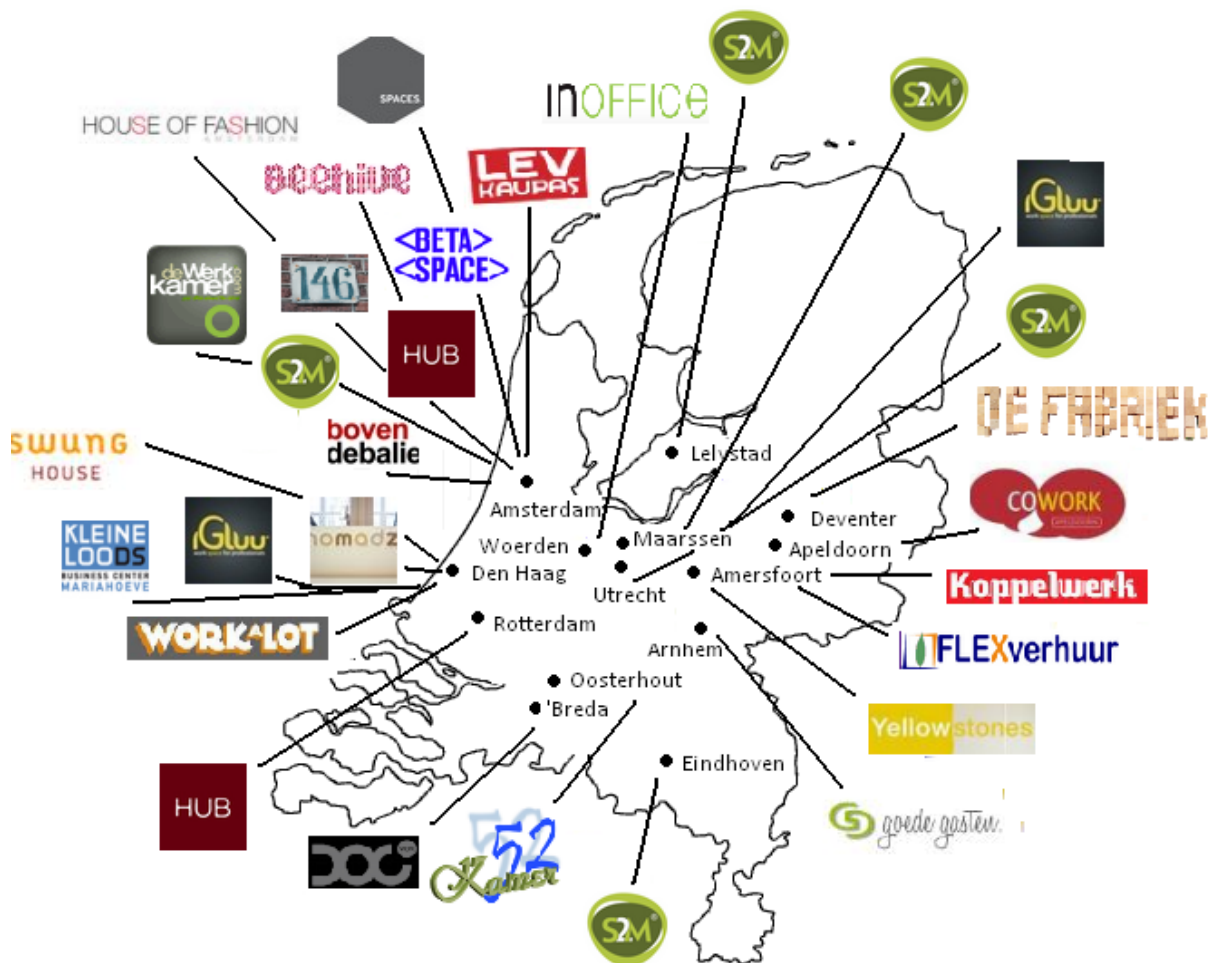


# Two Heads are Better than One

## *A Case Study of the Coworking Community in the Netherlands*

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## **Abstract**

This thesis aims at assessing the economic effects of the phenomenon coworking. This innovative workplace unites self-employed, flexible workers and students, in which the respective groups exchange knowledge and join forces in common projects. According to the endogenous growth theory, this process should lead to the formation of human capital, which is considered an engine of endless economic growth in the knowledge society. By means of an empirical research conducted in the coworking communities across the Netherlands, this explorative study finds that coworking enhances knowledge diffusion, sustains productivity growth and fosters innovation. Furthermore regression analysis has established that users of coworking spaces have a significantly higher income than the average entrepreneur. These findings are interesting for a country, which main source of economic growth constitutes technological progress.

## **Table of Contents**

1. Introduction -----	4
2. Theoretical framework -----	6
3. Empirical research design-----	13
4. Data -----	20
5. Methodology -----	25
6. Results -----	26
7. Discussion -----	32
8. Conclusion -----	34
9. Appendix -----	37
10. References -----	51

## **List of Figures**

Figure 1: The hypothesized number of self-employed and of real entrepreneurs

Figure 2: Mechanistic explanation of the relation between coworking spaces and economic growth

Figure 3: Spatial distribution of coworking spaces in the Netherlands

Figure 4: Binomial variables and the observed frequencies

## **List of Tables**

Table 1: Different types of entrepreneurs

Table 2: The relation between hypotheses, economic variables and questions

Table 3: Descriptive statistics of the quantitative variables

Table 4: Summarizing the response to the interview questions

Table 5: Descriptive statistics of data EIM

Table 6: Coefficients of the regression model

## 1: Introduction

A scientist engaged in the field of economics might occasionally wonder whether an economic system based upon competition, rather than collaboration, yields an optimal outcome. However, it is difficult to experiment with such ideas in an increasingly capitalistic society. Nevertheless, a natural experiment has arisen in the form of the emerging phenomenon of coworking (Scheurs, 2011). This is a place where workers work side by side, where knowledge is shared, human capital is constantly growing and value is created when competition ends and collaboration begins. Let us get more acquainted with this phenomenon. The definition given in previous research is as follows:

*“Coworking is a combination of working independently and interacting with others. Users of coworking spaces can decide where, when, how often and how long they work.” (Döring, 2010: 19)*

*“The immaterial benefits of coworking, such as knowledge transfer, informal exchange, the collaboration and interaction with others are for the users of coworking not merely a side-effect, but the main reason to use coworking, rather than just being able to have a flexible work space.” (Döring, 2010: 20)*

A coworking space is essentially a flexible work space, which is mainly used by entrepreneurs. The major benefit is clearly the flexibility for which this workspace allows. Moreover the social and community aspects are highlighted since many individuals, who start up their own business, might find themselves somewhat socially isolated in the beginning, when working in their home office or in any other space which allows for flexible working (Leforestier, 2009; Bizzarri, 2010; Döring, 2010; Erler, 2010). Throughout this article the term *coworker* will be used to refer to the users of coworking spaces and furthermore coworking spaces and collaborative work spaces will be used interchangeably.

The coworking space is an open community where trust and collaboration play a key role, without any hierarchical structure. It is a place where you can start a conversation with the person working on the table next to you and exchange ideas. Many coworking spaces have a coffee corner and comfortable couches in order to preserve an informal atmosphere and encourage interaction between members. In order to sustain this positive atmosphere, the five coworking values are safeguarded. Coworkers share knowledge, work together in projects

occasionally and organize workshops and events for their coworking community. Clearly there are also many possibilities for the generation of new knowledge and innovative activities (Bizzarri, 2010).

However, this way of working should not be confounded with business centers or other localities which allow for flexible working (e.g. in hostels, libraries or coffee companies). The main difference is that in coworking spaces the emphasis is put on the active building of a community, whereas in business spaces renters hardly know one another and as a result knowledge exchange occurs by mere coincidence, if it even occurs at all.

The history of coworking goes back to 2005. At that time Brad Neuberg founded the first coworking space in the USA (Döring, 2010; Erler, 2010). The first spaces were mainly intended for lonely entrepreneurs, but soon other groups, such as flexible employees and students, followed. Rapidly coworking spaces emerged across the entire globe. Erler (2010) notes the increasing flexibility of labour as the main reason for the emergence of coworking spaces. Technological change and the development into a knowledge society have enabled this new way of working.

The social and economic relevance of coworking can be motivated by various factors. First of all, there is a great potential for the transfer and generation of knowledge. In collaborative workspaces, entrepreneurs work side by side, whereas otherwise they would perform their activities in their home office, or in any other less interaction-prone environment such as a coffee company. These aforementioned knowledge spillovers may foster innovative activities. The generation of new ideas and inventions is considered highly important in a country where economic growth mainly constitutes technological progress. Moreover within the Netherlands the number of self-employed persons is ever increasing, while there is a trend among companies to outsource rather than hiring new employees (Vroonhof et al, 2008). This implies the potential market of coworking spaces will grow even further and could prove an interesting source for the generation of innovation in the knowledge society. As the coworking spaces might generate positive externalities to the whole of society, in the form of innovating activities, knowledge diffusion and economic growth, which are not taken into account by individual entrepreneurs, intervention by the (local government) in the form of subsidies may be desirable.

Furthermore the Netherlands will face a severe ageing problem in the near future. Lower population growth as well as less young persons might slow down the process of economic growth (Jones, 1995). Subsequently the government should support any initiative that does promote innovation in order to remain competitive on the global markets (Thurik

and Wennekers, 1999). Several counties in the US and France have already added coworking to their strategic economic growth plans and/or financially supported coworking centers (Zeiger, 2010). Is there a case for the Netherlands as well? This paper will identify the coworking communities in the Netherlands and aims at assessing its economic effects by means of empirical research. Therefore the research question will be: *In which ways and to what extent does coworking affect economic growth?* Among others, this thesis will investigate the amount of knowledge diffusion, productivity growth and innovation that occurs within coworking spaces.

The structure of this thesis is as follows. First, I will discuss previous research on coworking spaces as well as related academic literature. Specifically, attention will be paid to the endogenous growth models. Subsequently I will describe the design of the empirical research, which I have conducted in various coworking spaces across the Netherlands. The process of data collection is clarified and I will present the hypotheses which are to be tested. Among others, coworking is assumed to foster knowledge diffusion, productivity growth of workers and innovation. The binomial tests and regression analysis are identified as the main methodological tools. Subsequently the results of the empirical research are presented, in which all hypotheses seem to be confirmed. Thereafter I will weaken the aforementioned confirmation by elaborating on the limitations of this study as well as issues of validity. This article concludes by summarizing its main findings and discussing possible policy implications.

## 2: Theoretical framework

Coworking is a fairly recent phenomenon and as a result, there is hardly any academic literature available yet. Major scientific and empirical investigations still remain to be undertaken. Nevertheless I will discuss the present body of knowledge on coworking spaces below. Subsequently I will review general research on the link between entrepreneurship and economic growth.

### **Previous Research**

Bizzarri (2010) regards coworking as an emerging phenomenon, resulting from the changing nature of work within the knowledge society. The transformation into a knowledge-based economy has given rise to an increased flexibility of work. Knowledge workers can perform

their job at any time and any place, using their computer as a mobile office. This is also known as teleworking. However this virtualization has led to a desire to socialize as well (Erler, 2010). Coworking centers fulfill this need. Hence coworking emerged as “*a third working space, between home and an office.*” (Bizzarri, 2010: 197)

Then who are these workers? Coworking spaces are designed for workers who need a flexible workspace in a collaborative environment and only require a computer screen (Leforestier, 2009). Therefore mainly workers of the service area frequent these spaces. In Germany artistic professions are largely represented as well (Döring, 2010). Also spaces can serve a specific niche, aimed at gathering entrepreneurs of a certain branch (Leforestier, 2009). Although coworking spaces were essentially launched by entrepreneurs, for entrepreneurs only, nowadays students and tele-workers like to make use of the spaces as well. Döring (2010) finds that the German coworking community mainly consists of males and relatively young workers (26-34 years old). Most jobholders substitute time spent in the home office for working at the coworking space.

Erler (2010) finds that coworking spaces are primarily used by the “new entrepreneurs” (also known as “knowledge nomads”): those who are integrated in the knowledge economy and are flexible, original and creative. They are able to deliver personalized services. Coworking enhances their expertise as they share and enlarge their professional knowledge. Many even join forces and work together in short term projects. Coworkers are mainly highly educated and have creative and innovative professions; they are the “producers of ideas”. They benefit from the exchange of professional information by people working in different fields which allows for synergies.

The coworking community has safeguarded their common values in a so-called coworking manifest, formulated by space owners Tara Hunt and Chriss Messina (Döring, 2010). This has resulted in the following five coworking values:

- *Collaboration*: coworkers help each other by sharing their professional knowledge, which can lead to common projects and synergies. This is encouraged by the spatial design of the working areas, as usually group desks are used to allow for rapid exchange of information.
- *Openness*: transparency, open discussions and exchange of ideas are trivial. This enables an innovative culture, from which new knowledge can be generated. This sharing of knowledge has been shown to be an important aspect for coworking space users (Döring 2010). This should not be a surprising result, as the collaborative work spaces attract highly educated, knowledge workers who benefit from interaction and input of others.
- *Community*: coworkers support one another, give advice and connect online on social

network websites. Also they organize meetings and workshops on entrepreneurship for other coworkers. The host of the coworking space actively fosters this sense of community.

- *Accessibility*: the collaborative workspace should be open for anyone who would like to join this way of working, which implies that spaces should secure both financial and physical accessibility. They should not set their rates too high, as especially students and those who start their own company should be welcomed as well.
- *Sustainability*: a coworking space seeks to be sustainable in both the economic and ecological sense of the word. Coworkers use resources together (a desk, a printer etc.), which not only saves them money but physical resources are spared as well. Most coworking spaces are intentionally situated close to public transportation connections or in residential areas, in order to minimize CO2 emissions.

The primary reason for the rapidly emergence of many coworking spaces in Italy is the financial crisis, according to Bizzarri (2010). Entrepreneurs prefer to save money in uncertain times and rather share an office and the fixed costs. However, empirical research has shown that the socialization aspect is the main reason for people to join coworking spaces (Döring, 2010). The owners of collaborative work spaces see a potential for the increase of productivity of workers, stimulation of creativity, exchange of professional knowledge and creation of new assignments through an enlarged network. Also collaborative work spaces provide workers structure as well as “external” control and hence improve their work-life balance (Erler, 2010; Döring, 2010).

Possible drawbacks of coworking are potential hacking problems and lack of collaboration among certain coworkers, which might have a negative impact on the open atmosphere. Moreover Leforestier notes the lack of privacy, as a coworking place is essentially a public space and innovative ideas can be overheard and copied. Finally coworking spaces could be noisy and are therefore not recommended for people who cannot concentrate easily.

## **Related literature**

In order to infer how the knowledge transfer, which coworking brings about, affects the economy on the aggregate level, a fitting theoretical framework is indispensable. Therefore I will discuss the main economic theories in which entrepreneurship plays a crucial role in the remainder of this section.



One of the first economists to emphasize the role of the entrepreneur in the economy was Joseph A. Schumpeter. In particular he stresses the importance of the entrepreneur for the introduction of innovations, which constitute, according to Schumpeter, the genuine attainment of economic development. Schumpeter defines the term innovation as follows: it is the introduction of a new product or a method of production<sup>1</sup>. He recognizes that economic growth is a dynamic process, for which the occurrence of business cycles is inevitable as well as vital.

In fact, those shocks in the growth of GDP are caused by events on the micro-economic scale. Individuals who perceive profit-opportunities, will take their chances, despite the risks, to market innovations. Consequently this will induce more firms to enter the market, until all profits are deteriorated and economic growth falls. The same process repeats itself when a new innovation is marketed and the respective firm captures monopoly rents. As a result, the business cycle continues incessantly. However, as the innovations in fact substitute lower-quality goods and do capture the entire market, they turn former products obsolete. This process is called creative destruction. According to Aghion and Howitt (1992), this phenomenon also has a downside, which has not yet been recognized to a great extent in the literature. Innovations do create negative externalities. The adverse effect on economic development is that the mere prospect of being replaced by another innovation in the (near) future, which is a step higher on the quality ladder, decreases perceived forthcoming profits and consequently the incentive to innovate.

Despite the popular belief, not all self-employed are real entrepreneurs. Not all business owners do perform innovative activities<sup>2</sup>. A graphical representation of this fact can be found in Figure 1. One can note that a transition from a developing to developed country enhances the relative share of real entrepreneurs among the population of self-employed. By the same token, Schumpeter recognized the dynamics of entrepreneurship. This can be illustrated by the following passage (Schumpeter, 1934: 78):

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*“But whatever the type, everyone is an entrepreneur only when he actually “carries out new*

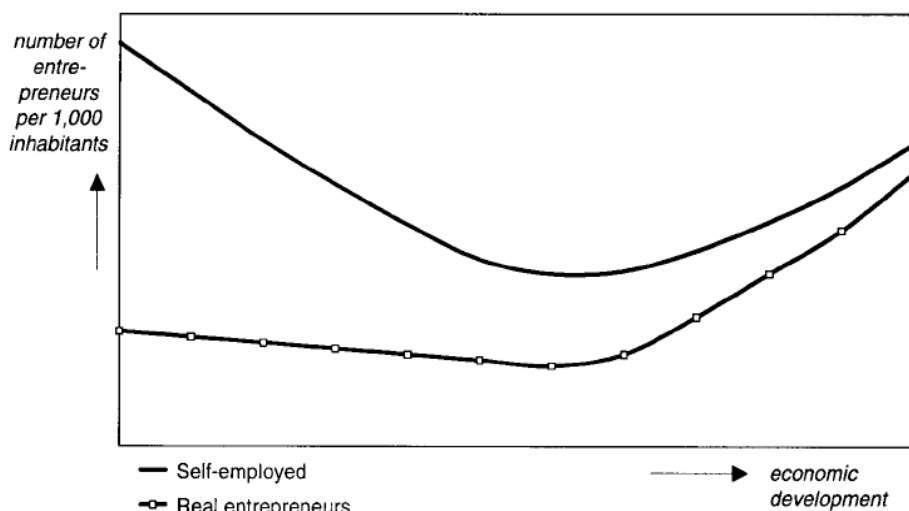
1 Furthermore he discusses other forms of innovations, such as opening of a new market. It goes beyond the scope of this paper to discuss all of them, nevertheless you may consult them in *The Theory of Economic Development* (1934).

2 Thurik finds in his literature research that two types of entrepreneurs can be distinguished: the neoclassical entrepreneur and the Schumpeterian entrepreneur. The former restores market equilibrium by starting up a new firm and increasing the intensity of competition and hence, in effect, eliminating excessive profit opportunities. To the contrary, the Schumpeterian entrepreneur appears in more dynamic economic models and happens to create instability by introducing new products through the process of creative destruction. For this paper, the latter, real entrepreneur will be the most interesting to focus on, due to its innovative nature. However, we may also encounter neo-classical entrepreneurs in coworking spaces.

*combinations,” and loses that character as soon as he has built up his business, when he settles down to running it as other people run their businesses. This is the rule, of course, and hence it is just as rare for anyone always to remain an entrepreneur throughout the decades of his active life as it is for a businessman never to have a moment in which he is an entrepreneur, to however a modest a degree.”*

Additionally, from this text one can learn that Schumpeter is familiar with intra-preneurship as well. Intrapreneurs are managers, who are thus not self-employed, but do bring about innovative processes within the company. With respect to the personality of the entrepreneur, Schumpeter finds that the innovator is not necessarily motivated by monetary gains, but may rather be attracted by the intrinsic value of the process of innovation, while seeking self-realization. Thurik and Wennekers (1999) add that other important characteristics of the entrepreneur are curiosity, creativity and open-mindedness.

Figure 1: The hypothesized number of self-employed and of real entrepreneurs



Source: Thurik and Wennekers (1999).

Inspired by the micro-foundations introduced by Schumpeter, the theory of economic development entered the era of endogenous growth models. These can be regarded as a reaction to the static neoclassical growth models, in which technological change is responsible for the major share of economic growth but remains unexplained, exogenous, as if apparently inventions and higher-quality goods fall from heaven. Endogenous growth theory makes use of micro-economic foundations to open this black box.

Hence, the first challenge all endogenous growth models take on is turning

technological change into an endogenous variable, depending on essential micro-economic factors. The main implication of these models is that changes in the level of skills in a country affect the level of technology. This makes the workers as well as capital more productive and consequently raises the level of GDP. Finally, higher economic growth positively affects the level of capital accumulation, education and innovation and so forth. In sum, technological change can be regarded as the result of intentional choices made by individuals on the acquisition of certain skills (Lucas, 1988; Romer, 1990; Stockey, 1991; Aghion and Howitt, 1992; Lucas, 1993; Grossman and Helpman, 1994; Jones, 1995; Howitt, 1999).

This leads to another major difference between the neo-classicists and the endogenous growth economists. The latter view labour as a heterogeneous variable. They distinguish different types of labour, as skills vary among workers. These skills can be denoted by the so-called variable human capital. Human capital can be accumulated either by schooling (Stockey, 1991) or on the job (Lucas, 1993). Additionally, one can differentiate between private human capital, which is only available to the worker himself, and the social stock of knowledge. An example of private human capital could be an innovative selling technique that a salesman has developed by professional experience. This technique is unobservable to others. To the contrary, external human capital may be illustrated by a law of nature which is discovered by a scientist and hence enhances the productivity of all further researchers (Romer, 1990). The social stock of knowledge could be considered a public good, as it is both non-rival and non-excludable. It comes about through the accumulation of private human capital, but merely as an external effect. Since by definition agents do not take externalities into account, the level of knowledge in society may be sub-optimal as a result.

Fundamentally, an increase in human capital leads to higher productivity (larger quantity) as well as production of higher-quality goods (more variety). Also cost-reducing innovations may take place (Aghion and Howitt, 1992). The aforementioned ways are all welfare enhancing and hence constitute economic development<sup>3</sup>. The key implication of these models is that government policies can have a permanent effect on the level of development of a country, by aiming at variables that affect the stock of human capital and hence the generation of innovations. The most direct and obvious way is by the subsidizing of public schooling.

The ever-increasing level of globalization clearly left its traces on the formation of human capital. This implies that knowledge spillovers occur across borders as well. The social

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3 Provided that patent systems and property rights are well-established, and other legal and institutional conditions have been satisfied. To consider all conditions goes beyond the scope of this paper.

stock of knowledge is no longer property of one nation, but becomes readily available to societies all over the globe, due to connecting mechanisms such as the Internet. One may note that international trade may be beneficial for the level of knowledge and growth a country experiences. However, many nuances and empirical issues should be considered<sup>4</sup>. This goes beyond the scope of this paper, but for now we can note that for advanced economies, investment in human capital may under certain conditions lead to the establishment of a comparative advantage of knowledge-intensive products on international markets (Grossman and Helpman, 1994).

The concept of creative destruction has become particularly relevant as our society has developed into a knowledge-based economy. Thurik and Wennekers elaborate on this phenomenon in the following passage (1999: 43):

*“This ICT revolution makes it increasingly necessary to distinguish between information and knowledge... ..Undoubtedly, new entrepreneurial edges will be based on knowledge. In this way an economy may develop which is driven by ideas in which entrepreneurship equates to competition between ideas.”*

One might wonder how the emergence of collaborative workspaces fits into this framework of endogenous growth. The case is as follows: as coworking spaces unite entrepreneurs, students and other knowledge workers in a professional environment, and encourage the exchange of ideas as well as interaction, knowledge spillovers are the inevitable result. In fact, previous research on coworking has shown that the major share of these workers are employed in knowledge-intensive sectors. According to the endogenous growth theory, this process of learning on the job leads to human capital formation, which in turn is the driving force behind boundless economic growth. It makes workers more productive and may enhance the quality of goods produced.

Furthermore the literature review has pinpointed the importance of entrepreneurship for the generation of innovation in the economy. As coworking unites entrepreneurs, who do not only freely share knowledge but also collaborate in common projects, it might enhance the probability of the emergence of innovative ideas and the practical implementation of those inventions.

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4 Such as that the backwardness and underdevelopment of a country may be enforced rather than cured. This is caused by the fact that high skilled labour becomes relatively abundant and cheap when opening the borders. Consequently the developed country will have a comparative advantage in the production of knowledge intensive goods while the developing economy falls behind.

The coworking community can be divided into different groups of users. One may encounter self-employed, tele-workers, who are employed by a company but have a flexible working location, and students. This distinction is important as all groups have a different function in the knowledge transfer process and in the implementation of innovations. According to our theoretical framework, different types of entrepreneurs can be distinguished (see Table 1), as being innovative is not exclusively granted to self-employed. Any person could be an entrepreneur at some point in his/her working life. Schumpeter (1934) as well as Thurik and Wennekers (1999) certainly recognize the importance of intrapreneurs, who are responsible for the generation of innovation within their business units. Also students are indispensable in the process of knowledge transfer and the creation of new ideas due to their close connection with scientific institutes. In addition, scholars might have a more critical attitude and fresh outlook upon matters.

Table 1: Different types of entrepreneurs

	Self-employed	Employee
Entrepreneurial	Schumpeterian entrepreneurs	Intrapreneurs
Managerial	Managerial business owners	Executive managers

Source: Thurik and Wennekers (1999)

Therefore these new, emerging workplaces with their distinct way of working, which is focused on collaboration rather than competition, may very well have a positive impact on (local) economic growth. As this has not been investigated up to now, the remainder of this thesis serves to explore these relations further.

### 3: Empirical Research Design

In this section I will shed light on how the perceived science gap may be filled. I will elaborate on the empirical research, which has been conducted in the Netherlands. Four hypotheses will be constructed, in which the economic variables of interest (*knowledge transfer, human capital, productivity, innovation and economic growth*) play a key role. It goes without saying that these concepts will be defined into measurable variables subsequently. In the final part of this section I will describe the process of data collection in the coworking spaces.

## **Construction of the hypotheses**

The literature review recognizes that the most direct link between entrepreneurship and economic growth is innovation. However, that is also the one that may be the most problematic to capture accurately in a field research among the Dutch coworking community. This due to the fact that the concept is not defined clearly in the society at large, outside the scope of economists, which may give rise to substantial measurement errors. Therefore, I will also focus on other ways in which entrepreneurs affect the pace of economic growth. Specifically, I will pay attention to another relation that has arisen from the literature research: the formation of human capital. As the exchange of knowledge is a very trivial aspect of the coworking phenomenon, this link is considered worth exploring. I find that the sharing of knowledge in a professional environment leads to learning on the job and hence elevates human capital. Consequently, this growth of human capital may lead to higher productivity of workers. Also it may bring about higher quality of goods produced or better ideas, since most coworkers are based in the knowledge economy and the goods they sell are in fact ideas. In order to test the aforementioned relations, I need to construct hypotheses that will be subject to empirical analysis. The four hypotheses will be presented below.

### **Hypothesis 1: Coworking enhances the sharing of knowledge between entrepreneurs**

I will investigate the knowledge transfers that coworking fosters. When knowledge is exchanged, private human capital can be accumulated as workers engage in pro-active discussions and in learning-on-the-job. In fact Seats2Meet, a large coworking space in the Netherlands, uses a quite leading-edge method in order to facilitate the knowledge exchange process. They have implemented a system, where workers can check-in by mobile phone once they arrive and mention what kind of knowledge they offer to share. Other participants can view this list which makes it much easier for entrepreneurs to find the persons with the professional knowledge of interest.

The feedback mechanism for which coworking allows, enhances this learning process of individual entrepreneurs and hence may ameliorate their human capital as well as business possibilities. Additionally, the stock of (local) social knowledge can grow when specific, professional knowledge becomes readily available to the coworking community at large. This happens through organized workshops and blogs posted on the website of the respective coworking space. Examples constitute a practical selling technique and other know-how. This

implies that the respective knowledge becomes non-rival as well as non-excludable and hence can be considered to increase the level of social human capital.

### **Hypothesis 2: Entrepreneurs are more productive in coworking spaces**

One can also consider the effects coworking brings about as a work environment. We can note the socialization aspect, external control and the structure that this space provides, which are all environmental factors. Accordingly, these elements might positively affect the level of motivation and the productivity the workers experience.

### **Hypothesis 3: Coworking enhances collaboration between different entrepreneurs, in which they come up with new, innovative products or projects**

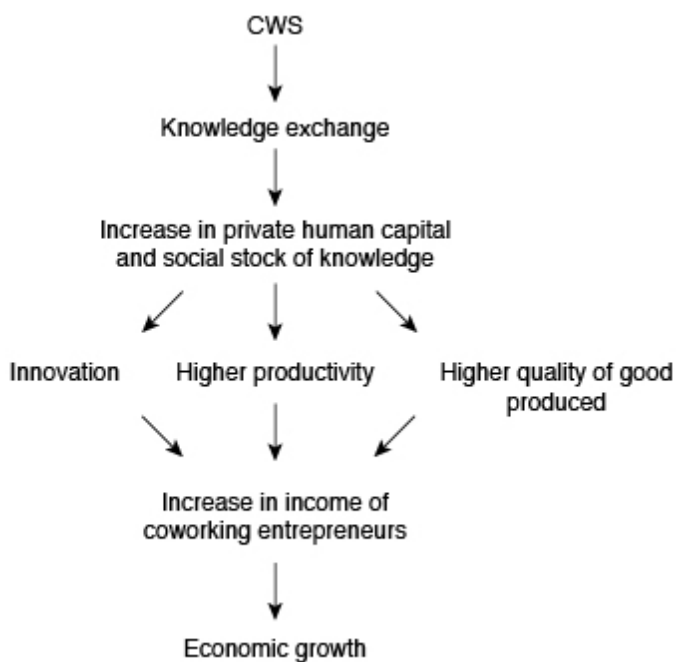
An important characteristic of coworking is the synergies that come about through the collaboration of different professionals. The famous expression “two heads are better than one” certainly is applicable here. This joint effort may enhance the probability of interesting discoveries, better ideas and hence foster innovation.

### **Hypothesis 4: Coworkers have a higher income than the average entrepreneur**

In addition to all aforementioned relations that may have a positive effect on the income of workers, coworking spaces provide more networking opportunities than the average entrepreneur has at his disposal. Therefore coworkers have a higher probability of acquiring new clients and assignments and hence of generating larger incomes.

In sum, a coworking space can be considered as a work environment that leads to more revenues. I find that average entrepreneurs may have fewer opportunities to expand their network, exchange knowledge and receive feedback etcetera. Hence coworking spaces may be conducive to economic growth. This process can be clarified with Figure 3. Note that all discussed ways may lead to economic growth. However do bear in mind that described relations can be considered tendencies rather than laws. The typical effect does not necessarily manifest itself as intervening factors may be present. For example, knowledge exchange through the feedback mechanism is very likely to lead to an increase in private human capital. However due to a poor memory for instance, this positive effect could be undermined.

Figure 3: Mechanistic explanation of the relation between coworking spaces (CWS) and economic growth



In order to investigate the hypotheses, I will conduct empirical research among the various coworking communities in the Netherlands. Both quantitative and qualitative data will be gathered. I will spread surveys among coworkers and conduct interviews with managers of coworking spaces. Due to the exploratory nature of this study, qualitative input is deemed necessary for a more profound understanding of the relations studied. The latter tool will take the form of an interview conducted with the manager of the respective coworking space, who is assumed to have a more general overview of the happenings in his space. Before one can measure concepts and know which questions to ask, one first needs to know how to measure the relevant concepts. Therefore I will proceed with the definition of variables of interest.

### **Definition of variables**

Throughout the analysis, the following economic variables will be subject of interest: knowledge diffusion, human capital, productivity, innovation and economic growth. In order to be able to measure these concepts, I need to define them first. Therefore I will elaborate on the definitions used below. Furthermore, the respective questions in the survey and interview, which are supposed to capture these variables, will be discussed afterwards. Both the survey and of the interview can be found in the appendix (A and B). Note that these questions are



translated versions, as the ones that have been originally used in the field research were in Dutch, in order to facilitate communication. You may refer to the summarizing Table 2 to learn which variables correspond to which hypothesis and which questions in the survey and interview are assumed to capture them.

### *Knowledge diffusion*

I define knowledge diffusion as the exchange of professional knowledge. Hereby I refer to business-related communication and other relevant (inter)sectoral interaction among coworkers. On average, knowledge transfer is considered to result in an increase in human capital.

### *Human capital*

I will define this as an increase in the level of professionally applicable skills of a person. I assume that the exchange of professional knowledge will automatically lead to an increase in the level of human capital through learning-on-the-job. Also the (local) social stock of knowledge is at disposal of the coworker and positively affects private human capital.

### *Productivity*

An increase in productivity may either result in an increase of goods produced or services performed. More specifically, since the majority of coworkers are based in the knowledge-intensive sectors, it refers to the production of better ideas.

### *Innovation*

Innovation will be regarded as the generation of new ideas, which will subsequently lead to the implementation and marketing of new products and services. This will include both incremental and radical innovations.

### *Economic growth*

When assessing the overall effects of coworking spaces on the economy as a whole, economic growth can be regarded as the increase of profits of the respective entrepreneurs who frequent them. Alternatively, I will consider the increase in revenues at the entrepreneurial level.

### *Coworker*

A coworker will be defined as a worker who uses collaborative workspaces on a regular basis.

This is captured by question 12 in the survey (see appendix A), in order to exclude people who may have ended up by pure chance in the respective space at the time was I handing out my surveys. This specifically applies to spaces with access free of charge, such as Seats2Meet, of which I have visited various locations throughout the Netherlands. Also first timers will be excluded from the analysis as they are considered to be not sufficiently familiar with coworking yet. A coworker could either be a self-employed entrepreneur, a tele-worker or a student.

Table 2: The relation between hypotheses, economic variables and questions

<b>Hypothesis</b>	<b>Economic variable</b>	<b>Question survey</b>	<b>Question interview</b>
1. Coworking enhances the sharing of knowledge between entrepreneurs	Knowledge diffusion, human capital	14	7
2. Entrepreneurs are more productive in coworking spaces.	Productivity	13	-
3. Coworking enhances collaboration between different entrepreneurs and fosters innovation.	Innovation	15	8
4. Coworkers have a higher income than the average entrepreneur.	Revenue, profit	9, 10, 11	5

Furthermore, the remaining questions (1-7 in the survey A) have been asked in order to determine the demographic and professional characteristics of the coworking community. Additionally, due to the exploratory character of this study, I have requested hosts of the spaces to elaborate on when coworking has first emerged in the Netherlands (question 10 in appendix B).

Finally, most questions in the survey are “multiple choice”, albeit a few open-ended ones are present whenever deemed necessary. Respondents can only choose one answer. As you may have noted, I intentionally omitted a neutral option in the statement questions, in order to make subjects think harder about their choices and to avoid a “flight to the middle” (Döring, 2010). However when the respective subject may have felt to be inherently indifferent between the options and as a result has left all of the boxes blank, I have respected this choice and simply omitted this particular answer from the observation. The remaining answers of this respondent have been maintained for the analysis.

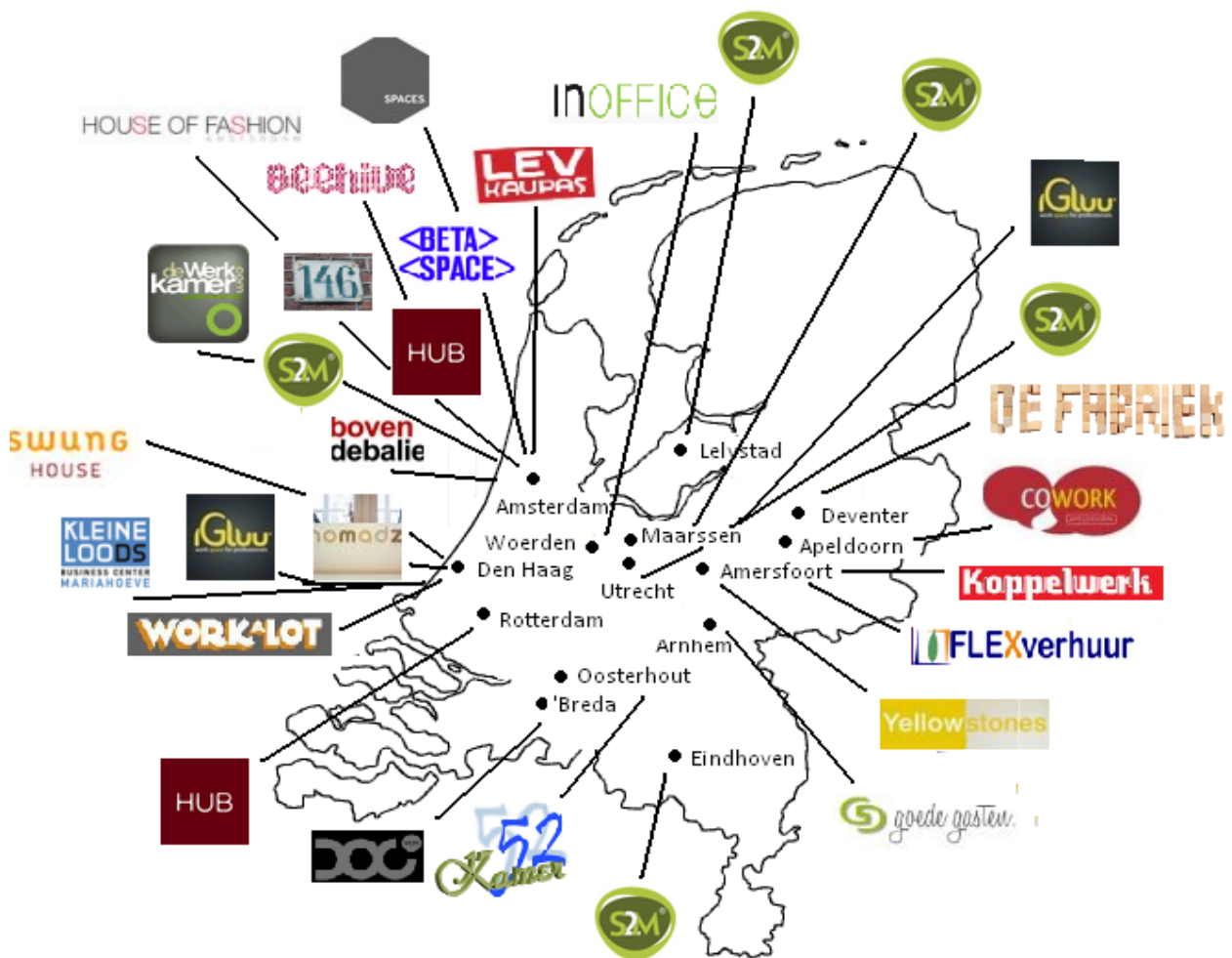
## **Process of data collection**

The surveys have been distributed and the interviews have been conducted in coworking spaces throughout the Netherlands. A possibly non-exhaustive list of coworking spaces in the Netherlands can be found in the appendix C. I have marked the ones that have participated in this study. In total, I have visited 9 spaces out of the 31 spaces currently present during the period May-June 2011. The spatial distribution of the coworking spaces in the Netherlands can be found in Figure 3. I have conducted 8 interviews and 9 coworking spaces allowed me to distribute my surveys among their members.

I have chosen to approach coworkers in their natural habitat, thereby reducing the risk of self-selection, as well as boosting the response rate at the same time. To the contrary, researchers of the German coworking community (Döring, 2010; Erler, 2010) have solely used online tools to get in touch with potential respondents. Additionally I have created an online version of the questionnaire and aimed at approaching coworkers by sending out messages via the social media tool Twitter. The online survey has been available from May to July 2011.

In order to investigate hypothesis 4, additional data is needed in the form of income of the average entrepreneur. This has been gathered in the data lab of EIM Business and Policy Research, which performs panel data investigations among self-employed in the Netherlands. These data will be discussed more extensively in the following section.

Figure 3: Spatial distribution of coworking spaces in the Netherlands



#### 4: Data

This section serves to familiarize the reader with the data that has been gathered in the field research. First, I will discuss how the raw data has been processed in order to constitute meaningful information of the economic variables of interest. Moreover I give the descriptive statistics and elaborate on observed trends with respect to demographic and professional characteristics. Furthermore attention will be drawn to the distribution of certain variables, such as income and the division of coworkers across different sectors. This section will provide a better understanding of the Dutch coworking community. Subsequently I will briefly discuss the qualitative data, which has been gathered by means of interviews. Finally I will review the data from another source (EIM Business and Policy Research) that will be indispensable for the investigation of the last hypothesis.

## Description of survey data

First of all the raw data have been processed in such a manner that all observations are consistent with the definition of a coworker. In other words, I have excluded all respondents who have opted for the answer “I do not use coworking on a regular basis” in Question 12 of Appendix A. This has resulted in a net sample size of 85 surveys (see Appendix D). I cannot judge to what extent this sample is a truthful and reliable representation of the entire population, as the size of the Dutch coworking community is still unknown up to date. However the different coworking spaces are represented well, as one can learn from Appendix E. An overview of all variables that will be used for quantitative analysis can be found in Table 3. The descriptive statistics are given and I have clarified to which survey questions the respective variable corresponds. Further clarification with respect to the interpretation of the values of the variables can be found in Appendix G.

When exploring the data, I can detect certain trends with respect to the demographic and professional characteristics. The first noteworthy observation is that coworkers are relatively highly-educated; 94% of the respondents attained either a university or college degree. The majority of the Dutch coworkers are male (68%). With respect to age I find that the workers are relatively young, as half of the respondents are currently below the age of 35. This is in accordance with the characteristics found in the literature. Workers tend to spend on average 19 hours per week in the coworking space. 85% of the flexible workers are employed in the service sector, of which more than half has a job in the business-related service sector. In the latter sector one may encounter professions such as consultant, trainer or coach. The average coworker has a net income of €1500-2000 per month. A more detailed distribution of the income can be found in Appendix J. Most self-employed have founded their business quite recently, as half of the enterprises have been set up after 2008, as one can learn from Appendix K.

I find that 87% of the Dutch coworking community is self-employed. Other groups I distinguish are tele-workers, who are employed by a company but have a flexible working location (7%) and students (6%). For the subsequent statistical analysis, some of the groups will be excluded in order to yield coherent and meaningful results. This implies that, when examining hypothesis 4, it would not make sense to compare the income of the average Dutch entrepreneur with the income of students and intrapreneurs as well. Therefore both employees and students will be temporarily excluded from the analysis. For the other 3 hypotheses, all groups are relevant as they all contribute to knowledge transfer and the feedback mechanisms.

To facilitate the exclusion of certain groups, I have created variable *self employed* which takes value 1 if the respective coworker is an entrepreneur, 2 if he is an employee and 3 if the person has manifested himself as a student in Question 4 of Appendix A<sup>5</sup>.

Table 3: Descriptive statistics of the quantitative variables

Variable	Obs.	Min	Max	Mean	Std. Dev.	Question survey
Birthyear	85	1951	1991	1974.71	9.088	1
Gender	85	1	2	1.32	.468	2
Education	85	2	5	3.98	.308	3
Sector	85	1	12	9.49	2.130	5
Self-employed	85	1	3	1.19	.523	6
Year foundation enterprise	74	1995	2011	2007.97	3.697	7
Sources income	74	1	5	1.61	1.108	8
Net income per month	83	1	7	3.42	1.862	9
Hours per week	82	2	80	19.26	13.874	12
Productivity	81	0	4	3.14	.877	13
Knowledge diffusion	83	1	4	3.10	.759	14
Innovation	83	1	4	3,12	.705	15

Furthermore I have established the correlations between different variables, as an exercise to investigate whether I am heading in the right direction with our constructed model of relations between different variables and hypotheses (as shown in Figure 2). In Appendix L, one can find that *knowledge diffusion*, *productivity* and *innovation* are all significantly correlated to one another, however some correlations are stronger than others. I am particularly interested in the correlation between *knowledge diffusion* and *productivity*, as the transfer of knowledge is assumed to contribute to the growth of human capital, which in turn may result in a higher productivity. The reported correlation value is quite low, yet significant. However, this does not imply that the causal relationship should not hold. On the other hand, *knowledge diffusion* and *innovation* seem to move closely together. This might point towards the direction of synergy effects, which emerge through the collaboration between different entrepreneurs and foster innovation.

Finally I have made various minor modifications. I have created a new variable *age*, which is constructed by subtracting 2011 from the variable *birthyear*. Also I have excluded category 5 "Different type of education" from the variable *education*. This measure has been

<sup>5</sup> In case the respective coworker has reported to be studying as well as managing his or her own business at the same time, income will be the decisive factor. In case the net income of the studying entrepreneur is higher than €1250 per month, he or she is considered to be an entrepreneur.

taken due to the fact that this observation is considered to be an outlier. A final adjustment has been made to the variable *income*. In order to facilitate linear regression analysis further on, the class number has been multiplied by the class average. For instance, all observations with code “3” (net monthly income ranging from €1500-2000) have been alternated into “1750”. For the last income class (earn more than €5000), the upper bound has been set somewhat arbitrarily, nevertheless motivated by an educated guess, at €10.000, which has resulted in a class average of €7500. Lastly I have created the variable *firm tenure* by subtracting *year foundation business* from 2011. This is due to the facilitation of interpretation of variables in the subsequent regression analysis.

### Description of interview data

I have conducted 7 interviews with key persons in the management of the Dutch coworking community. A preliminary summary of these qualitative data may be found in Table 4. I have registered the frequency of answers to the respective questions on the variables of interest. The outcome of the interviews will be discussed more in-depth in the Results section. For now I can note that knowledge diffusion seems to be the most promising effect of coworking, as perceived by the managers of the spaces.

Table 4: Summarizing the response to the interview questions

Variable	Yes	No	Maybe	Question interview (appendix B)
Knowledge diffusion	7	0	0	7
Innovation	4	3	0	8
Income	2	1	4	5
(Local) economic growth	6	1	0	6

### Description of EIM dataset

At the research company EIM, I have gotten access to a source of panel data, which tracks a sample of 2.000 Dutch self-employed during various years. The data that I have used, for the purpose of comparison with my own dataset of coworkers, has been gathered in Fall 2010, by means of telephone interviews. This implies I can expect little self-selection bias here. The variables of interest are net income per month, demographic statistics (*age*, *gender* and *education*), the sources of income the respective entrepreneur receives and the sector in which his or her enterprise operates. The descriptive statistics of these variables can be found in

Table 5 and a further explanation of the respective variable in Appendix I. Note that the sources of income have been denoted as dummy variables (*business only*, *business job*, *business benefit* and *other income*). Moreover I examine the maturity of the respective enterprises and work location in order to investigate to what extent this group of self-employed may be considered comparable to the coworking community.

Table 5: Descriptive statistics of data EIM

<b>Variable</b>	<b>Obs.</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Std. Dev.</b>
Net income per month	1010	1	6	2,88	1,631
Gender	2163	1,00	2,00	1,2959	,45655
Age	2157	19,00	86,00	48,2605	10,18110
Education	2151	1,00	6,00	2,4212	1,48424
Sector	2163	1,00	10,00	5,6972	2,81734
Business only	1737	0	1	,73	,444
Business job	1737	0	1	,12	,329
Business benefit	1737	0	1	,11	,314
Other income	1737	0	1	,04	,188
Year foundation business	2137	1950,00	2010,00	1999,7993	9,31017
Worklocation	886	1	3	1,57	,834

As for preliminary findings, one can note that the net income shows large variance among entrepreneurs. A Chi Square test has shown that this is highly dependent on respective sectors and professions. Nevertheless the mean income lingers around €1500-2000 per month. When comparing the dataset of the EIM with coworkers, I find that the coworking group is relatively more employed in knowledge-intensive sectors, such as the business-related service sector. Moreover coworkers appear to be higher educated on average, as 94% of the coworkers have attended either college or university whereas this percent lingers around 43% for the average entrepreneur. Again I find that a majority of self-employed is male (70%).

Finally the work space is found to be a distinctive factor between the regular self-employed and coworkers. I find that the majority of regular entrepreneur mainly works at home. Other mentioned work spaces are in an office and ambulatory, which refers to working in a train, in a coffee company or any other space that allows for flexible working. Therefore I can conclude that this group can be considered to be sufficiently comparable with the coworking community, as both groups consist of self-employed individuals who tend to opt for flexible, non-conventional work spaces. However, the main difference between the datasets lies within the sample size; I have gathered 74 responses to the income question,



whereas the panel data of the EIM consist of a sample size of 1010.

Before one can proceed to conclude whether the hypotheses have been confirmed by the data or not, one needs an appropriate, scientifically sound tool to yield any meaningful results. This will be the subject of interest in the following chapter.

## 5: Methodology

In this section I will elaborate on the statistical techniques that are to be performed on the quantitative data in order to yield meaningful results. For hypotheses 1, 2 and 3 I have performed the binomial test. This allows us to evaluate whether the responses given to the respective statements differ considerably. For the last hypothesis, however, I have applied regression analysis to investigate whether coworkers earn significantly more than the average entrepreneur. Both methods will be discussed extensively below.

### **Binomial test**

I want to test whether the majority of respondents agrees with the proposed statement. All respondents will be included in the analysis, as students and flexible workers have been recognized to be indispensable in the process of knowledge diffusion and generation. In order to be able to perform this test, all observations of the statement questions should be modified into a binomial variable which takes only two values. With respect to the variables *knowledge diffusion*, *productivity* and *innovation*, I have taken the former four categories ("do not agree at all", "disagree", "agree" and "fully agree") and merged them into two options: either "agree" or "disagree". For this purpose I have created the new variables: *knowledge diffusion binom*, *productivity binom* and *innovation binom*. Their respective frequencies as well as preliminary implications for the hypotheses can be found in Figure 4 in the next section.

The binomial test serves to assess whether a significant majority agrees with the respective statement; therefore I will define success as observing option 1 ("agree"), while an observation of disagreement will be regarded as failure. The null hypothesis tells me that I expect equal proportions of both categories to appear in the population. This implies that I expect to draw a sample in which 50% agrees with the statements, whereas the other half disagrees. This expectation would be statistically denoted as  $p = 0.5$ .

Nevertheless, the hypotheses that I have constructed in Section 2 tell me that I expect coworking to have a beneficial effect on its users, as it makes workers more productive,

enhances knowledge diffusion as well as innovation. Therefore the alternative hypothesis consists of the share of agreement in the sample being significantly larger than 50% ( $p > 0.5$ ).

Throughout the analysis a significance level of  $\alpha = 0.05$  will be used, since a one-sided binomial test will be employed. That is, if the p-value is smaller than 0.05, the null hypothesis will be rejected.

## **Regression analysis**

First of all, the two datasets -the one consisting data of coworkers, gathered by my field research and the information on the average entrepreneurs as collected by the EIM- will be pooled together. For comparability purposes, I have based my survey questions on the questions the EIM generally employs for the investigation of the entrepreneurial panel (Vroonhof et al, 2008). *Net income per month*, *sources of income* and *education* are captured by the same questions. However, some answers have been coded in a slightly different manner. Moreover *sector* and the available options have been organized in a quite distinctive fashion. Therefore some modifications have been made in order to merge the datasets.

Subsequently, Ordinary Least Squares (OLS) regression analysis will be employed. The dependent variable *income per month* will be regressed on various explanatory variables. The main variable of interest will be *CWS*, a dummy variable, which I have created for this purpose. It will take value “1” if the respective entrepreneur is a coworker, whereas if the data from the EIM will levy code “0”. Control variables will be *age*, *gender*, *education*, *sources of income* and *firm tenure*. The variable *sector* will be inserted as a fixed effect, since different sector are assumed to have different levels of earnings. Hence the intercept differs across sectors, while the slope remains the same.

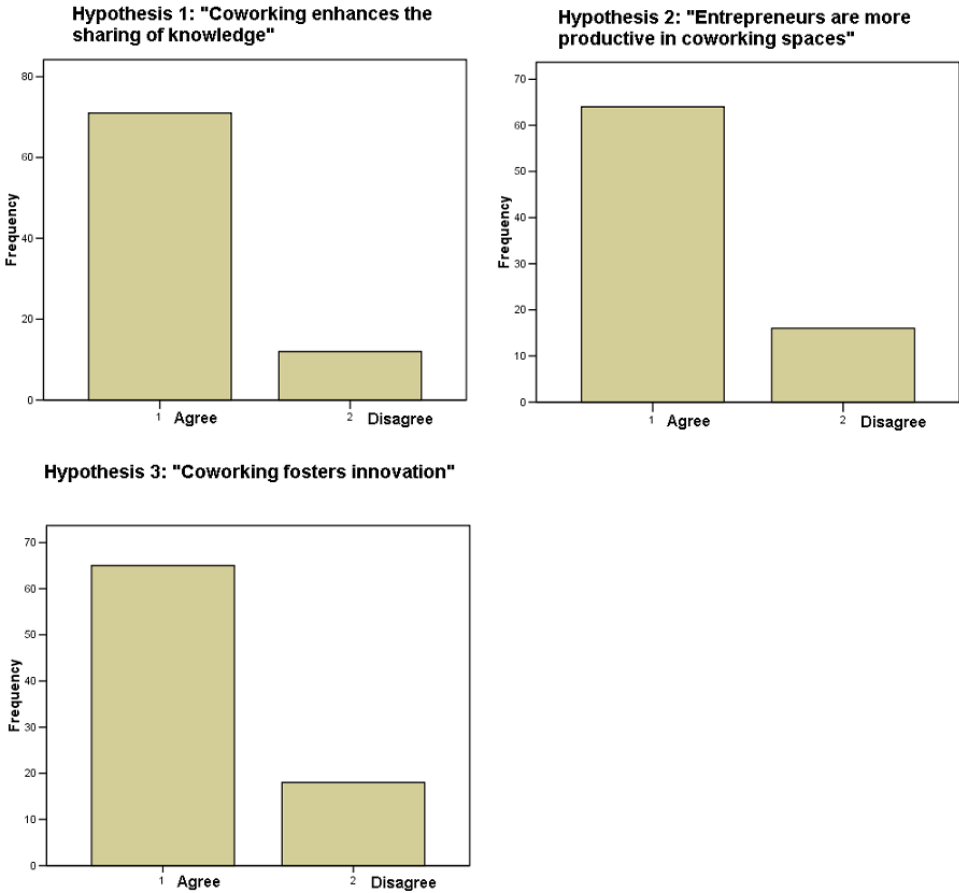
I am interested in whether coworkers have significantly higher revenues than regular entrepreneurs. Therefore if the variable *CWS* turns out significant as well as positive, I can consider my hypothesis to be confirmed. For this analysis, all coworkers, who have been denoted as either student or employee, will be excluded temporarily as it would not make sense to compare their incomes with incomes of the regular entrepreneur.

## 6: Results

Since data has been gathered by means of field research among the Dutch coworking community and the binomial test and regression analysis have been established as

methodological tools, I can proceed to the discussion of the results. A preliminary overview of the outcome of the binomial test in Figure 4 shows that all statements, posed in the questionnaire, have significantly more respondents agreeing than disagreeing. Subsequently all hypotheses will be examined separately, noting both the results of the analysis of the quantitative data and the outcome of the in-depth interviews conducted with the directors of the coworking spaces. Finally the closure of this section will shed light on whether the hypotheses have been confirmed or rejected.

Figure 4: Binomial variables and the observed frequencies



**Hypothesis 1: Coworking enhances the sharing of knowledge between entrepreneurs**

*Quantitative*

I found that 86% of the respondents agree with this statement, whereas 14% disagrees. A graphical representation of this distribution may be found in Figure 4. Clearly a majority is in favor, which has been shown to be statistically significant at the  $\alpha = 0.01$  level. Therefore, as

for the quantitative analysis, the inevitable conclusion is that the null hypothesis of the binomial test is to be rejected, which implies a significant majority finds that coworking in fact fosters knowledge transfer.

#### *Qualitative*

All interviewed managers of coworking spaces have responded positively to the question whether coworking fosters knowledge transfer between entrepreneurs. They explain that the low physical barriers enable swift information exchange. During this exchange mainly small sector-related issues are addressed. For instance, a communication expert could correct a text written by fellow coworker, while an accountant gives advice on financial matters. Furthermore “tips and tricks” from one’s field of specialization are taught. Small advice is for free, whereas more extensive questions lead to business arrangements between two coworkers or barter deals. Moreover practical knowledge is shared by means of workshops, which coworkers organize within their own work space.

### **Hypothesis 2: Entrepreneurs are more productive in coworking spaces**

The major share of consulted coworkers (80%) is in favor of the proposed statement. Statistical analysis has proven this proportion to be a significant majority at the  $\alpha = 0.01$  level. This implies that, on average, entrepreneurs find that their productivity is positively affected by the use of coworking spaces. This could be due to the external control that the work space imposes.

### **Hypothesis 3: Coworking enhances collaboration between different entrepreneurs, in which they come up with new, innovative products or projects**

#### *Quantitative*

A somewhat smaller amount of the respondents (78%) concurs with our hypothesis that coworking may foster innovation. In fact, binomial analysis shows that this still may be considered a fair majority, even at the  $\alpha = 0.01$  significance level. Hence coworkers find that collaborative workspaces lead to synergies and are a source of innovation.

#### *Qualitative*

Some managers of collaborative workspaces suspect that innovation may occur within their

spaces. However, they do not have any specific information regarding this subject, although one manager mentioned for instance a brainstorm session with various coworkers, in which they created numerous applications for smart-phones. Other interviewees find that innovation is more likely to happen on the individual level, due to lack with privacy within coworking spaces. This is despite the fact that coworking may have indirectly contributed to the occurred innovation as the sharing of knowledge might have fostered the new inspirations and ideas.

#### **Hypothesis 4: Coworkers have a higher income than the average entrepreneur**

##### *Quantitative*

The previous section has revealed the construction of the dataset and has identified regression (OLS) analysis as the proposed methodological tool. The dependent variable *Ln income* has been regressed on a coworking dummy and various control variables. The following dummy variables have been excluded from analysis as they have been used as baseline, in order to avoid multicollinearity issues: *education low*, *business only* and *sector construction*.

Moreover this facilitates the interpretation of the coefficients of the resulting variables, as they are established in comparison to the baseline. The analysis has resulted in the following equation:

$$\begin{aligned} Ln \text{ income} = & 7.529 - 0.351 * \text{gender} + 0.421 * \text{age} - 0.500 * \text{age}^2 + 0.084 * \text{education high} + \\ & 0.087 * \text{firm tenure} - 0.234 * \text{business job} - 0.217 * \text{business benefit} + 0.061 * \text{CWS} - 0.056 * \\ & \text{sector trade} + 0.032 * \text{sector financ} - 0.028 * \text{sector ICT} - 0.021 * \text{sector health} + 0.055 * \\ & \text{sector business service} - 0.039 * \text{sector other services} + e \end{aligned}$$

In Table 6 you may find the coefficients values accompanied by their respective significance levels. Firstly, coworking appears to have a positive effect on the income of entrepreneurs. Changing one's work location to one of the CWS results on average in an increase in income of 6%, keeping all other matters constant. Furthermore gender has a strong negative impact on income, as women earn 35% less, on average. The response coefficients of age together reflect the inverted U relationship between age and income, which has been encountered in preliminary exploration of the data. The respective coefficients imply that age has a positive effect on income until a certain threshold. Being highly educated is an asset, as it enhances income by 8%, *ceteris paribus*, compared with unskilled workers. Moreover other sources of income matter; having a job or social benefit next to one's enterprise decreases income

approximately by respectively 23% or 21%, keeping all other variables constant. The major share of the sector variables turn out insignificant.

Table 6: Coefficients of the regression model

Variable	Coefficient
Gender	-0.351***
Age	0.421**
Age <sup>2</sup>	-0.500**
Education high	0.084***
Firm tenure	0.087***
Business job	-0.234***
Business benefit	-0.217***
CWS dummy	0.061**
Sector trade	-0.056*
Sector finance	0.032
Sector ICT	-0.028
Sector health	-0.021
Sector business service	0.055
Sector other service	-0.039

Dependent variable: *Ln income*. All standardized coefficients marked with an asterisk \*/\*\*/\*\* are significant at 10%/5%/1% level.

As for the assumptions of the OLS model, overall they seem to be satisfied. The residuals are normally distributed, as one can learn from Appendix M. In addition, I can conclude from the scatter plot in Appendix N that linearity seems to be the case, even though some outliers are present and one can clearly recognize the six income classes that have been used in the process of data collection. In Appendix O, there is no evidence for a larger spread of residuals once income increase. Hence one should not worry about heteroskedasticity issues.

Furthermore, as no use is made of panel data, it is very unlikely to encounter the presence of autocorrelation. The results of the Durbin-Watson test confirm this, as the observed value of 1.935 lies above the upper bound of 1.824 for 14 regressors and a sample size of 200. This implies the null hypothesis of no autocorrelation cannot be rejected. Hence no autocorrelation is present. In fact, my sample size is larger than 200 observations, but this makes the result of the Durbin-Watson test even more significant. Finally the sector dummies are mostly

insignificant and somewhat correlated but since I have predefined a specific sector variable (construction) as baseline, it should not give rise to multicollinearity issues. Apart from age and age<sup>2</sup>, no high VIF values have been observed, as one can learn from Appendix P. In conclusion, one can rely, without any further hesitation, on the aforementioned results of the regression analysis.

### *Qualitative*

Managers point out that coworking may create more opportunities for the generation of a higher income, but this effect does not occur automatically. The positive factors are networking possibilities, more external control, which leads to a higher productivity, and knowledge diffusion. Also coworkers frequently join forces in common projects, which improves the probability of client acquisition, as they can live up better to expectations of demand as well as guarantee continuity of services. However managers also mention that coworkers aim at having sustainable contact with customers, by not making excessive short term profits, which could lead to a lower income than the average entrepreneur earns.

Nevertheless coworking could result in a higher income in the long term due to continuity of assignments. Hence the effect of coworking could be lagged. Finally some interviewees find that the choice of coworking as a workspace may rather depend upon the income of self-employed. If the income of the entrepreneur would have been higher, he or she would have opted for renting his or her own office, goes the underlying reasoning. This implies that endogeneity issues could be present. These will be explored more in-depth in the following section.

### **Summary of the results**

The knowledge diffusion hypothesis certainly has been confirmed. Coworkers as well as managers of coworking spaces have been quite positive regarding this aspect. Furthermore coworkers reported an increased productivity once they started using coworking spaces. This could be due to the structure and external control this work space provides. Moreover the occurrence of innovation is reported by coworkers, whereas managers have more reservations towards this effect. Finally statistical analysis has shown that coworkers have a significantly higher income than the average entrepreneur. In addition, from the analysis of the qualitative data it appears that coworking has first emerged in the Netherlands in 2008. Coworking spaces are rapidly expanding and growing at this very moment. This may be due to the

influence of the recent financial crisis (Bizzarri, 2010).

However one might question the robustness of the aforementioned results. It might be the case that insertion of different control variables yields different results. Furthermore, could the results of this research be extrapolated to other coworking communities, which are emerging around the world? The external validity of the results is questionable. Clearly, there are some nuances to be addressed with respect to the findings of this thesis. Those will be discussed in the subsequent section.

## 7: Discussion

In this section certain considerations, with respect to the validity of the results, will be outlined. First the internal validity of the findings will be subject of interest, as I will question to what extent coworking does in fact cause economic growth. For instance, is it certain that the causal relation runs from coworking to income and not *vice versa*? Furthermore the external validity will be investigated briefly, as I consider whether the respective findings can be extrapolated to other coworking communities outside of the Netherlands. Finally policy implications are given. The results of this exploratory study are promising, however further research into the mechanisms of coworking is deemed necessary.

### **Internal validity**

Firstly, when examining the results of hypotheses 1-3, one will quickly recognize that a subjective element is present in the findings. This is due to the fact that results have been based upon responses to proposed statements. However, often, respondents are the only ones who are able to judge the respective values, as for instance their productivity cannot be monitored by an external party, due to the relatively knowledge-intensive professions employed. Therefore it is deemed necessary to rely on the persons themselves reporting the respective levels of innovation, knowledge diffusion and so forth. Furthermore, concepts could be interpreted in different ways, especially a concept as vague as innovation, for which no universally accepted definition exists yet. Moreover I do not have any information regarding the actual share of Schumpeterian entrepreneurs among the self-employed utilizing the coworking spaces. Hence subjectivity is inevitable and one should take into account that it is present to a certain extent.

As for hypothesis 4 and the subsequent regression analysis, the reliability may be



questionable. The population size of the coworking community is unknown, hence I cannot judge to what extent the sample has represented it properly. However our model appears to be quite robust to control variables. As the step-wise construction of the model proceeds, as shown in Appendix Q, the addition of the variable coworking does not change any signs or significance values of the control variables. By the same token one can note a steady increase in the (adjusted)  $R^2$ . In sum, I can conclude that the model is robust.

On the other hand, endogeneity issues could be present. As has been suggested in the Results section, the causal relation between coworking and income does not necessarily run into one direction. It is very likely that one's income does to some extent affect the choice of work space. This implies the dummy variable coworking in the regression analysis could cease to be an exogenous, independent variable, which would in turn greatly reduce the validity of its results. The lurking variable in this relation could be maturity of one's enterprise, causing both income and the choice for the preferred work space. Once the company becomes more successful and mature, the entrepreneur will shift to another, more fitting work space. One could argue that this is somewhat captured by the variable firm tenure. However, if at all, this relationship will be captured in an imperfect way, as generally years of age do not accurately resemble success rates. In order to correct for these endogeneity issues, an instrumental variable strategy could be deemed necessary.

Finally there is a possibility that there is a lagged effect of CWS on income. It is reasonable to assume that it takes time for knowledge diffusion to form into human capital, and consequently render a higher productivity or a larger level of innovation. As this thesis has solely employed cross-sectional data, this effect could not be captured accurately. This assumption may be supported by the fact that coworking has only been introduced in the Netherlands very recently.

### **External validity**

One might wonder to what extent the findings of this study could be extrapolated to coworking communities in other countries. It must be noted that coworking is a quite recent phenomenon, and as a result the coworking market is still in a developing phase. Therefore it could be that the background settings of different countries are not comparable to one another. For instance, as CWS took a head start in the United States 6 years ago, its coworking space market is currently much more evolved and satisfied than the one in the Netherlands. In case a lagged effect exists, one could detect it with much greater ease within the US.

Furthermore it can be questioned to what extent coworkers across different countries are homogeneous groups, as large differences can already be noted across different spaces in the same country. This is due to the fact that different spaces attract different professions and niches exist. In addition, it matters what kind of industry a country employs and how the factors human capital and technology are present in the respective region. All aforementioned issues could affect the amount of professional knowledge exchange and formation of human capital that coworking brings about. Last but not least, cultural differences could give rise to distinctive effects. Summarizing, different effects could be expected among the coworking populations across various countries.

### **Policy implications**

In conclusion, the results of this study are promising and point in the direction towards a positive effect of coworking on economic growth, although some nuances have to be considered. Due to the exploratory nature of this study, further research is deemed necessary before outlining any recommendation for governmental support. However it might be interesting for local authorities to consider supporting and experimenting with these coworking initiatives. Starting one's own business is a good way to regain one's independence of unemployment benefits (Vroonhof et al, 2008) and having other entrepreneurs around you for support and professional feedback appears to be more motivating. Entrepreneurs are older than the average working population and work longer (Kösters, 2009). Therefore encouraging entrepreneurship would be a logical step in an ageing society in order to sustain the level of employment. Furthermore coworking spaces could be regarded as an opportunity to revitalize city centers, by making use of empty office spaces. Finally, an expansion in the CWS market is to be expected, due to the ever increasing flexibility of labour, the growing number of self-employed and the tendency of companies to outsource rather than hire new personnel (Vroonhof et al, 2008). Therefore the coworking phenomenon is certainly considered worth a further exploration. One should not close one's eyes to the dynamics of society, but rather anticipate the emerging changes.

### **8: Conclusion**

This study deals with the emerging phenomenon of coworking spaces. Coworking spaces can be defined as flexible workspaces for self-employed workers, employees and students. In

these so-called collaborative workspaces, the emphasis lies upon the active building of a community and cooperation between different workers. Most users of coworking spaces are self-employed and based in a knowledge-intensive sector. As I have established in the theoretical framework, entrepreneurship can have a positive effect on economic growth. This happens through the innovation, which small firms bring about. In addition, endogenous growth theory shows that schooling and learning-on-the-job, which improve one's human capital, constitute economic development. Hence, it implies that coworking spaces, which unite entrepreneurs and other knowledge workers and encourage exchange of knowledge, could possibly foster economic growth. As no economic research has been conducted yet upon the phenomenon of coworking, this thesis aims at exploring the coworking communities of the Netherlands and assessing its economic effects.

By means of a survey and interviews, conducted in various coworking spaces throughout the Netherlands, this study finds that coworkers find that their productivity has risen due to the collaborative work spaces. This could be due to the structure and external control the work place provides, as opposed to a home office. Moreover the majority of users of coworking spaces find that coworking leads to knowledge diffusion: the exchange of professional knowledge among workers in similar or different sectors. These joint efforts may give rise to innovative activities. Empirical analysis has shown that the major share of Dutch coworkers finds that innovation actually occurs in coworking spaces. However, the managers of these spaces are somewhat more reluctant to confirm the possible relationship between coworking and innovation. Furthermore a regression analysis has been conducted in order to compare the net income per month of self-employed coworkers and the average Dutch entrepreneur, who is assumed to use alternative workplaces. The analysis has brought forward that coworking in fact has a significant and positive effect on income, even when controlled for age, gender, education, sources of income, firm tenure and sector. This could be due to the aforementioned processes of knowledge diffusion, which enhances one's human capital, productivity growth and the occurrence of innovation.

However some drawbacks of this study can be noted. Except for the income data, many observations, used to assess the hypotheses, are highly subjective. This is due to the fact that coworkers are for now, by lack of any natural experiment, the only ones who can judge their own productivity and level of knowledge diffusion and so forth. Therefore there is no choice but to depend upon the reported subjective values. With respect to the empirically established positive effect of coworking on income, it should be noted that endogeneity issues could be present. Managers of coworking spaces have pointed out that workers may choose

their workplace based upon their income. Hence this result should be interpreted carefully. Finally the external validity of this study is questionable, as coworking communities differ across countries, due to cultural factors among others. Furthermore the market of coworking spaces is in distinct phases of development throughout the world.

Finally various suggestions for future research will be made. It would be interesting to investigate whether coworking has a lagged effect upon income, which is reasonable, as the process of knowledge diffusion and formation of human capital take time. Therefore a panel of representative entrepreneurs and time series data will be indispensable. Additionally, these panel data could provide natural experiments and avoid subjectivity issues. Furthermore one could research to what extent self-selection occurs among the users of coworking spaces -i.e. are coworkers more socially skilled and communicative than the average self-employed- and whether the found positive effects of coworking would hold for any entrepreneur. Finally concepts of human capital and knowledge diffusion should be operationalized further and tools should be developed to measure those variables within coworking spaces. However, even though this could be very interesting from an economic perspective, this is not solely an economist's task. The aid of psychological and sociological scientists will be indispensable. The coworking phenomenon is a complex development, which does not allow itself to be captured by taking a single discipline approach. Instead, it necessitates an interdisciplinary perspective. Nevertheless, the exerted effort may indeed prove to be very rewarding and promising in the near future, when coworking spaces become a conventional workplace, while the development of the knowledge-based economy continues.

## Appendix

### A: Survey for coworkers

## Survey



Dear coworker,

Thank you for participating in my research. The goal of this research is to estimate the economic value of *coworking spaces*.

*Coworking spaces* are centers where self-employed entrepreneurs can hire a place to work as alternative to a home office, while exchanging knowledge with other *coworkers*. This way of working is called *coworking*.

Your participation in this research is anonymous. All data will be aggregated, so that no *coworking space* or individual *coworker* can be recognized. Confidentiality is guaranteed.

This survey consists of 4 pages and will take approximately 5 minutes of your time. In case you have any questions, do not hesitate to ask me.

### Demographic data

**1. What is your birth year?**

**2. What is your gender?**

1. *Male*
2. *Female*

**3. What is your highest attained level of education?**

3. *Primary school*
4. *Preparatory vocational education*
5. *Vocational education*
6. *College / university*
7. *Other*

### Income

**4. What is your profession?**

**5. To which sector does your profession / business belong?**

*Agriculture*

*Industry*  
*Construction*  
*Trade*  
*Catering*  
*Transportation of goods*  
*Other transportation*  
*Financial services*  
*ICT-services*  
*Other business-related services*  
*Health care*  
*Other services (media, hair dressers, beauty institutes etc.)*

**6. Are you self-employed and do you have your own enterprise?**

- 8. Yes
- 9. No (continue to question 6)

**7. In which year did you found your enterprise?**

**8. What are your sources of income?**

*Enterprise is my only source of income*  
*Next to enterprise, I am an employee*  
*Next to enterprise, I receive pension benefits*  
*Next to enterprise, I receive unemployment benefits*  
*Other*

**9. What is your net monthly income?**

*Less than € 1.250*  
*€ 1.250 until € 1.500*  
*€ 1.500 until € 2.000*  
*€ 2.000 until € 3.000*  
*€ 3.000 until € 5.000*  
*€ 5.000 or more*  
*Don't know*

**10. What happened to your (net) profit since you started coworking? Please estimate below.**

*Increased, with €*

*Decreased, with €*

*Unchanged*

*Don't know*

**11. Do you expect your income/profit to rise in the long term due to coworking?**

*Yes*

*No*

*Don't know*

**12. Do you work on regular basis in this coworking space where you are now?  
How many hours per week?**

*Yes,                                          hours per week*

*No*

Economic benefits of Coworking

**13. I am more productive in my coworking space than at the place where I used to work, before I joined coworking (e.g. at home).**

*Do not agree at all*

*Do not agree*

*Agree*

*Definitely agree*

**14. I exchange knowledge and ideas with other coworkers, from which I benefit on a professional level.**

*Do not agree at all*

*Do not agree*

*Agree*

*Definitely agree*

**15. I come up with innovative (=new) ideas for products or projects in cooperation with other coworkers.**

*Do not agree at all*

*Do not agree*

*Agree*

*Definitely agree*

Final

**16. Would you like to remark anything on coworking, economic growth and innovation which could be useful for my research?**

**17. Please write your e-mail address below in case you would like to updated on the results of my research.**

Thank you for your time and contribution to this research. In case answering these answers has left you a bit hungry, I brought some stroopwafels and would like to offer you one.



## B: Questions of Interview for managers or hosts of coworking space

### General data

1. What is the name of this coworking space?
2. How many members does this space have?
3. How many coworkers frequent this space on a daily basis?
4. To what extent do you actively engage in forming a community in this space, in which the five values of coworking play a key role? (Accessibility, Collaboration, Openness, Community en Sustainability)

### Coworking and economic growth

5. Do you think that coworkers earn a higher income and profit than the average entrepreneur? (correcting for sector). Why or why not?
6. What do you think about the effect of this coworking space on (local) economic growth?
7. To what extent does knowledge transfer arise between different coworkers? What form does this take? Please elaborate on examples.
8. To what extent do innovative ideas and innovation arise from collaboration between different coworkers in coworking spaces?

### Coworking and governmental support

9. What do you think about the necessity and desirability of (financial) governmental support for coworking spaces? Is this necessary? What are possible effects?

### Final questions

10. When did coworking emerge in the Netherlands? Do you know which coworking space was the first?

11. Do you object to mentioning your coworking space in my research?

12. Would you like to remark anything on coworking, economic growth and innovation which could be useful for my research?

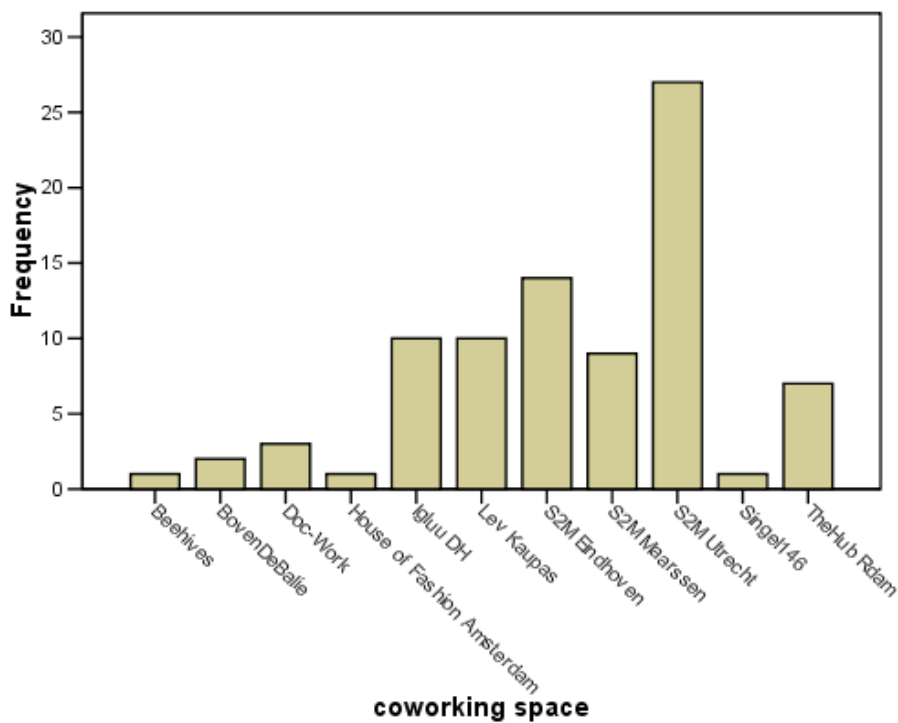
C: A list of coworking spaces in the Netherlands

<u>Name</u>	<u>City</u>	<u>Participated in field research</u>	<u>Coworkers found online survey</u>
TheHub Amsterdam	Amsterdam		
De Werkkamer	Amsterdam	X	
Singel 146	Amsterdam		X
Boven de Balie	Amsterdam		X
Spaces Heregracht	Amsterdam		
Spaces Zuid-As	Amsterdam		
Lev Kaupas	Amsterdam	X	
Betaspace	Amsterdam		
Beehives	Amsterdam		X
House of Fashion	Amsterdam		X
Seats2Meet Sloterdijk	Amsterdam		
Nomadz	Den Haag		
Swung House	Den Haag		
Igluu Den Haag	Den Haag	X	
WorkaLot/Cabellero Fabriek	Den Haag		
Kleine Loods	Den Haag		
TheHub Rotterdam	Rotterdam	X	
InOffice	Woerden		
Igluu Utrecht	Utrecht		
Seats2Meet Utrecht	Utrecht	X	
Seats2Meet Maarssen	Maarssen	X	
FLEXverhuur	Amersfoort	X	
Koppelwerk	Amersfoort		
Yellow Stones	Amersfoort		
Cowork Apeldoorn	Apeldoorn		
De Fabriek	Denventer		
Seats2Meet Lelystad	Lelystad		
Goede Gasten	Arnhem		
Seats2Meet Eindhoven	Eindhoven	X	
DocWork	Breda	X	
Kamer52	Oosterhout		

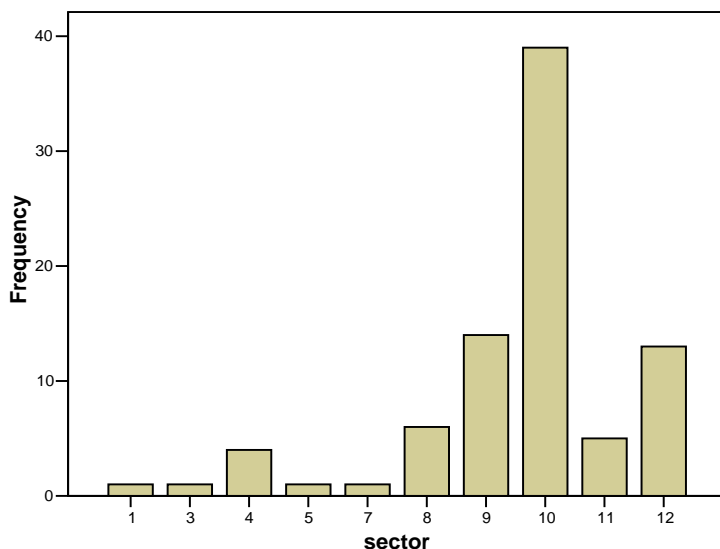
D: Distribution of respondents according to different categories

Distribution of Respondents	Observations	%
Gross response	106	100%
<u>Excluded cases (non-regular users of CWS)</u>	<u>21</u>	<u>20%</u>
Net response	85	80%
<u>Net response</u>	<u>85</u>	<u>100%</u>
Self-employed	74	87%
Employees	6	7%
Students	5	5%

E: Distribution of respondents across different coworking spaces in the Netherlands



F: Distribution of coworkers across different sectors



## G: Description of variables coworking dataset

*Birthyear* represents the year of birth of the respective respondent and is denoted in four digits.

*Gender*: “1” refers to male, whereas observation “2” represents a female respondent.

*Education* refers to the level of schooling. “1”, “2” and “3” imply low educated workers (mainly vocational courses), while “4” refers to a higher degree of education (college or university). “5” denotes any other type of schooling, which has not been included in the former options.

*Sector*: a list of sectors can be found in Appendix H.

*Year foundation enterprise* represents the amount of years that have passed since the respective enterprise has been founded, in case the respondent has identified himself as a self-employed worker.

*Sources of income*: “1” implies that the entrepreneur is solely dependent upon one's business. Options “2”, “3” and “4” register an additional source of income next to one's enterprise, respectively a job, a pension or a social benefit.

*Net income per month* represents the disposable income of the respondent, denoted in euros. Categories 1-5 represent different income classes, which can be found in question 9 of Appendix A. The income classes have been denoted in increasing order of value.

*Hours per week* refers to the average time per week spent in coworking spaces.

*Productivity* captures the answer given by the respondent to question 13 of Appendix A. Then numbers 1-4 represent in increasing order to which degree the respondent concurs with the respective statement.

*Knowledge diffusion* summarizes answers given to question 14 of Appendix A. Then numbers 1-4 represent in increasing order to which degree the respondent concurs with the respective statement.

*Innovation* reflects the degree of innovation that occurs within coworking spaces, as perceived by its users. This comes forward by means of question 15 of Appendix A. Then numbers 1-4 represent in increasing order to which degree the respondent concurs with the respective statement.

## H: List of sectors:

1. Agriculture
2. Industry

3. Construction
4. Trade
5. Catering industry
6. Transportation of goods
7. Other transportation
8. Financial services
9. ICT-services
10. Other business-related services
11. Health care
12. Other services (media, hair dressers, beauty institutes etc.)

#### I: Description of variables EIM dataset

*Net income per month* represents the disposable income of the respondent, denoted in euros. Categories 1-5 represent different income classes, which can be found in question 9 of Appendix A. The income classes have been denoted in increasing order of value.

*Gender*: “1” refers to male, whereas observation “2” represents a female respondent.

*Age* represents the amount of years that have passed since the birth year of respondent.

*Education* refers to the level of schooling. “1” implies a high degree of education (college or university), while options “2” up to “6” imply low educated workers (mainly secondary education and vocational courses). “7” denotes any other type of schooling, which has not been included in the former options.

*Sector*: different sectors have been listed. A “1” refers to agriculture, option “2” represent an industry worker, whereas “3” denotes the construction sector. “4” and “5” respond to trade and transport respectively. Finally the service sectors are ICT (6), other business services (7), health (8), education and training (9) and other services (10).

*Business only* is a dummy variable and a “1” implies that the entrepreneur is solely dependent upon one's business.

*Business job* is a dummy variable and a “1” implies that the self-employed has a job in addition to the founded enterprise.

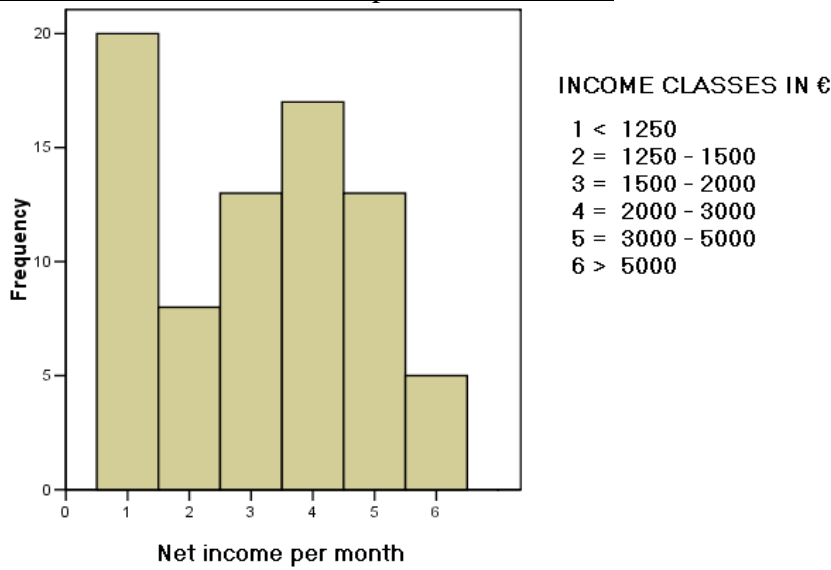
*Business benefit* is a dummy variable and a “1” implies that the entrepreneur receives a social benefit next to the income of one's business.

*Other income* is a dummy variable and a “1” implies that the entrepreneur has any other additional source of income next to the income of one's enterprise.

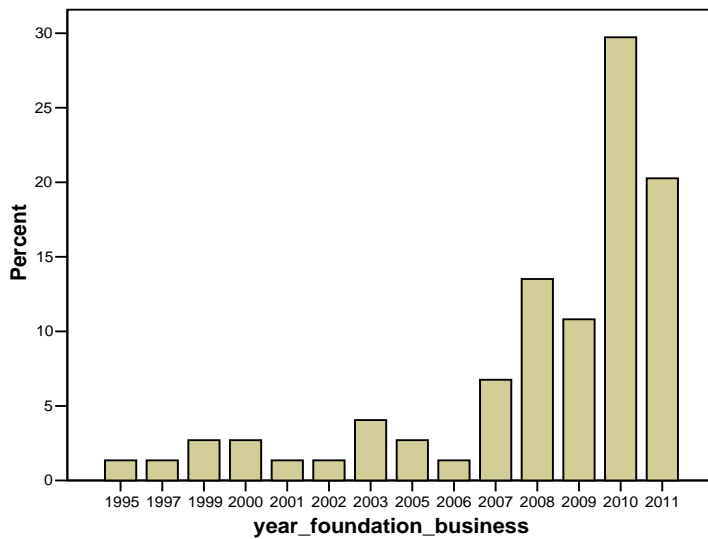
*Year foundation enterprise* represents the amount of years that have passed since the respective enterprise has been founded, in case the respondent has identified himself as a self-employed worker.

*Worklocation*: option “1” denotes a home office, whereas “2” refers to a rented office. Finally “3” implies an ambulatory work location.

**J: Distribution of net income per month in euros**



**K: Firm tenure of founded enterprises of self-employed coworkers**

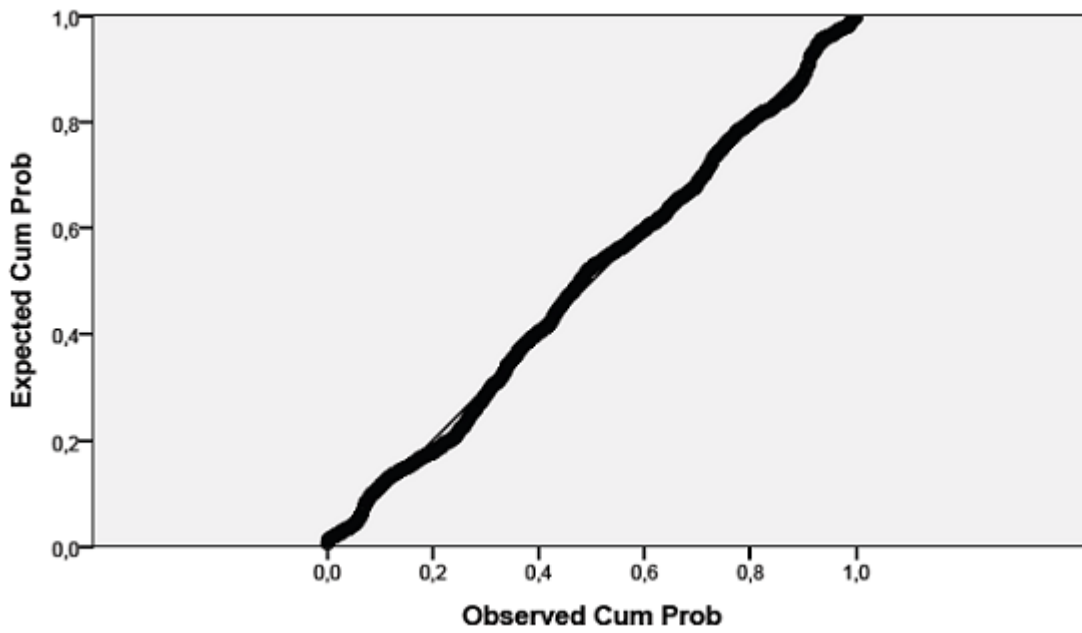


**L: Correlations between economic variables of interest**

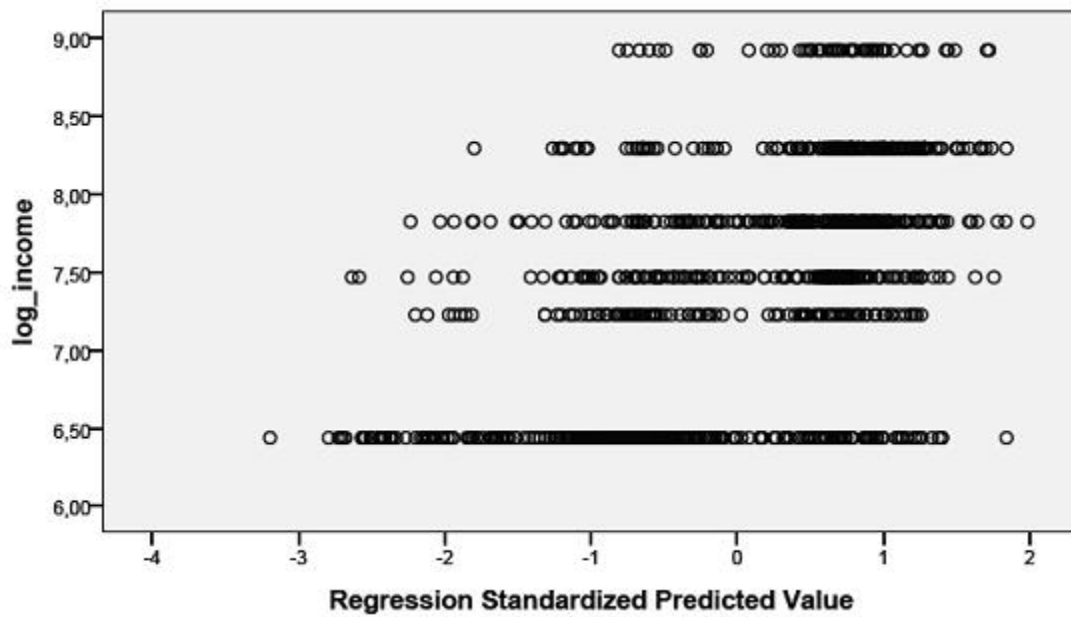
Correlation values	Knowledge diffusion	Productivity	Innovation
Knowledge diffusion	<b>X</b>	0.208	0.706
Productivity	0.208	<b>X</b>	0.267
Innovation	0.706	0.267	<b>X</b>

All values are significant at  $\alpha = 0.01$  level.

M: Normal P-P lot of regression standardized residual

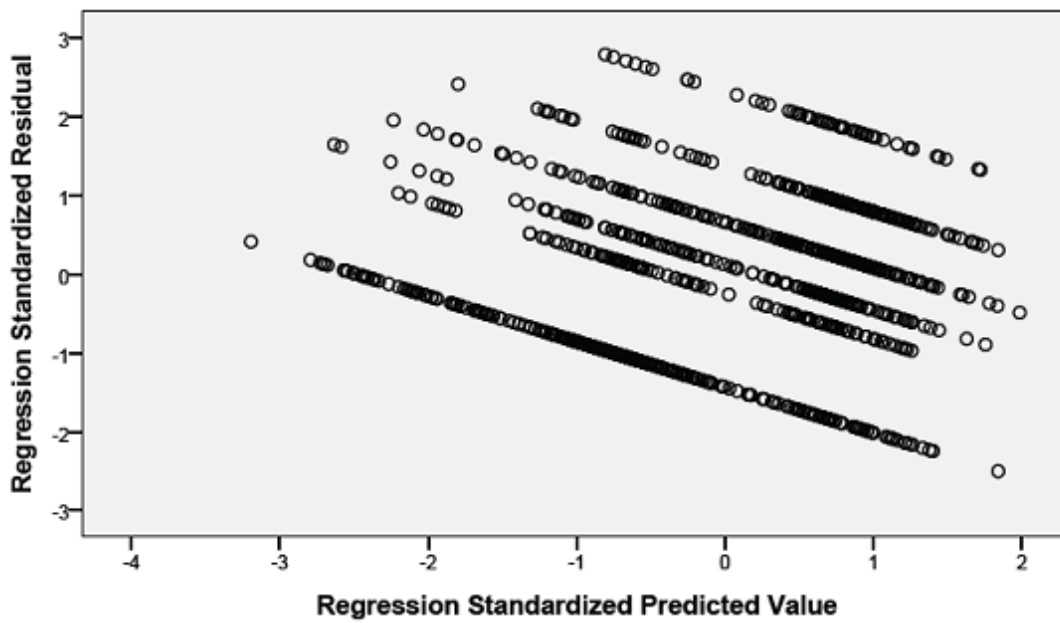


N: Scatter plot of predicted against observed value





O: Scatter plot of residuals against predicted value



P: VIF values of coefficients

Variable	VIF value
Gender	1.286
Age	57.042
Age 2	59.722
Education high	1.401
Firm tenure	1.360
Firm and job	1.040
Firm and benefit	1.371
Sector trade	1.147
Sector finance	1.043
Sector ICT	1.326
Sector health	1.603
Sector business	1.743
Sector other services	1.354
CWS	1.233

Q: Step-wise creation of the model and robustness analysis

<b>Variable</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
Gender	- 0.364 ***	-0.355 ***	-0.356 ***	-0.351 ***
Age	0.677 ***	0.356 *	0.336 *	0.421 **
Age 2	- 0.803 ***	-0.448 **	-0.431 **	-0.500 **
Education high	0.073 **	0.112 ***	0.096 ***	0.084 ***
Firm tenure		0.080 **	0.081 ***	0.087 ***
Firm and job		-0.237 ***	-0.232 ***	-0.234 ***
Firm and benefit		-0.216 ***	-0.214 ***	-0.217 ***
Sector trade			-0.053 *	-0.056 *
Sector finance			0.035	0.032
Sector ICT			-0.028	-0.028
Sector health			-0.021	-0.021
Sector business			0.062*	0.055
Sector other services			-0.038	-0.039
CWS				0.061**
Adj. R 2	0.141	0.233	0.241	0.244

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