience with sound design, and we got some experience also with marketing, probably mostly eVp, because I didn't really participate in that. … I think that we also got some kind of experience of game development and how it actually works with App Store and stuff. So, I think that it was kind of an important experience for developing software.

Our next software was completely, was the idea of eVp. … iPhone had accelerometers, and he had this idea of using them kind of like creating a false 3D effect with the iPhone. Which would be kind of, like, it wasn't real but it seemed so nice compared to some static games.

eVp

I started the new game 27.12. … I wasn't going to make a proper game. I was going to release it for free, to drive the sales of my first game or something. … I read a manual on real stereoscopic games. I figured I only have one eye in this, but it will move based on how you tilt the device. I made a demo, a wooden box. Based on how you tilt it, it would render the box in different angels. I thought it looked awesome. I sent it to my friend Tabus, who said it looked boring. I said:" Nono, it's awesome!"

Tabus

The second game was basically kind of like almost shooting yourself to the leg, because there was also really successful similar game in the store, which had been selling like already a year…. I just basically watched from background in that point. I still thought that it is a bit risky to do it. So I thought, I wait and see what happens.

eVp

After about two weeks the game part was done. Making the menus took more time than making the game. I told Tabus it would be ready in a week, then two, then three, but it only became three.

Tabus

In the end it seemed that he was getting the final product, which was kind of nice, and I thought that now, we really need a good sound for this game. So I ended up recording the sounds, and actually designed the sound scenes. And then we did some cooperation with how we implement the sound engine into the game.

The music on the other hand is probably even more interesting story. It is basically done by two quite good friends O&J

O&J

Tabus asked us to record a sound track for the game. His suggestion for us was to make an acoustic guitar version of a song that we entered few years back for Assembly demo party's music competition. Since we already had material for the soundtrack and a good idea what it should be like, the recording process was rather fast.

Tabus

They came out with a legendary, legendary song. I think that it was really, really good. So, I'm, and, and eVp also agreed that this is really good thing, this music. … I also ended up creating levels for the game. eVp was himself creating levels. I was creating levels. Then we had this guy from somewhere from US, who was really interested about the game and eVp kind of drafted him to do marketing and also creating levels. … It's really, really embarrassing but I just can't remember his name. Cause I wasn't in contact with him, he was just in contact with eVp.

So we had quite a lot of levels, and actually at one point, which I should also discuss, we really tuned the physics engine in the game quite a lot. Basically eVp did the tuning, but I kind of provided him with a filter, which would smooth the movements of the device, so that the gaming was predictable. And I also, also tested quite a lot, and offered him feedback about the physics.

Stephen

When they [Apple] announced the App Store for third-party applications, I thought that was a novel idea. I started a YouTube channel and reviewed different iPhone apps. I'd have a video camera pointing at my iPhone, and just play around with the game, show how it worked, what I thought of it, what I liked and what I didn't like. So to get these apps I used to contact different developers …Basically you get the promotional code, you type it in the iTunes and it downloads the app for free…I saw eVp's post on their [Touch Arcade] forum, and his old app looked very interesting. … So, I asked eVp for a promo code, he gave it to me, he was very nice in his first email and he always has been, and I download the app. I posted a glowing review. And we just kept talking. It was through the email, just really casual emails. And he mentioned a project he was working on. So he asked me, if I could do a few levels for the game. And I didn't have much else to do, this was around 8th grade, at the time I was about 13 and I didn't have too much homework at the time, so I started working on the levels.

Launching the game and developing it further

eVp

The first day it sold three copies worldwide, but that's because it was launched in the middle of the freaking night, and it was only for sale for two hours in some Hawaiian island probably. The next day it sold 600 euro, which was a lot for a student like me.

Stephen

> So after we had a lot of levels done, we launched it [the game] on the App Store. Had a pretty good success to start, in the first few hours. And then Touch Arcade actually posted an article about our iPhone app, and that made the sales soar!

eVp

Opened a new thread on Touch Arcade:

> My second iPhone game after [the local] smash hit is a bit more familiar concept to also people living outside [my country]. It's probably so familiar that some of you might be put off by it. Why did I make a game that's been made many times already? Well, I didn't like any of the former entries enough. I thought [the original game] wasn't tapping into the iPhone's power as much as it could (and was too expensive) and that the rest of them were just weak imitations…

Touch Arcade community

Very active discussion in several threads on topics such as: suggestions for new properties, copyright concerns, like/dislike of the game, "chitchat".

Tabus

> I think that [word-of-mouth to distribute that this game is really good] is probably one of the most important things for, for App Store games. So, yeah, you have to get, to get the ball rolling, and when you get it, then you do get some, you do really get some sales and, and stuff.

Stephen

> We had different promotional codes, I helped, after I made the levels, I helped to market the app. I went on different forums … had to give it out in people's hands. And have people tell their friends about it. I also contacted all my YouTube friends and said, hey, I helped to make this iPhone app, can you review it for me possibly? And they of course said, yes, they loved the app, they got a free app on the way, and all it took was to make a video of it.

eVp

> Then I made a free version to drive its [the paid version's] sales.

Tabus

> So actually one thing, one thing more, which is probably really, is really relevant for my developer's part in that game, is that random level generation algorithm there. … We discussed with eVp that, and he thought that there was really no use for random generated levels, because he thought that basically user-made levels were always better … I ended up doing this algorithm for developing levels. Actually I had kind of like perfect experience for this already, because I had done this kind of a maze game, where you guide a man through a maze, as my school project in a programming course. …I think that the result was really good, and actually I think in the end eVp even improved it a few months ago by adding the different levels to the map, so you could have jumping levels.

Apple Design Award

Stephen

So the app kept growing and the Apple design award, the WWDC worldwide developer conference was coming up, this was back in two thousand nine. I mentioned it to eVp… I just said, hey, for the heck of it, why don't you just submit it to the Apple Design awards?

eVp

Stephen convinced me to enter for the Apple design awards contest. And I wan. … The price was good: MacBook pro, cinema display, iPhone and an iPod Touch. Bad deal was that if I was in the conferences, because if I had been, I would have gotten my ticket refunded, my flights refunded and 2000 dollars worth of expenses refunded. Just goes to show you that you should be there when stuff happens! …The visibility boosted the sales of the application, so it broke the 100 barrier in the US, and the free version took off, it was #1 free version in the US and shipped 70 000 copies in one day. The paid version followed, ended up around 50, never broke to top ten or anything. Made about 17 000 euro one day.

Stephen

Neither of us were able to go to the World Wide Developers Conference. … eVp sent me a nice email about it, that it won the Apple Design Award and we were both ecstatic. We were amazed that Apple would choose our app as one of the six apps out of about tens of thousands of apps on the Apps Store. … and the trophy is pretty awesome! If you touch it, it glows. That's probably the coolest part about it, besides all the fame, it's the trophy.

Tabus

The thing is that it did get Apple Design Award, which was really interesting. And, and I ended up getting a display from eVp from that, which was really nice for me. I couldn't ask more reward for doing the sounds.

And then…

eVp

That was the time when I should have made another game. I still made some updates for the second game. And we [eVp, LT and TP) had founded a company called Q, and we were doing customer work, so that was taking up my time. But I was still adamant about making a new game. So we discussed possibilities and concepts with Tabus, whom I hoped would join me in creating the game. Nothing really panned out, I mean we made couple of working demos. But it just, we didn't have the drive any more.

Tabus

Also, the problem with our game ideas, with eVp and me is that we are both, we are quite accomplished gamers, or what you could call expert gamers in this sense. And the thing is that we desire challenge for games. We want kind of, like, at least mildly difficult games. We want the games to kick our face and resist, when we play instead of just offering everything. … So that's like a kind of a problem for us because we could probably create game ideas, which would be really good for the hard-core gamers, but these soft gamers, which are nowadays playing a lot of games and they are not the correct audience for that.

eVp

I was thinking to myself that ok, I'm never going to get millions of downloads on any other application than this one, most likely. So, I should probably concentrate on making money with this one, and forget about all the rest. So, that's when I added advertisements to the application, and in-app purchasing, which turned out to be a huge mistake, and all sorts of ways to monetize the application through different means.

Afterthoughts

Stephen

And not even for the money, … I had an opportunity that not many thirteen year olds get. So, why not? There is no reason not to. … We actually made the app when I was in the 8 grade in middle school, and I'll have people, you know, hear that I helped to design an iPhone app. People will go, oh, which one, and I say [the name of the game], and they'll have a glow on their face, and they'll go: "Oh my god, you really helped make that app! It's my favorite game, I have it on my iPhone". And they'll show it to me, and they don't believe me that I helped to make levels and market in eight grade. So then I show them in the credits: Stephen!

In the near future I want to study business in college and I want to go that route. … I like to be in the middle of action, I always want to be busy. And that's another reason why I'd like to become possibly a stockbroker who works on the exchange floor, because it is always busy there, something's always happening.

O&J

Although knowing that memories grow sweeter in time, it is still very difficult to remember anything negative from this process. …Nevertheless, this game project for us was more a one-time coincidence, an opportunity, which was easy to grasp. Making game music professionally might take away the pleasure it now offers as a counterbalance to work.

Tabus

Yeah, probably I should also kind of, like give my reasons why I haven't gone to the really development business. … I believe that my friends eVp and LT, who both are part of company Q, and both were also in the same freshmen group with me …they probably would have offered me a job in their firm, but my main interests are still in the audio, instead of just developing games. I'm really interested in games and developing stuff, but I still want to keep it as kind of like hobby, and my main interests are in the in audio and acoustics. So, that's the reason I ended up as a postgraduate student and started for doctoral theses. And I think that was the correct choice for me, because when I do something related to this acoustics field, it is always really fulfilling for me. … I never have been really motivated by money also. So I it is more important I do something, which I really like, instead that I do something for money.

eVp

I kind of hope to see a world where I didn't start Q. It has been a good company, but again, it has never felt like my company. … I'd wish to see a world where I started a company with Tabus or someone else doing iPhone stuff that looked and felt like, like my own. Probably doing games.