MSc Programme in Urban Management and Development

Rotterdam, the Netherlands

September 2020

Innovation Districts: between young firms and employment formation

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Specialisation: Urban Competitiveness and Resilience

Country: Netherlands

Report number: 1422

UMD 16

IHS Making cities work Erasmus

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Summary

Innovation districts have become a popular development tool for economic growth and employment creation. Within this context young firms develop into large and established companies and are a source of new jobs for the innovation district. However, consistent empirical evidence regarding the relationship between employment formation and young firms within innovation districts is largely missing. With a focus on Rotterdam Makers District, this study aims to assess the relationship between young firms and employment formation and explain its determinants. By employing quantitative and qualitative evidence, heterogeneous results are found. An increase in the number of young firms choosing to locate in the innovation district's area is identified and their presence contributes to the number of new jobs concentrated within Rotterdam Makers District. Nevertheless, this trend oscillates between a 'come, grow, and leave' and 'come and stay' scenario. Moreover, it is shown that these trends are determined by the innovation districts conditions. The results imply that when young firms are stimulated by support initiatives, and the presence of young firms is in line with the goals and strategies of the innovation district and its driving actors, young firms can influence employment formation in the innovation district.

Keywords

Innovation districts, young firms, employment formation, support measures, Rotterdam Makers District, RDM, M4H

Acknowledgements

I would like to thank the following people, without whom I would not have been able to complete this research.

I would like to express my sincere appreciation to my thesis supervisor, Professor Doctor Frank van Oort, who provided guidance and feedback, and whose knowledge and insights have helped me navigate the complex world of 'innovation districts'.
To Beatriz Calzada Olvera, for her critical and much helpful comments, to the UCR team for their patience and support throughout the entire time.

To all the respondents who agreed and took time to answer my questions and without whom this research would have not been possible.

To my parents, to my old and new UMD friends, for their endless support and uplifting messages.

And last, but not least, to my little army of supporters, Anca and Ioana for your help and all our cheerful conversations, no matter where we are. To Matt, my best data 'wrangler' who so patiently helped me retrieve my data.

Thank you!

Abbreviations

IHS	Institute for Housing and Urban Development Studies
ID	Innovation District
PoR	Port of Rotterdam
RDM	Rotterdamsche Droogdok Maatschappij
M4H	Merwe-Vierhavens

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Chapter 1: *Introduction*

1.1. Research problem

Almost 100 innovation districts have emerged around the globe during the last couple of years (Wagner et al., 2019) and their goals cover economic development, sustainable development, urban resilience and social inclusion. For these reasons innovation districts have become a popular tool among policymakers who want to have their own neighbourhood where the innovation economy will give the regional development a jump-start. This novel tool could create competitive advantages for cities while growing the local economy, creating new jobs, fighting poverty and social inequality, and advancing sustainable urban development projects (Katz and Wagner, 2014). It is a strategy that, when successful, brings benefits for each party involved: from policymakers who want to grow economies, to startups, or companies looking to expand, to universities and researchers wanting to commercialize their invention (Baily and Montalbano, 2018). Growing in popularity, every city wants to have this "strategic mix of universities, established companies, and startups [that] will attract entrepreneurs, spurring further development" (Pazzanese, 2014). Consequently, considerable amounts of money are being spent on these initiatives that put to (good) use the socio-economic and physical potential of a region. And the stakes are high because "well-functioning urban and regional economies (...) attract investments, talent and productive firms, create employment and stimulate entrepreneurship" (van Haaren et al., 2019, p.1). At the same time, Katz and Wagner discuss why innovation districts matter and three out of their five main observations reference job creation (Katz and Wagner, 2014). Innovation districts are the attempt of solving local problems with local resources, while aiming for results on larger scales.

Under the sign of innovation these places 'matter' because they "empower entrepreneurs as a key vehicle for economic growth and job creation" (Katz and Wagner, 2014, p.4). Entrepreneurs starting their firms and choosing the innovation district over their own garages gain access to a collaborative environment with shared facilities, networking events, and legal and financial support. As promoters of the innovation economy, innovation districts support the Schumpeterian *creative destruction.* They place the entrepreneurs at their core and support them as "the underlying force of economic development" (Santarelli and Vivarelli, 2007, p.455). Indeed, entrepreneurs are recognized as drivers of economic and social progress and are "important sources of innovation, employment and productivity growth" (World Economic Forum, 2013, p.5). By design, innovation districts promote a context rich in entrepreneurship capital. They encourage the emergence of new entrepreneurs and support "young companies [to] grow into large established enterprises" (Rotterdam Makers District, 2018). Through their structure, assets and strategies, these structures attempt to recreate a favorable context that allows entrepreneurs to seize opportunities, create public goods and become successful. Therefore, an important relationship emerges between young entrepreneurs and innovation districts that culminates in new jobs and economic growth.

However, consistent empirical evidence regarding employment growth, or the relationship between employment formation and young firms within innovation districts is largely missing. While qualitative descriptions of some of the most successful cases are available (Pazzanese, 2014; Baily and Montalbano, 2018; Mulgan, 2019), systematic quantitative research is actually rare. With more innovation districts emerging and more entrepreneurs moving into an innovation district, this trend seems to be driven by at least two situations.

First, entrepreneurs seek to increase their chances of success. Despite acknowledging the importance of entrepreneurs who move from the individual level to the firm level in order to pursue opportunities (Acs and Armington, 2004), these young firms show low survival rates. Santarelli and Vivarelli suggest that about "20-40% of entering firms fail within the first 2 years of life, while only 40–50% survive beyond the seventh year" (2007, p. 457). Furthermore, innovative environments exert important pressure on the survival rate of new entrants (Audretsch, 1995) and new-to-the world innovations have an effect on the chances of survival of new firms (Buddelmeyer et al., 2006). These first years of young firms are characterized by numerous liabilities. However, entrepreneurs through their background, network and the firm's capability can attempt to outweigh the initial liabilities by accessing external support or resources they don't possess (van Haaren et al., 2020). Hence, making use of external conditions is in the hands of the entrepreneur and this can be noticed when they choose innovation districts for their new location. Second, these entrepreneurs help innovation districts strengthen their position and role within the innovation ecosystem (Wagner et al., 2019). Katz and Wagner promote that by growing the firms and networks, innovation districts can help their driving actors or its city to advance their competitive advantages (2014).

These situations seem to determine the presence of firms, and consequently young firms within innovation districts. The choice of the entrepreneur and the goals and motivations of the innovation district influence the relationship between young firms and innovation districts. Additionally, considering the increased importance of innovation districts as a tool for employment creation and for growing entrepreneurs into large and established firms, it makes sense to study whether this relationship develops into new jobs.

Within the Dutch policy context, the demand for innovation districts has grown, therefore, this research will focus on two initiatives existing in Rotterdam: RDM and M4H that in 2018 have joined forces under one single entity - Rotterdam Makers District. The choice of the two places is not random. First, these initiatives revolve around the innovative manufacturing industry, which is considered to be part of the Fourth Industrial Revolution and to have high socio-economic impacts (World Economic Forum, McKinsey & Company, 2019). Second, RDM and M4H promote a business climate favorable for young businesses to grow into developed firms, all within an environment characterized by collaboration and exchange (Rotterdam Makers District, 2018a). While RDM is focused on the production and experimentation part of the value chain, M4H concentrates more on the services accompanying innovative manufacturing. Third, the location at the outskirts of the city together with the maritime and industrial past of the entire area were leveraged into a spatial framework that allows for "an innovative living-working environment, optimally equipped for innovative manufacturing industry and with a mix of working, residential, culture, catering, sports and education." (Rotterdam Makers District, 2018b, p.2). These features follow the line of characteristics defining innovation districts and therefore present the perfect context for analysing how innovation districts achieve their 'employment creation' goal.

Within the context of RDM and M4H while some firms succeed, others fail. These two projects are a combination of new-born firms and established companies. While some test markets for new ideas, others look to expand an already growing portfolio. While some firms look for cheap space, others look for more space. With some success stories of growing young firms, Rotterdam Makers District has seen its number of entrepreneurs increasing during the past years. Likely, this mix of firms can be considered as an attempt to achieve a critical mass of firms (Wagner et al., 2019). There are reasons to believe that this mix is

influenced by the combination of the innovation district's setup, the support measures available and the innovation district's goals and motivations. For these reasons, this study hypothesizes that employment formation in innovation districts depends on the presence of young firms and their presence is determined by the innovation district's conditions.

This study introduces the presence of young firms together with the innovation districts conditions as determinants of employment formation in Rotterdam Makers District. These conditions can be described as the innovation district's setup, the stimulating support measures attracting young firms, and the innovation district's motivations. By doing so, the research contributes to the scarce literature regarding employment formation in innovation districts. It provides insights on the functioning mechanisms of innovation districts and offers evidence-based recommendations on how innovation districts can advance their goal of employment formation. Furthermore, by using empirical evidence this study advances existing literature concerning innovation districts and employment formation. To this aim, the following research question is formulated: ***To what extent and under which conditions do young firms influence employment formation in innovation districts?***

The aim of this research is to explain the relationship between young firms and employment formation with a focus on Rotterdam Makers District. First it identifies the employment formation trends within RDM and M4H. Second, it explains the conditions determining these results, both from the firm and the innovation district's perspective. Third it discusses how the presence of young firms contributes to Rotterdam Makers District ecosystem.

The relationship between Rotterdam Makers District and young firms was analysed using a mixed method where both quantitative and qualitative data were employed. Quantifying the employment formation trends was complemented with qualitative data allowing to explain the context within which these patterns develop. At the level of Rotterdam Makers District heterogeneous results are found, with RDM and M4H showing different trends. Employed empirical evidence suggests indeed that young firms when moving to the innovation district bring in new jobs. However, between RDM and M4H the localisation of jobs within the area follows different time spans which makes it difficult to identify growth patterns in terms of employment formation. Finally, these results can be explained by different determining conditions that nevertheless confirm the employed hypothesis. When young firms are stimulated by support initiatives, and the presence of young firms is in line with the goals and strategies of the innovation district and its driving actors, young firms can influence the number of new jobs available within the area.

We should, however, also be aware that the innovation district concept is still novel, and Rotterdam Makers District is still a 'young' and 'still developing' project. This novelty makes it difficult to precisely establish the geographical limits or clearly identify the sample to be researched. Despite seeing innovation districts as a place-based intervention, its span does not stop at the border of the district. Moreover, it should not be forgotten that firms or young firms can come from different places and are not limited by the district's outline. Therefore, this research has attempted to take into consideration the variety of the sample and also include the firms clearly promoted as part of the Rotterdam Makers District community.

The following sections present an overview of the existing theoretical and empirical evidence concerning innovation districts, employment formation and young firms. Based on this literature, a theoretical framework is constructed, and several propositions are introduced. The operationalization of this model is presented in chapter 3 together with the research

design and methodology, and the sample selection process. Chapter 4 describes and analyzes the collected data. It discusses the potential of the identified relationship based on the empirical evidence. The last chapter concludes, and offers recommendations for advancing the role of Rotterdam Makers District within the region.

1.2. Main research question and sub questions

1. *To what extent do young firms influence employment formation in innovation districts?*

2. *Under which conditions does the presence of young firms influence employment formation in innovation districts?*
    A. *Which conditions stimulate young firms to locate in an innovation district?*
    B. *What determines innovation districts to embrace young firms?*

3. *How does the presence of young firms contribute to the innovation district's conditions?*

These questions and sub question are presented in detail in Chapter 2.

Chapter 2: *The determinants of employment formation*

Innovation districts are promoted as tools for economic growth and employment creation. Through their presence and development, they attract entrepreneurs, startups, or established companies that at their turn bring in new firms and consequently generate new employment in the region. However, increasing attention has been paid to young entrepreneurs that within the context of the innovation district can grow into the next success story. The following chapter starts by discussing the innovation district tool for employment creation. Second, it looks at employment creation in relation to young firms. Third, it focuses on the liabilities describing the first years of young firms. And fourth, it discusses the link between these young firms and innovation districts. The purpose of this following part is to define the main concepts of this research and build the conceptual framework for answering the main research question.

2.1 Innovation Districts: a place-based solution for economic growth and employment formation

Innovation districts are defined as "geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators and accelerators" (Katz and Wagner, 2014, p.1). They are constructs that make use of place to create relationships between people and firms. Innovation districts can be found in downtowns or mid-towns of central cities, in "re-imagined urban areas", or in "urbanized science parks" (Katz and Wagner, 2014, p.3). In these places local institutions and economic actors are in close proximity, interact and accelerate ideas and their commercialization. The innovation district model clearly follows the place-based approach where "interaction between institutions and geography are critical for development" (Barca et al.,2012, p.140). This perspective brings forward the potential of the area to create economic growth by employing its best resources (Barca et al.,2012). Innovation districts as development of institutional arrangements and constructs of space allow economic activity to emerge. As representations of place-based policies, they underline the potential of the region and can strengthen the comparative advantages of the territories. By linking economic activity to local social, institutional and economic fabric, innovation districts grow the potential of the area. Additionally, through their externalities, innovation districts offer individuals opportunities to become successful (Barca et al., 2012). The place-based perspective suggests the importance of improving the place in order to achieve the well-being of the people. Innovation districts, as their name indicates, grow from the innovation emerging within its boundaries. For this reason, Katz and Bradley consider innovation districts a construct of the next economy that can lead to economic growth (2014). Nevertheless, one of the key ingredients for achieving these goals is the entrepreneurial activity, that presumably is attracted by these place-based interventions.

2.2 Employment formation and young firms

Entrepreneurship as the process by which new firms are created and developed into viable enterprises is considered beneficial for economic growth, employment formation and employment reduction (Santarelli and Vivarelli, 2007). Acs and Armington state that employment growth is strongly and positively correlated with entrepreneurial activity and it can be described as a function of entrepreneurial activity, agglomeration effects and human capital (2004). Within this function a significant contribution comes from the presence of new entrants increasing the entrepreneurial activity. These newly founded firms are the step forward from the individual to the firm level where opportunities are pursued and

entrepreneurial action appears (Acs and Armington, 2004). They are seen as important in "fostering structural change, innovation and new job creation to reduce high unemployment" (Tamasy, 2005, p.365). Ahmad and Hoffmann in their OECD report support this view and define entrepreneurial activity as the "enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity" (2008, p.4) with the 'entrepreneurs' as the ones engaging in this activity. For these reasons, they have gained growing popularity among the 'entrepreneurship disciplines' that attempt to provide information not only about the number of entrepreneurs but also what are the benefits arising from their presence.

Ahmad and Hoffmann underline that 'doing something new' is what separates entrepreneurs from other businesses (2008). The authors underline the importance of creating value and support the importance of failure as part of the entrepreneurial process (Ahmad and Hoffmann, 2008). Where the final outcome of the entrepreneurial activity is 'value' as "both monetary and non-monetary returns" (Ahmad and Hoffmann, 2008, p.4). However, when discussing this 'value' from the policy-maker's perspective this can take forms of economic growth, environmental development or social inclusion (Ahmad and Hoffmann, 2008). These goals achieved through actions carried by entrepreneurs can be approached from different perspectives: an increase in sales and profits, an increase in productivity or an increase in the number of employees (Sleutjes et al., 2012). From the employment formation approach, it can be considered that when 'entrepreneurial' translates into 'new firm formation' new jobs are directly added to the job count (van Steel and Storey, 2004). Acs and Mueller adapt Birch's major contribution on business dynamics and employment effects and find that new firms have a positive effect on employment the year they enter the market (2008). Moreover, their results show that young firms, less than 5 years, have the strongest employment effect. Nevertheless these effects decrease over time and start being negligible after 5 years (Acs and Mueller , 2008). Additionally, they suggest that young firms' presence stimulates the performance of older establishments and thus leading to new employment formation (2008). Drautzburg strengthens these results through his study on the role of new businesses in employment formation in the US (2016). While his findings confirm previous investigations, he adds to discussion the more recent declining share of new jobs coming from young firms (Drautzburg, 2016). However, not all researchers obtain similar results. Van Stel and Storey discuss the case of Great Britain and conclude that the link between firm birth and job creation is defined by a negative relationship (2004). The difficulties of the study derive from the sectoral composition effects, the time lapse for the employment effect, the area of the study: urban or rural, the local wages rates or the existing policies stimulating new firm formation (van Stel and Storey, 2004). Indeed, multiple opinions exist when discussing the role of young firms and whether policies should encourage new incumbents or rather support their survival, since their rates of success are seemingly low.

2.3 Young firms: from liabilities to support measures

While navigating the pre-entry conditions is less complicated, the post-entry phase determines the success of the entrepreneur in terms of survival and growth of his/her young firm. There are various factors that influence firms' development curve: from its characteristics, to the entrepreneur's background or the context within which it evolves (Tamasy, 2006). All together contributing to the low survival rates among new firms: "20-40% of new entrants fail within their first 2 years, and only 40-50% survive past their seventh year" (Santarelli and Vivarelli, 2007, p.457). With percentages varying between countries and industries, researchers agree on these low percentages when discussing the survival of

young firms (Sleutjes et al., 2012; Kangasharju, 2000; Tamasy, 2006). “Liability of newness”, “liability of the smallness”, “entrepreneurial uncertainty” or “noisy selection” are just some of the approaches attempting to explain what determines these low rates of success.

Uncertainty, liability of the newness, and liability of the smallness

Entrepreneurs launching their firms can not predict all the events nor the outcomes occurring. According to Magnani and Zuchella, these situations are characterized by uncertainty (2018). Exploring and responding to opportunities in uncertain contexts is part of the entrepreneurship process and it determines the success or failure of the firm (Magnani and Zuchella, 2018; McKelvie et al, 2011). Audretsch and Thruik reinforce that firm’s new ideas, either an innovation, a new product to the market, or a new clone, are covered in uncertainty (2003). Predicting how the market will embrace the results of the entrepreneurial activity is uncertain. In addition, the age of the firm proves to be another uncertain determinant for a new enterprise (Audretsch and Thurik, 2004). Sleutjes et al. (2012) or Tamasy (2006) both support this hypothesis using empirical evidence from the Dutch and German context. Also named the ‘liability of the newness’, young firms are faced with a higher risk of death during their first years of life. However, if they manage to survive, this risk decreases with the age which Tamasy describes as the ‘liability of adolescence’ (2006). In addition, Audretsch and Thurik describe the “liability of newness” as the following 4 social conditions that affect the survival rate of new firms: “the ease of obtaining skills; the degree of initiative and responsibility within the workforce; the trustworthiness of strangers; and finally, the strength of the ties between customers and established firms” (2003, p. 44). Tamasy reinforces these conditions and describes young firms’ growth path as an inverted U-shaped pattern that is explained by hazard rate (2006). Moreover, employment growth is also related to the size of the firm, according to Tamasy “the bigger the better” (2006, p.368). Sleutjes et al (2012) and Schutjens and Wever (2000) both find the same positive relation. Starting the firm as a one-man business reduces the chances of growth (Sleutjes et al, 2012), nevertheless this pattern is quite common among future entrepreneurs trying to avoid unemployment. However, based on empirical evidence, Santarelli and Vivarelli conclude that entry size is not always a good predictor (2007). Nevertheless, it is worth mentioning it since it is very common among young firms to start small.

Sector, finance, and noisy selection

Equally important is the relation between the sector of the firm and the entrepreneurial growth. On the one hand, the sector of activity affects the growth probability of the firm due to different growth rates of industries. This phenomenon is particularly observed for the smaller firms (Kangasharju, 2012). On the other, entrepreneurs starting a firm in the same sector and region of their previous working experience have higher chances of success (Santarelli and Vivarelli, 2007). Jacobs’ externalities explain very well this phenomenon that increases competition but also allows for new firms to specialize within a new product niche (Audretsch and Thurik, 2004). Additionally, innovation within the sector of activity proves to be a positive predictor of the post-entry performance and enhances the expected time of survival by 11% (Santarelli and Vivarelli, 2007). This is in line with the Schumpeterian *‘creative destruction’* model that promotes that “new firms can displace obsolete firms" (Santarelli and Vivarelli, 2007, p. 456). Besides the firm’s sector, lack of external financial support seems to be the main cause of problems indicated by entrepreneurs (Santarelli and Vivarelli, 2007). However, literature both supports and contradicts this condition. While Sleutjes et al. mention that a lack of capital reduces the firm’s growth (2012), Santarelli and Vivarelli suggest that it can be a “symptom of more fundamental deficiencies internal to the firm” (2007, p.468). Additionally, in the case of new firms operating within innovative fields,

expensive equipment is oftenly required, for which initial financial capital is necessary and therefore finances can become a real first obstacle (Santarelli and Vivarelli, 2007). In contrast with the liabilities defining young firms, Jovanic brings in a different perspective explaining the success and failure of young firms. According to the 'noisy selection' approach "efficient firms grow and survive; inefficient firms decline and fail" (1982, p. 649). Costs are random and known to entrepreneurs, however "true costs" are unknown. Whether these "true costs" are indeed true is what will allow the firm to continue surviving (Jovanic, 1982). Despite some initial knowledge about the market, it is the ability of the entrepreneur to manage these supplementary "true costs" that will allow the firm to be efficient, grow and survive.

For all these liabilities and uncertainties defining the first years of young firms, the entrepreneur based on its capabilities makes use of the firm's knowledge base to "assess, access, and internalize externally available knowledge" (van Haaren et al., 2020). This available knowledge also includes the forms of support available within the entrepreneur's network and consequently the firm's network. Comprised by entrepreneurship policies, support measures target "individuals who are either considering, are about to, may wish to consider, or have recently started a new business." (Ramlogan and Rigby, 2014, p.6). The forms of support can include hard and soft measures. Hard support consists of financial assistance, while soft support "include counselling activities to entrepreneurs before business start-up, counselling at the start-up phase, facilitating financial assistance, enhancing technology and access to technology and improving access to physical infrastructure, or advice after the start" (Ramlogan and Rigby, 2014, p.7). These policies aim to improve the performance of entrepreneurs and increase the number of entrepreneurs, nevertheless accessing these forms of support remains at the firm level.

2.4 Innovation districts and the relationship with young firms

In this vain, innovation districts play an important role in encouraging and supporting young firms. Together with scaleups or large companies, new firms choose innovation districts to perform their activities and aspire to benefit from the available conditions and support measures. Because they are associated with economic growth (Knoben et al., 2011), entrepreneurs are the link between innovation districts and employment creation. By growing entrepreneurs, innovation districts aim to contribute to "creating jobs for the full spectrum of the working population" (Rotterdam Makers District, 2018). Or as Katz and Wagner suggest, innovation districts are important for their ability to "empower entrepreneurs as a key vehicle for economic growth and job creation" or "to grow better and more accessible jobs" (2014, p.4). These constructs attempt to recreate a favorable context that allows entrepreneurs to navigate the pre-entry phase, overcome the initial liabilities and consequently contribute to employment formation. With this purpose, driving stakeholders that go from public to private entities, from mayors to presidents of universities or anchor companies, innovation districts establish and follow strategies that leverage their economic, physical and social assets (Katz and Wagner, 2014). This refers to anything that is controlled or employed by the various parties involved in the innovation district. These resources can become their strengths and enable innovation districts to become more successful.

According to Katz and Wagner, innovation districts "uniquely contain three categories of assets: economic, physical and networking assets" (2014, p.10). This deconstruction makes use of the innovation district's definition where the multiple actors and the built facilities become an economic asset, the generated interaction is a networking resource and the geographic location turns to be a physical asset. Or in other words participating stakeholders

together with economic actors bring in their services or products, networks and connections all within the geographical area of the innovation district while making use of the existing physical resources. The Brookings Institute report classifies economic assets into innovation drivers, innovation cultivators and neighbourhood-building amenities (Katz and Wagner, 2014), this creates an overlap between the physical and economic assets. Therefore, all the public and private realm within the district is considered as a physical asset. This includes public spaces with existing infrastructure, parks, amenities, housing and the privately-owned buildings and spaces. For describing the 'actors' resource category, this study will employ the network theory. Therefore, all the involved parties are independent actors having various objectives that define different strategies. However, they are all led by the desire of an "interaction process in which actors exchange information about problems, preferences and means, and trade off goals and resources" (Klijn, 2007) in order to get closer to the final outcome. The 'network' asset describes ties that actors create and grow with other internal or external actors. The importance of networks for economic development is highly documented by numerous scholars. Connections "increase collaboration for obtaining, exchanging, and mutually developing resources" (van Haaren et al., 2020, p. 4). Nevertheless, this capital needs to be continuously 'boosted' and combined with "a supportive and risk-taking culture" (Katz and Wagner, 2014, p.10) where mixtures of assets are being exploited for growing entrepreneurial initiatives, while strengthening the role of the innovation district within the innovation ecosystem.

The 'population of actors' within the innovation district is essential for driving, supporting and cultivating the entrepreneurship capital. Their diversity in size or sector influences competitiveness, it allows for knowledge externalities and contributes to innovation activity (Audretsch and Thurik, 2004). From a resource-based perspective, an important 'actors capital' includes not only firms, but also actors from the educational and R&D area. Schools or universities partnering with innovation districts provide a skilled labour pool within the geographical proximity of entrepreneurs. However, one might ask whether physical proximity is sufficient for accessing this resource. Additionally, actors providing supporting services, from legal or financial to technical advice, strengthen the ecosystem. Furthermore, an important capital of actors can also serve for market opportunities. Depending on each firm's sector of activity, possible clients might appear from the community, entrepreneurs or schools. All together they create a mixed density that may be beneficial for entrepreneurial growth and determine the critical mass of the innovation district.

Furthermore, physical assets of innovation districts describe an environment suitable for entrepreneurial performance. However, spaces allowing for physical proximity, collaborative or evenementiel activities and providing specialized equipment are not the sole requisite. The quality of place has the potential to attract a higher range of people (Wagner et al., 2019) and therefore accessibility within the region is key. Additionally, amenities, shops, restaurants or green areas can increase the 'attractiveness' of the district and attract the skilled creative class (Sleutjes et al., 2012). However, innovation districts as place-based tools are frequently targeting deprived areas where significant development investments are required. While this process develops during several years, on numerous occasions physical assets are not all available from time zero and therefore this decreases the attractability of the location during the initial phase. Nevertheless, with the growth of the innovation districts land value increases as well, which some researchers mention as "large capital windfalls to landowners, many of whom have contributed little to the wealth they capture" (Mulgan, 2019). While often associated with gentrification phenomena resulting from the improvement of the

existing real estate, innovation districts as place-based constructs highly rely on these physical assets.

Equally important, if not essential, is how the networking assets translate into ties or relations between entrepreneurs and other independent entities (Havnes and Senneseth, 2001). According to entrepreneurship theory, the entrepreneur makes use of its personal networks in order to grow his/her firm. This line of idea is recaptured by supporters of the entrepreneurial ecosystem view, who promote the importance of belonging to a group or community where advisors, mentors or supporters are present and actively involved (Feld, 2012; Stam, 2015; Isenberg, 2010). Additionally, the industrial literature endorses the importance of networks for making resources or partnerships available to entrepreneurs (Havnes and Senneseth, 2001). In the long run firms with important networks show competitive advantages and this benefits its growth (Audretsch and Thurik, 2004). Innovation districts understand the value of networks, especially in innovation-driven ecosystems and attempt to create a context suitable for developing interactions. Through their choice of actors, partnerships, programming or space design, innovation districts dedicate teams to "choreographing 'spontaneous opportunities for smart people to interact with each other" (Wagner et al., 2019, p. 17). However, a 'buzzing' community becomes important only when the entrepreneurs know, can and will attempt to draw benefits from these interactions.

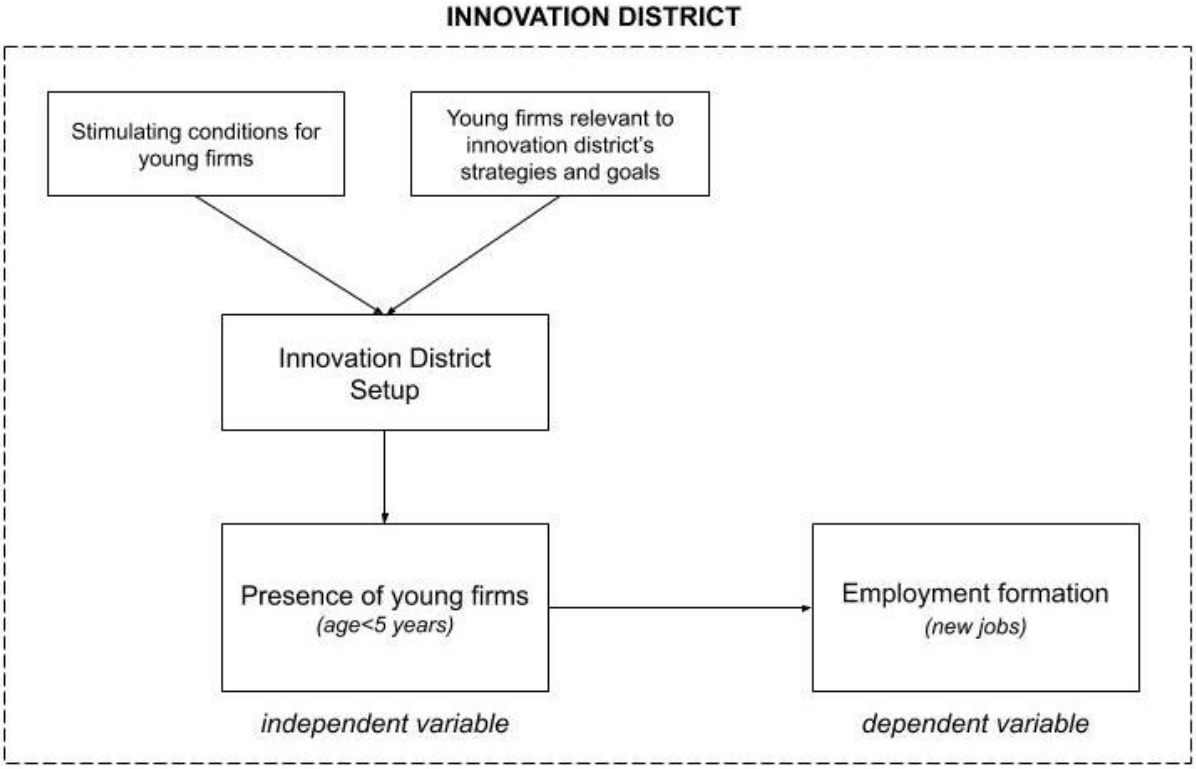
In an attempt to give a more guided agenda for innovation districts' stakeholders Wagner et al. suggest the following strategies: *creating a competitive advantage, building a critical mass, facilitating convergence, developing quality of place and orchestrating a buzzing connected community* (2018). While similar to organizing principles of a well-functioning economic cluster or an urban development project, these strategies can contribute to cluster externalities, industrial features or knowledge spillovers within the innovation district (Wagner et al., 2019). By leveraging their assets, innovation districts attempt to simulate an ecosystem favorable for all its actors, among them the young firms. Likewise, firms part of the ecosystem also play an important role as 'feeders' contributing and growing this community (Stam, 2015). Despite the classical tautology that a successful ecosystem is one where there are a lot of successful entrepreneurs, and where there are successful entrepreneurs the ecosystem is successful, the 'entrepreneurial ecosystem' approach strengthens the value of the actors who "also feed back into the system's conditions" (Stam, 2015, p.1766). For this reason, when young firms emerge successful innovation districts benefit (Pazzanese, 2014; Flint, 2016): in terms of employment creation, economic growth or popularity. Moreover, they can also 'feed back' and contribute to the innovation district's conditions.

2.5 Theoretical framework and propositions

Using the literature on entrepreneurship, young firms and their liabilities, and innovation districts, this study follows a deductive approach and builds the following conceptual framework (***figure 2.1)*.** This model considers the context of innovation districts and seeks an explanation for the 'employment formation' process. Building on existing literature the conceptual model suggests that employment formation in innovation districts depends on the presence of young firms. Their presence is determined by the setup of innovation districts. On the one hand, this setup stimulates young firms to locate in innovation districts for the available support measures that can guide them through their initial years when numerous liabilities arise. On the other hand, this setup emerges when the presence of young firms is relevant to the innovation districts' goals and motivations. In other words, when young firms

are stimulated to locate in an innovation district, and their presence is relevant to the innovation district's goals and strategies, young firms can influence employment creation in innovation districts.

Figure 2. 1 Conceptual framework; author's own elaboration (2020)



Employing this theoretical framework several propositions are formulated and serve for answering the main research question. The following propositions are made for each sub question.

1. ***To what extent do young firms influence employment formation in innovation districts?***
   P1: *Young firms from the innovation district create new employment.*
   P2: *Young firms from the innovation district grow into large and established companies. (more than 5 years and more than 10 jobs)*

This sub question seeks to identify the employment formation trends that young firms bring to the innovation district, both in the short and long term.

2. ***Under which conditions does the presence of young firms influence employment formation in innovation districts?***
   A. ***Which conditions stimulate young firms to locate in an innovation district?***
      P3: *Young firms choose to be part of the innovation district for the support and existing setup.*
   B. ***What determines innovation districts to embrace young firms?***
      P4: *The presence of young firms is relevant to the innovation district's strategies and goals.*
      P5: *The critical mass of economic actors permits the innovation district to support young firms.*

This sub question explore the conditions determining the presence of young firms in the innovation district area, both from the perspective of young firms and main stakeholders. It is expected to identify that support measures and the innovation district's environment stimulate young firms to locate in an innovation district. Additionally, when the presence of young firms fits the innovation district's motivation, assets are leveraged into strategies that enable support to young firms.

3. ***How does the presence of young firms contribute to the innovation district's conditions?***

    P6: *Young firms bring new population and activate the innovation district's area.*
    P7: *Young firms create links between the innovation district and the region*.

This sub question explores how these young firms contribute and 'feed back' into to the innovation district's ecosystem. Through their presence young firms can 'activate' and connect the innovation district to the regional ecosystem.

Chapter 3: *Research Design and Methods*

This research identifies the relationship between employment formation in innovation districts and young firms. It hypothesizes that when young firms are stimulated to locate in an innovation district, and their presence is relevant to the innovation district's goals and strategies, young firms can influence employment creation in innovation districts. To this aim, the following chapter presents the research methodology employed for answering the main research question ***"To what extent and under which conditions do young firms influence employment formation in innovation districts?"*** First, a translation of the theoretical concepts into observable and measurable entities will be provided, the operationalization phase. Second, it presents the research strategy, methods and techniques. Third, the sampling framework will be discussed. Fourth, it presents the measures taken to ensure reliability and validity. Fifth, it discusses the ways in which the data will be analysed (van Thiel, 2014).

3.1 Operationalization

Based on the upper mentioned theoretical model 5 main concepts are identified: employment formation, young firms and innovation districts conditions, in brief. These conditions are defined by the innovation district's setup, stimulating support measures, and last but not least, the relevance of young firms for the innovation district. The variables and empirical indicators employed to test the main assumption are presented in *table 3.1*.

Table 3. 1 Operationalisation table; author's own elaboration (2020)

Concept	Variable	Empirical indicator	Data source
Dependent variable: *Employment Formation*			
Employment formation	Number of new jobs	Net new jobs = jobs gained - jobs lost (Birley, 1986)	Primary data collected through semi-structured interviews & secondary data
Independent variable: *Presence of Young Firms*			
Young firms	Number of young firms	Number of young firms with an age between 0-5 years at the moment of the study	Primary data collected through semi-structured interviews & secondary data
Conditions			
Innovation District's Setup			
Available Assets	Actors assets	Presence of economic actors, educational institutions, research actors, and driving stakeholders (Katz and Wagner, 2014)	Primary data collected through semi-structured interviews & secondary data
	Physical assets in the private realm	Available real estate, testing facilities, or other facilities owned by the driving actors and employed by the actors (Katz and Wagner, 2014)	Primary data collected through semi-structured interviews & secondary data

Table 3. 1 Operationalisation table continuation; author's own elaboration (2020)

Concept	Variable	Empirical indicator	Data source
Conditions			
Innovation District's Setup			
Available Assets	Physical assets in the public realm	Presence of amenities, public spaces, access to public transport within the innovation district's area (Katz and Wagner, 2014)	Primary data collected through semi-structured interviews & secondary data
	Networking assets	Organized events or activities with the purpose of reinforcing the network of the involved actors (Katz and Wagner, 2014)	Primary data collected through semi-structured interviews & secondary data
Stimulating support measures			
Support measures	Hard support measures	Financial assistance	Primary data collected through semi-structured interviews & secondary data
	Soft support measures	Enhancing technology and access to technology and improving access to physical infrastructure, or counseling (Ramlogan and Rigby, 2014)	Primary data collected through semi-structured interviews & secondary
Relevance of young firms for the innovation district			
Relevance	Goals and motivations of innovation district	Presence of young firms fits the additional goals and motivations of the innovation district and its driving actors (Wagner et al., 2019)	Primary data collected through semi-structured interviews & secondary

3.2 Research strategy, methods and techniques

The purpose of this research is on the one hand exploratory because it investigates the subject of innovation districts where little knowledge is available, and explanatory on the other. By applying existing literature, this study seeks to identify the causes and the conditions determining the relationship between young firms and employment formation in innovation districts. Since the field of innovation districts is still in a nascent stage, this research will employ the case study strategy. For this purpose it examines the case of RDM and M4H as the two components of Rotterdam Makers District. The criteria for choosing this case are the following: Rotterdam Makers District is clearly branded as an innovation district for the manufacturing economy, both RDM and M4H clearly state their desire to grow young companies into established firms (Rotterdam Makers District, 2018), Rotterdam Makers District clearly states its role in creating new jobs within the regional ecosystem (Rotterdam Makers District, 2018).

The study of RDM and M4H permits to understand how the 'innovation district' phenomenon applies to Rotterdam's Innovation District and identify new descriptions of this phenomenon that later can serve the scarce existing literature. Following a deductive approach, this strategy is the most appropriate for reviewing the development of the 'innovation district' concept when applied to a real-life context. In addition, RDM and M4H

allow us to understand and discuss the employment formation phenomenon within innovation districts. For this purpose, RDM and M4H become an instrumental case study (Swanson and Holton, 2005). Moreover, this design permits to identify unique characteristics for the Rotterdam case and therefore it strengthens the 'warning' that innovation districts are not a copy-paste strategy that can suit all policymakers' ambitions. Furthermore, an in-depth understanding of the RDM and M4H cases is sought and for this reason the case study strategy is reinforced by desk research allowing the collection of both primary and secondary material. Primary material served mainly for building a dataset representative for the Rotterdam Makers District. Secondary material consisting of previous research or presentation documents were used mostly for triangulation purposes.

The methodology for this design employs both quantitative and qualitative data, making it a mixed methods approach (Swanson and Holton, 2005). This choice comes from the purpose of this research. On the one hand, it seeks to identify the relationship between young firms and employment formation in innovation districts, and understand the process determining this relationship on the other. It employs a concurrent design where qualitative and quantitative data are collected at the same time (Swanson and Holton, 2005). This mixed approach permits us to connect the quantitative results to qualitative data collected through in-depth interviews. Quantitative data is used to identify the relationship between new jobs in RDM and M4H and the young firms, while qualitative data will complement these results with explanations. Additionally, mixed methods reinforce the triangulation process.

The employed design included primary and secondary data collection. The main source of primary qualitative data were the semi-structured interviews with researchers, organizational team members for RDM and M4H, and entrepreneurs located in the Rotterdam Makers District. The interviews offered an in-depth understanding of the processes and structures typical to RDM and M4H. Additionally they provided background information from key respondents (van Thiel, 2014). The interviews were conducted online and by telephone, and a list of the guiding questions was provided to each respondent before the interview took place. The duration of the interviews varied between 15 minutes to 60 minutes. An interview report was done after each conversation to strengthen the reliability of the study. The interview questions were based on the operationalization of the variables (van Thiel, 2014) and were grouped around 5 main themes: structure and goals of the innovation district, actor assets, physical assets and networking assets, development process of the firms located in RDM and M4H. A general outline for the interviews can be found in *Appendix 5*.

Another essential source of primary quantitative data was the dataset comprising the firms from the Rotterdam Makers District. This primary data was collected by the researcher through desk research and it is based on information that was not primarily built for research purposes (van Thiel, 2014). The sources of this dataset are presented in *Appendix 1*. A brief description of the collection method is presented in the sampling framework section and *Appendix 2* presents the step by step methodology. A detailed codebook for the employed dataset is available in *Appendix 3.*

In addition, secondary quantitative and qualitative data was collected, a detailed presentation of these sources is available in *Appendix 6*. This secondary data allowed us to complement the primary dataset, and triangulate the main findings.

3.3 Sampling framework

Qualitative data

The selection of respondents was based on a representative sample from the various categories of actors involved in the Rotterdam Makers District. These categories are the following: team members from the RDM project, team members from the M4H project, entrepreneurs and researchers. The purpose of this selection was to collect information from respondents having different forms of involvement in the innovation district. Email invitations were sent to 40 contacts who were selected from the RDM and M4H website or were considered to have direct involvement in the Rotterdam Makers District. 4 have agreed to be involved in the data collection process, while only 4 indicated their unavailability. Despite a low rate of response, the 4 respondents covered the purposive sample necessary for enhancing the reliability and validity of the research. References to each interview will be marked using the following code "int_" followed by a letter identifying the source of the quote, for example [*int_a*]. The employed qualitative data is available in *Appendix 9.*

Quantitative data

This research focuses on the young firms part of the Rotterdam Makers District. In order to identify these firms, the research had defined the geographical area of the innovation district based on the first 4 digits of the postal code for RDM and M4H. These postcodes are 3089 for the RDM area and 3029 for the M4H neighbourhood. The choice for this geographical area follows the literature on innovation districts supporting their direct role at the neighbourhood level. Initially a longitudinal LISA 2018 dataset was employed. The dataset provides information on the sector and the numbers of employees for all the firms registered at an address located within the 3089 and 3029 postcode between 2000 and 2017. However, using this sample presented multiple inconsistencies when relating it to the empirical evidence collected through interviews and desk research.

RDM case

During the interviews, some of the respondents indicated that RDM's limits are defined by the premises owned by the Port of Rotterdam [*int_m, int_l*]. Within the 3089 area the Heijplaat village and the Weel-Eemhaven are also included. After excluding these 2 areas, RDM's limits are defined by the outline presented in *Figure 3.1.*

Figure 3. 1 Map presenting the 3089 area; author's own elaboration (2020) based on Postcodebjadres website

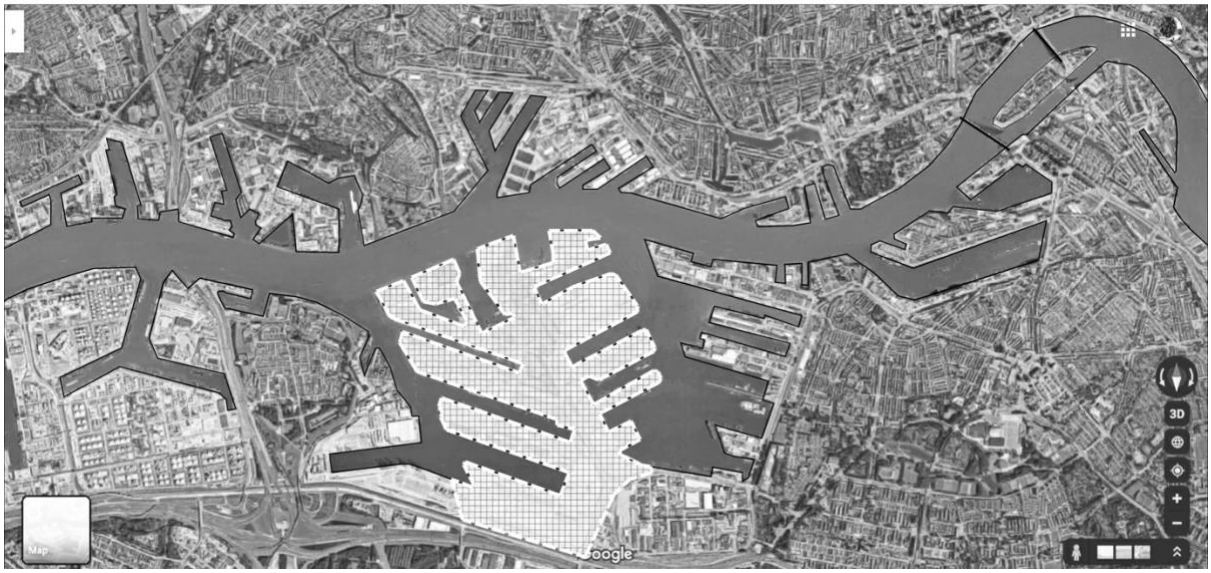
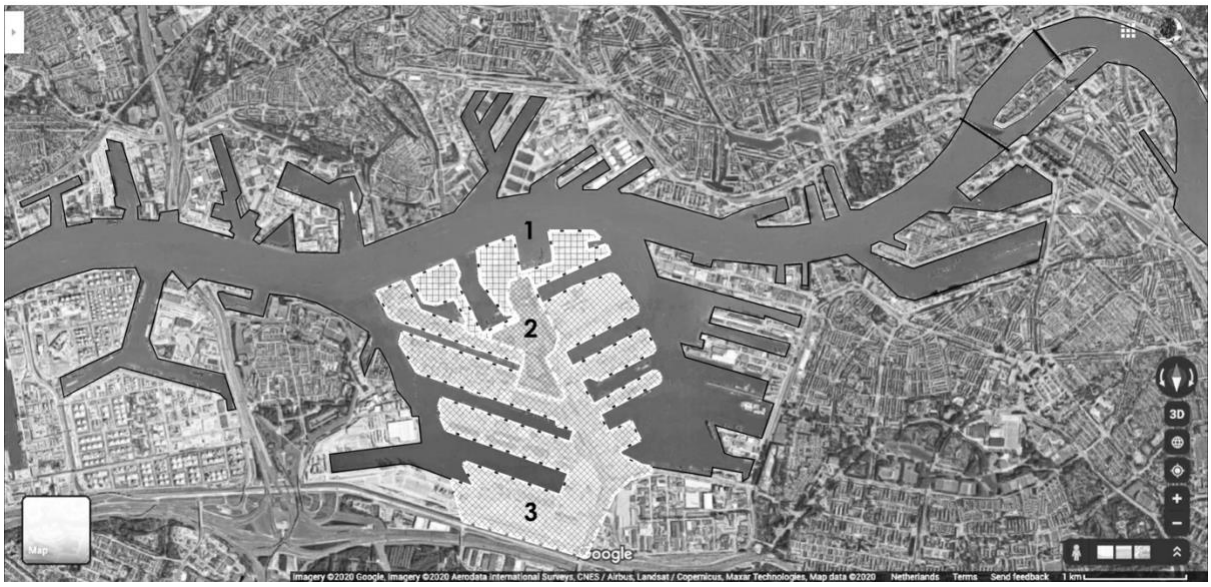


Figure 3. 2 Map presenting the 3089 area distinguishing RDM's limits (1), Heijplaat village (2), Weel-Eemhaven (3); author's own elaboration (2020) based on the 2011 Stadshavens agreement (Port of Rotterdam, 2011)



Using the secondary dataset comprising all the firms registered at a location within the 3089 area between the years 2000 and 2017, initially a sample of 602 firms was identified. Following the respondent's information, these firms were distributed according to the 3 areas RDM, Heijplaat and Waal-Eemhaven. After identifying the postcodes covering each zone the results were the following: 150 firms for RDM, 156 firms for Heijplaat and 311 firms for Waal-Eemhaven (*figure 3.3)*.

Figure 3. 3 Map presenting the firms from the 3 zones within the 3089 area: blue: firms within the RDM area; green: firms within the Waal-Eemhaven area; pink: firms within Heijplaat area; author's own elaboration (2020)

For triangulation purposes, this sample was compared with the names of the firms published on the RDM website in 2020 and the list of tenants from 2014 published by the Port of Rotterdam [*doc_5*]. This revealed the second inconsistency: only 22 firms out of the 602 units belonged to both sources. In addition, the size of the sample was also different (*Table 3.2*).

Table 3. 2 Table presenting the size of the sample according to different sources; author's own elaboration (2020)

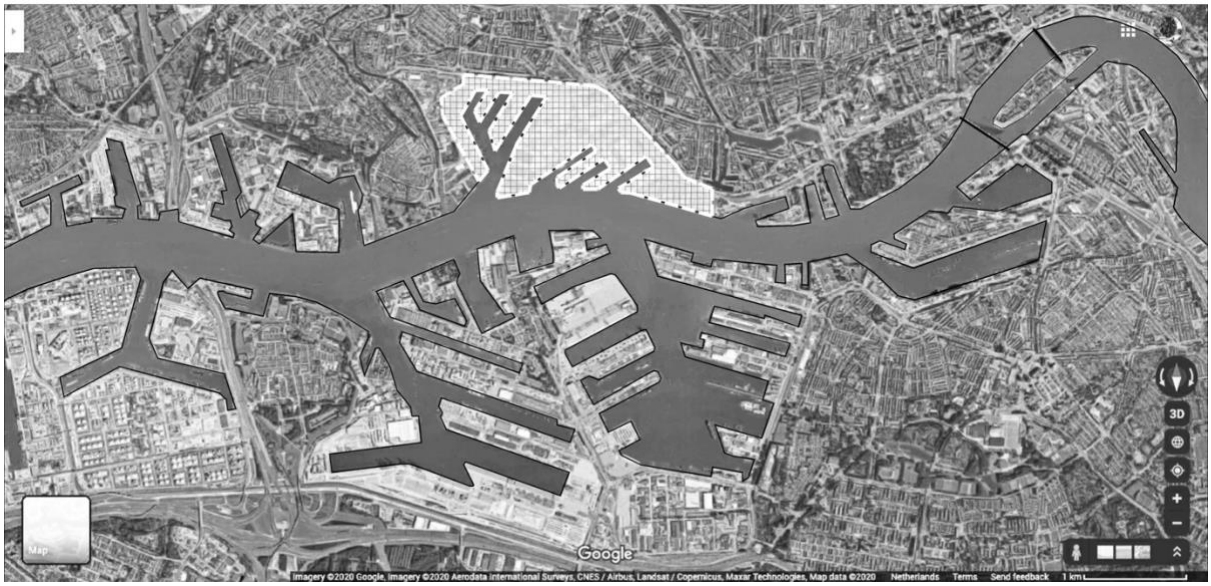
Year	Sample size for the firms registered within the RDM area, based on secondary dataset	Sample size according to secondary data: RDM website and *doc_5*
2013	41 firms	
2014	47 firms	33 firms
2015	61 firms	20 firms
2016	68 firms	40 firms
2017	61 firms	50 firms
2020		64 firms

Based on these initial findings, a new dataset was built using only the names of the firms presented on the RDM website and the secondary sources [*doc_5, doc_6*]. The timeline for these sources starts in 2014 and goes up to 2020. Using web scraping methods, this resulted in 100 different firms. For these firms data was retrieved using querying open web APIs methods from the sources indicated in *Appendix 1*. However only 40 firms had clear referents from unambiguous research results. The rest of the dataset was built manually by retrieving data from the same sources. A complete step-by-step description of the procedure is presented in *Appendix 2.*

M4H case

Building the sample of firms for M4H was done using similar methods. First a secondary longitudinal dataset between the years 2000 and 2017 (LISA 2018) was used to identify the firms registered at an address within the 3029 area (*figure* **TO BE COMPLETED**).

Figure 3. 4 Map presenting the 3029 area; author's own elaboration (2020) based on Postcodebjadres website



From this initial dataset only the firms having their first occurrence starting with the year 2012 are considered. The M4H project was officially launched with the Stadshavens initiative in 2015 [*web_5*]. While firms have started locating in the M4H area long before 2015, the year 2012 is integrated because it offers a benchmark for discussing the 5 years time lapse for young firms. This sample is supplemented with the firms presented on M4H's website in 2018 and at the present date. The same methodology was applied to retrieve data for each firm. In addition, the initial longitudinal dataset (LISA2018) was completed with the year of registration, current status (bankrupt, active/inactive firm) and the number of jobs at the latest reference for all units. In total 529 unique firms have been identified as part of the M4H area between 2012 and 2017. *Figure 3.5* presents their location within the established area of study.

Figure 3. 5 Map presenting the firms located within the 3029 area; author's own elaboration (2020)

3.4 Validity and Reliability

According to the employed strategy the following measures to ensure the validity and reliability of the study were used. Triangulation of the case study strategy was assured by making use of different data sources, resources and methods (van Thiel, 2014). The researcher attempted to take a diversified approach and collect as much diversified information as possible. This allowed to ensure the validity of the data, regardless of the small number of units studied (van Thiel, 2014). In order to enhance the reliability of the research the steps followed and the data sources are documented and presented in *Appendices 1, 2, and 6* therefore, the process can be reviewed afterwards (van Thiel, 2014). A codebook for the employed variables, the structure of the interviews, the answers together with the coding process is available in *Appendices 4-9.* The steps followed for the analysis are documented, hence permitting to repeat the analysis process. In addition, extra attention was accorded to the representativeness of the sample and numerous checks were performed on its composition, as illustrated in the *'sampling framework'* part of this chapter. The results were presented for review to other experts at Erasmus University as well, adding another form of control contributing to a higher internal validity.

3.5 Data analysis

Quantitative data

While inferential statistics analysis was not employed for this research, this study did make use of descriptive statistics methods. After collecting and assembling the data, ample inspections of the datasets were executed. This allowed us to complete the missing data and remove the observations not following the sampling requirements. Further on, recoding and categorization of the data was effectuated, in order to facilitate the analysis or reveal new patterns. Moreover, the existing data was analysed through descriptive statistics methods (means, standard deviations, histograms, cross-tabulations and correlations). Chapter 4 together with *Appendix 4* present the data analysis process.

Qualitative data

After the collection process, qualitative data was divided into units of analysis and coded following a deductive approach. Thematic codes were generated based on the theoretical framework and were used to identify interrelated constructs as observed from the empirical evidence (van Thuil, 2014). Each theme was subdivided into several indicators, therefore allowing the clustering of the empirical evidence. The qualitative data is analysed through pattern matching techniques and this allows to check whether the empirical evidence matches the theoretical hypothesis. Qualitative and secondary data were coded following the codebook available in *Appendix 7*. Through conditional formatting functions, relationships and patterns were identified among codes. The results are also available under the form of a co-occurrence matrix (*Appendix 9*) and a word network graph (*Appendix 8*).

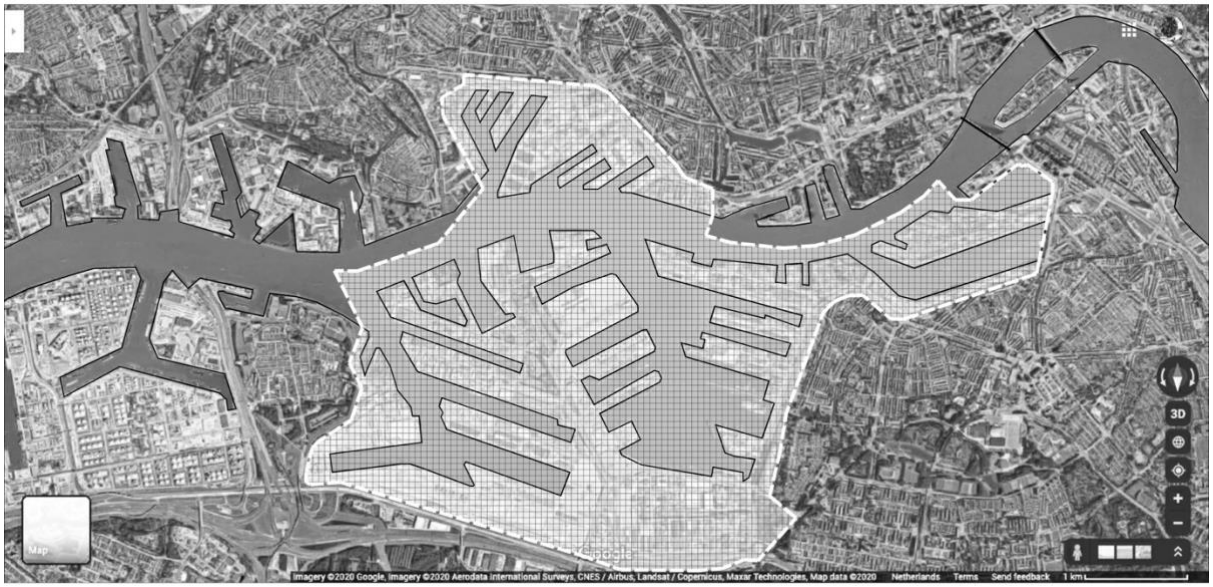
Chapter 4: *Findings*

The following section deals with the employment formation in innovation districts as a dependent variable on the presence of young firms. This relationship is determined by the setup innovation districts offer to young firms and the conditions favouring this setup. This section is structured as follows. First a brief description of Rotterdam Makers District's timeline is presented. Second, it describes the employment formation trends identified in the innovation district. Third it describes the setup and assets of Rotterdam Makers District together with the conditions determining this setting: from the firms' perspective and the innovation district. Fourth, it presents the contribution of young firms to the district's ecosystem. Finally, the fifth part deals with testing the initial propositions.

4.1 Context

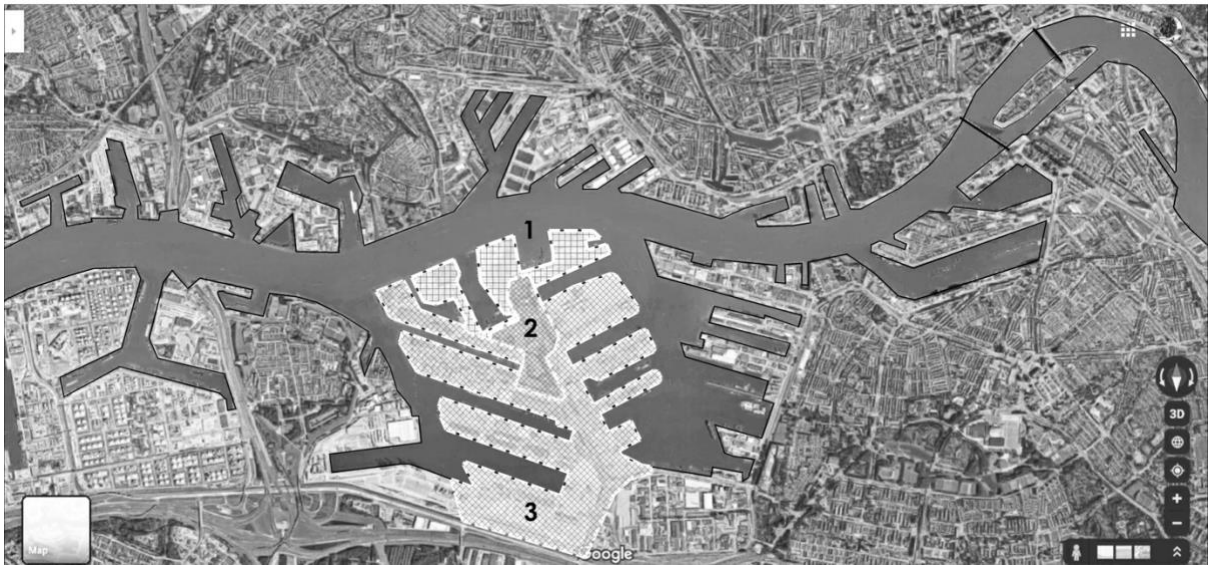
The Rotterdamsche Droogdok Maatschappij or RDM project opened officially at the end of 2009. However, the project started a few years before, when in 2005 the Hogeschool Rotterdam and the Albeda College were looking for new spaces for their study programs (van Tuijl and Otgaar, 2007; Vries, 2014). The initial project was developed around the triple helix model where education, research and enterprises meet. For the Port of Rotterdam partnering with these educational institutions was the occasion to form a new and younger labour pool into technical skills. The Port Authority as the main owner of the site developed the historical buildings, invested in the public space development and put in place the water bus connection (Vries, 2014). In 2011, the Stadshavens development strategy between the City of Rotterdam and the Port Authority was approved. Its aims are "to strengthen the economy of the city and port and the development of attractive and high-quality living and working environments" (van Tuijl and Otgaar, 2007, p.10). This strategy covers 4 main areas: Rijn-Maashaven, Merwe-Vierhavens, Waal-Eemhaven and RDM-Heijplaat where different stakeholders are present, *Figure 4.1.*

Figure 4. 1 Map presenting the area covered by the Stadshavens agreement (Port of Rotterdam, 2011); author's own elaboration (2020)



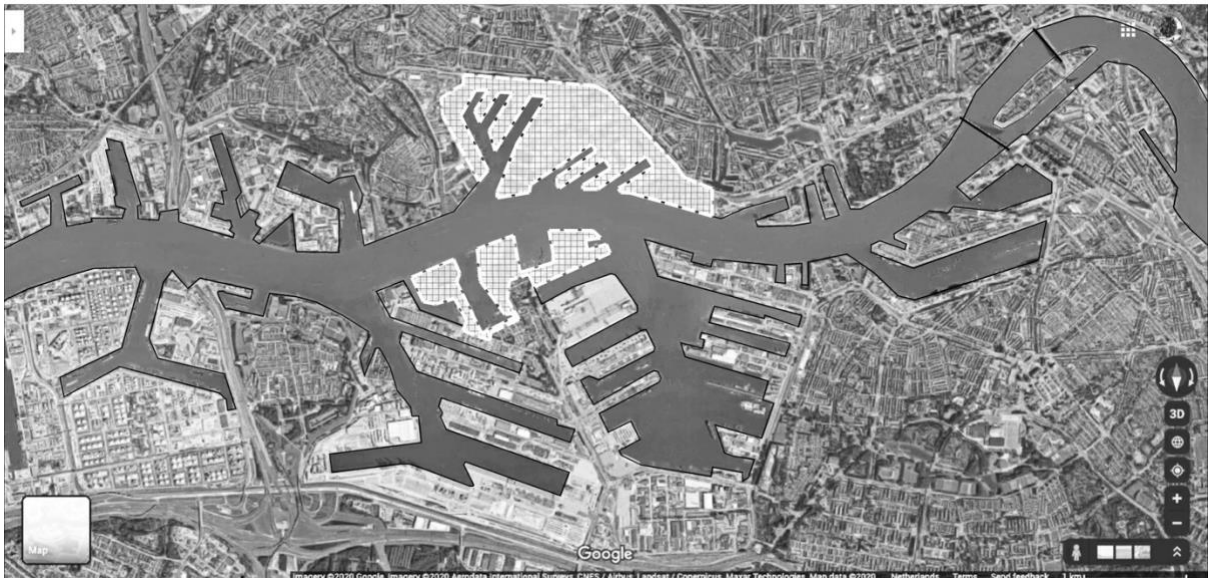
While initially RDM-Heijplaat was seen as a joint collaboration between the Port, the City and the Woonbron Authority, with time this evolved into a more scattered development (van Tuijl and Otgaar, 2007) with different authorities behind the steering wheel. Therefore, the RDM Campus is defined by the developments done in the central and western part of the RDM site, *Figure 4.2.*

Figure 4. 2 Map presenting RDM's limits (1), Heijplaat village (2), Weel-Eemhaven (3) according to the Stadshavens agreement (Port of Rotterdam, 2011); author's own elaboration (2020)



However, its eccentric location with difficult accessibility made it difficult for the RDM team to *"offer all kinds of amenities and facilities to the young firms on site"* [*int_g*]. This being one of the reasons behind the 2018 merger between RDM, on the south bank of the river Maas, and M4H, on the north bank. Since *"RDM is quite eccentric, we thought RDM could profit from the M4H area, and the other way around as well"* [*int_g*], this resulted into the merger of RDM and M4H under *"the umbrella brand Rotterdam Makers District"* [*int_l*]. With M4H at the beginning of its development, this area has a *"profile on the creative industries on the making industries"* [*int_g*]. Profile that can become complementary to the firms, educational institutions, facilities, and equipment available on the other side of the river [*int_g*]. In brief, RDM and M4H are two areas with different profiles and locations, that share resources and a team under the Rotterdam Makers District label.

Figure 4. 3 Map presenting Rotterdam Makers District area; author's own elaboration (2020)



4.2 Part 1: To what extent does the presence of young firms influence employment formation in the innovation district? *(sub question 1)*

The following part will describe trends identified using quantitative data for RDM and M4H. Further on these results will be complemented by qualitative data. This allows to connect the 'quantitative' patterns to Rotterdam Makers District 'qualitative' context. In addition, Appendix 4 offers further descriptions of the dataset.

A. RDM area

In total 94 firms have been identified as RDM tenants between 2014 and 2020. Out of the total sample 86,17% of the firms are still present on the market.

In 2020, 54 firms are currently located at RDM. Compared to the 64 entities present on RDM website, from the count have been excluded the educational institutions (3 entities), all research initiatives that are not formally registered under a unique KVK number (4 entities), public actors such as municipality of Rotterdam (1 entity), testing facilities (2 entities). 48,1% of the RDM tenants are young firms registered within the last 5 years, and 52,9% of the firms are older than 6 years, with Broekman Shipping B.V. or Hobrand B.V. taking the lead. According to their recent declaration the size of these firms varies. The young firms have a size between 1 to 9 employees and the older firms employ between 1 to 50 people. 77% of the total firms employ between 1 to 5 people. 11,5% of the young firms employ between 5 to 10 people.

In 2019, 37 RDM tenants have been identified, with 40,5% of the firms aged between 1 to 5 years. The age for the older firms goes up to 35 years for Radio Holland Group B.V. In 2020, 56,7% of the 2019 cohort is still part of the RDM community. The current size of the young firms from the 2019 group varies between 1 to 10 employees, with 13,3% of the young firms currently employing 5 to 10 people. 66,6% of the young firms in 2019 are currently located in

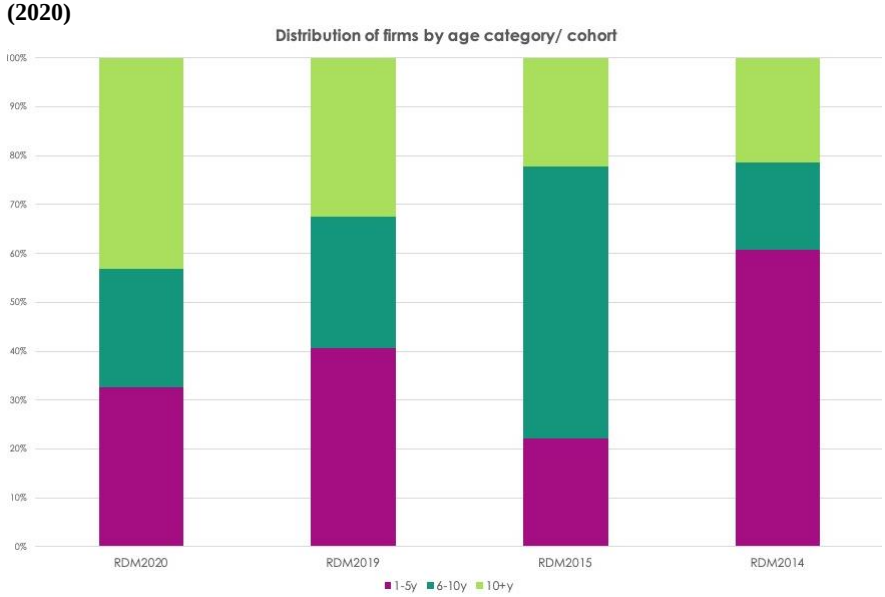
RDM. Out of the total 2019 population, 29,7% are firms older than 6 years and currently have a size of 1-5 people. Out of the firms that left RDM, 25% have exited the market, 25% are currently employing 1-5 people, and 25% have a size of 5-10 people. 31% of the relocating firms were young firms.

In 2015, 18 firms were identified as RDM tenants. 33,3% of the firms are still in RDM in 2020. 22% of the firms from the 2015 cohort have exited the market. 16,6% of the firms are aged between 1 to 5 years in 2015. At the moment, all the young firms (in 2015) employ between 1 to 5 people, while 38,8% of the firms are now older than 5 years and employ 1-5 people. 33,3% of the relocating firms currently employ 1 to 5 people. 66,6% of the young firms in 2015 are currently located in RDM.

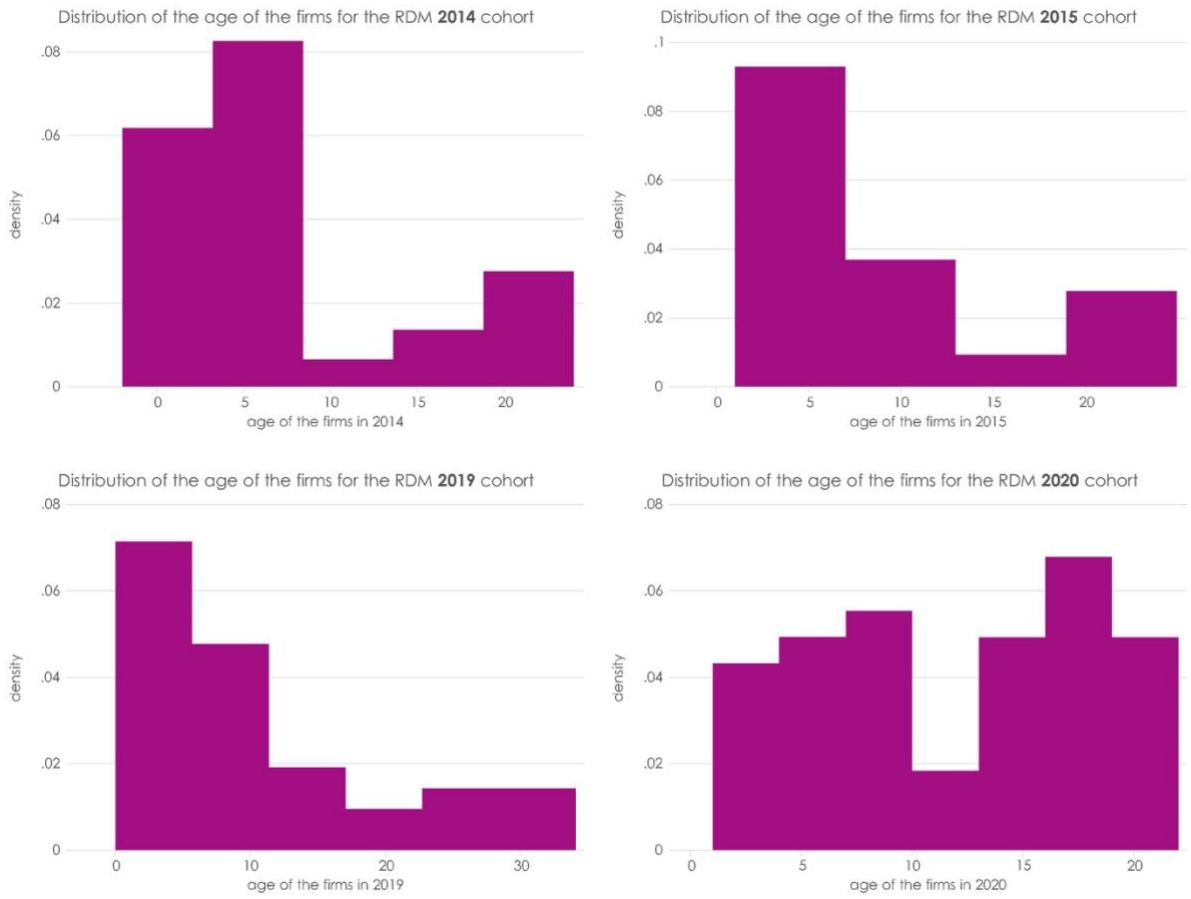
In 2014, 28 firms were located at RDM. 39,2% of the firms are still in RDM in 2020. 25% of the 2014 group have exited the market. In 2014, 46,4% were registered between 2009 and 2014. Out of these firms 61,5% are currently employing 1 to 5 people, while the rest have stopped their activity. Out of the firms aged more than 5 years in 2014, 21,4% currently have a size between 1 to 5 employees. Among the firms that changed their location, 38,8% are currently employing 1 to 5 people and 16,6% have ceased their activity. None of the young firms in 2014 are present in RDM at the moment.

When discussing the ages of the firms from the 4 cohorts, it can be noticed the preponderance of young firms. However, the trend tends to change for the 2020 group, where a more balanced distribution of the ages is noticed (*Graph 4.1, Graph 4.2*).

Graph 4. 1 Graph presenting the distribution of firms by age category for the 4 cohorts; authors own elaboration (2020)

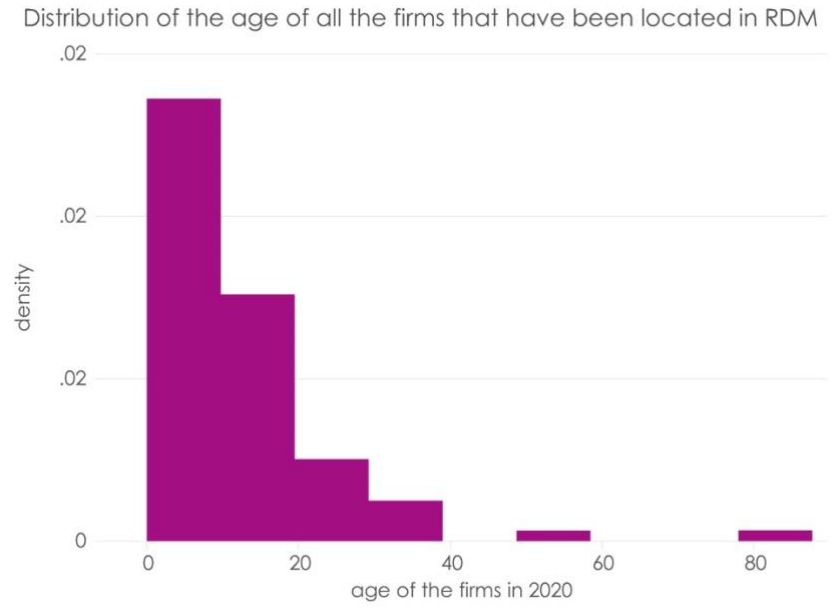


Graph 4. 2 Distribution of the age of the firms for the 4 RDM cohorts; authors own elaboration (2020)



When discussing the current (in 2020) age of the entire sample of RDM tenants since 2014, a skewed distribution in favour of young firms appears, *Graph 4.3*.

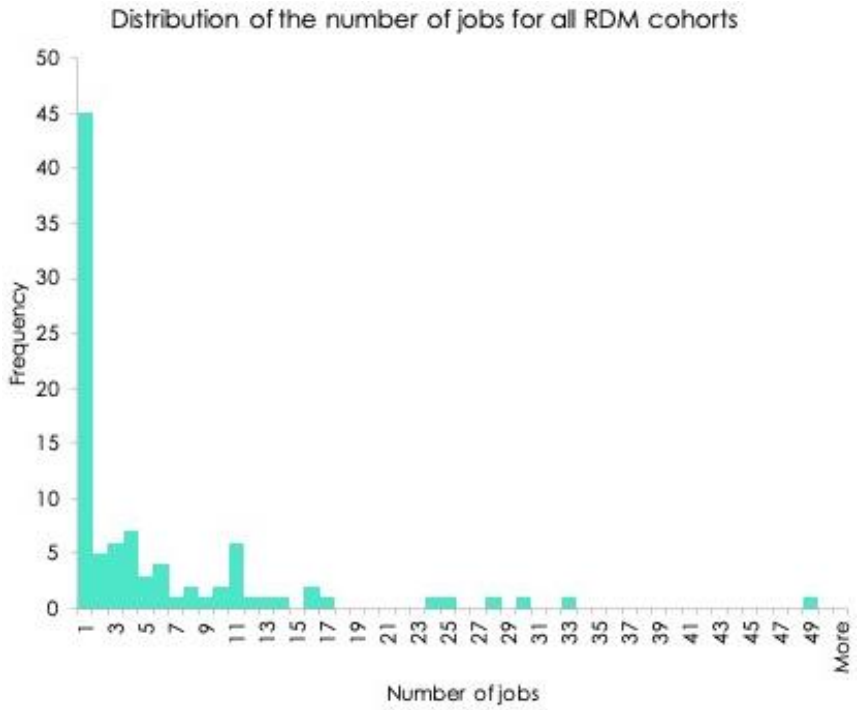
Graph 4. 3 Current age of all the firms part of RDM since 2014; author's own source elaboration (2020)



The present age of the RDM tenants varies between 0 (firms registered in 2020) and 88 for the *Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek TNO.* The entity was included within the sample, since it contributed to research partnerships and it was mentioned on the RDM website. The standard deviation of the firm's age is 12.26.

Concerning the current number of employees of the entire RDM sample, the distribution is again right skewed, *Graph 4.4.*

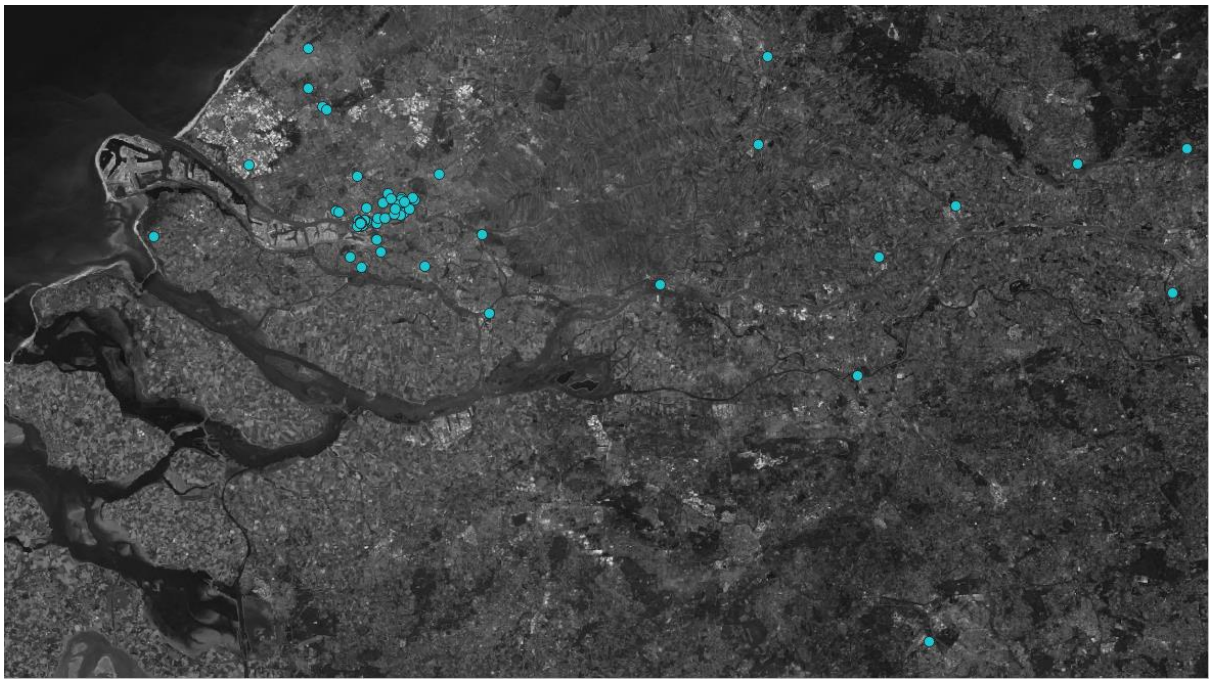
Graph 4. 4 Distribution of the current number of jobs for all RDM tenants; author's own source elaboration (2020)



The correlation between the age of the firms and the number of jobs is positive (0,34) and statistically significant at the 1% level.

The address of registration for these firms is not limited to the RDM's area. *Figure 4.4* presents a map with the locations of these firms.

Figure 4. 4 Location of all the firms part of RDM since 2014; author's own source elaboration (2020)

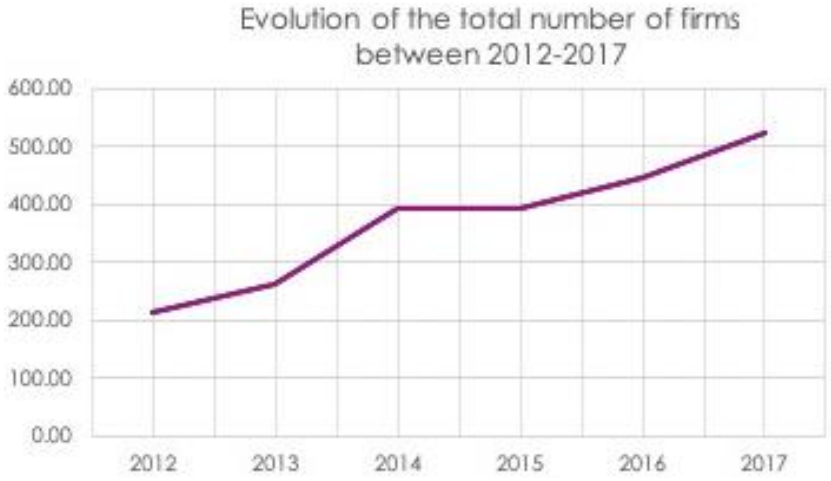


B. M4H area

In total 529 unique firms have been identified as part of the M4H area between 2012 and 2017.

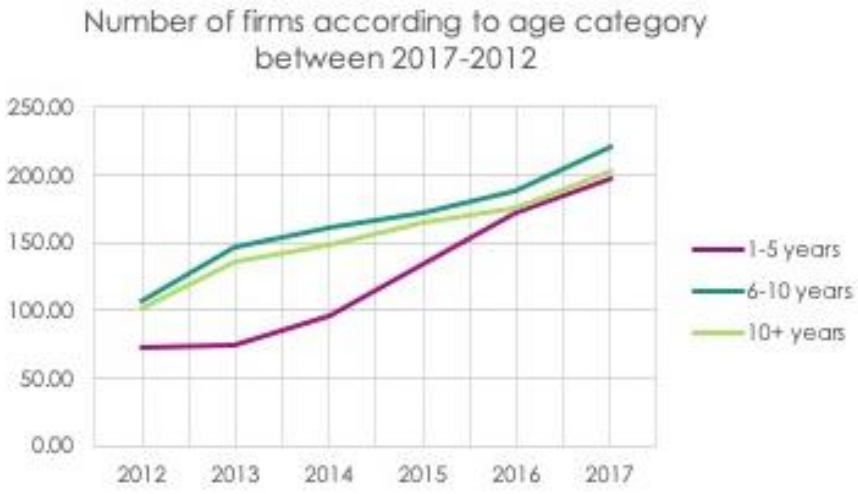
Between 2012 and 2017 an increase in the total number of firms can be noticed. While in 2012, 214 firms were registered, in 2017, 523 firms appeared as registered within the 3029 area, *Graph 4.5*.

Graph 4. 5 Evolution of the total number of firms since 2012 at M4H; author's own source elaboration (2020)



While the distribution of the firms in terms of age has stayed similar during the 6 years, the number of the young firms has more than doubled between 2012 and 2017, *Graph 4.6*.

Graph 4. 6 Number of firms by age category since 2012 atM4H; author's own source elaboration (2020)

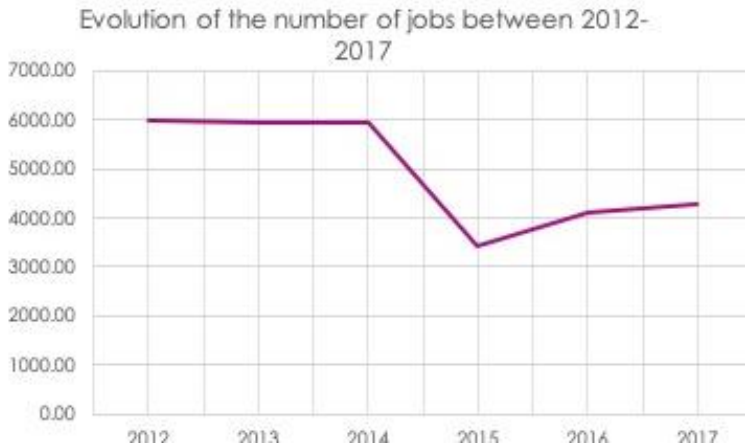


Among the firms present at M4H, around 30-38% are young firms, and 42-55% have an age between 6 to 10 years, *graph 4.7.*

Graph 4. 7 Distribution of the number of firms by age category in 2012 and 2017; author's own source elaboration (2020)

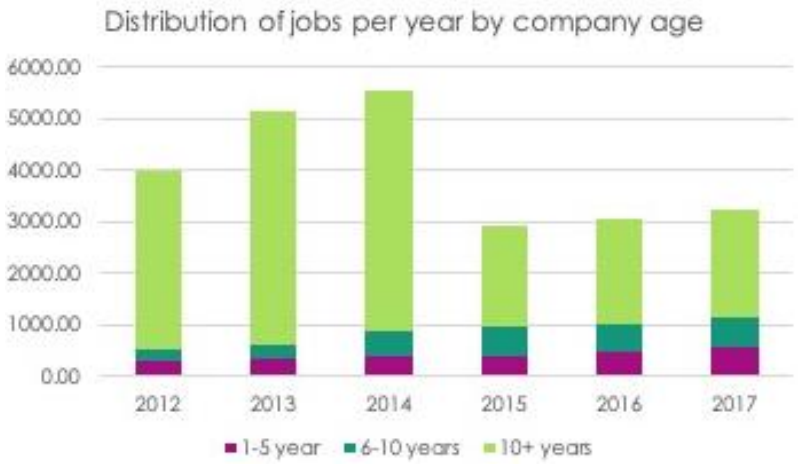
In terms of the number of jobs, the trend has decreased (*Graph 4.8*) between 2012 and 2017 with 28,5%. The departure of the municipality services from the studied area is one of the main reasons for this evolution (Rotterdam Makers District, 2019b).

Graph 4. 8 Evolution of the number of jobs between 2012 and 2017; author's own source elaboration (2020)



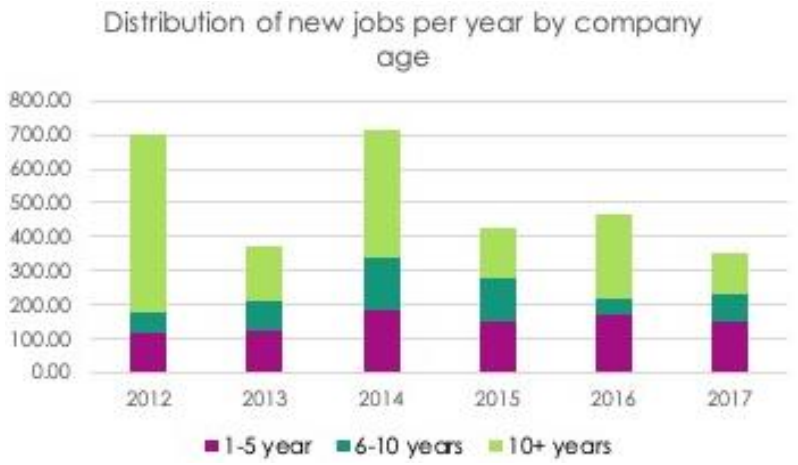
When comparing the distribution of the total number of jobs by company's age, it can be noticed that the older firms have the largest share, *Graph 4.9*. Nevertheless, during the last 3 years, this share has decreased, while the share of the younger firms has a growing trend.

Graph 4. 9 Distribution of the number of jobs per year by age category; author's own source elaboration (2020)



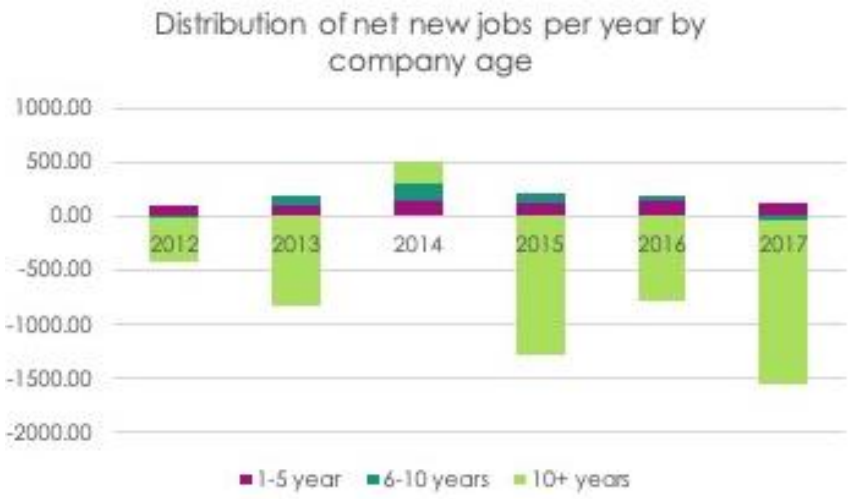
The following *graph 4.10* describes the distribution of the new jobs that were added each year by the 3 categories of firms: 1-5 years, 6-10 years and 10+ years. It can be noticed that the share of the young firms has increased along the 6 years of observation. However, the older firms keep on having the largest contribution.

Graph 4. 10 Distribution of new jobs per year by age category; author's own source elaboration (2020)



However, when accounting for the net new jobs which is the difference between the jobs gained and the jobs lost, a different distribution appears. The presence of a few major employers that have relocated leads to a negative trend for the older firms. It is only in 2014, when all the 3 categories of firms have a positive contribution to the net new jobs. It can be noticed that the young firms have always had a positive trend during the 6 years of observation, *Graph 4.11*.

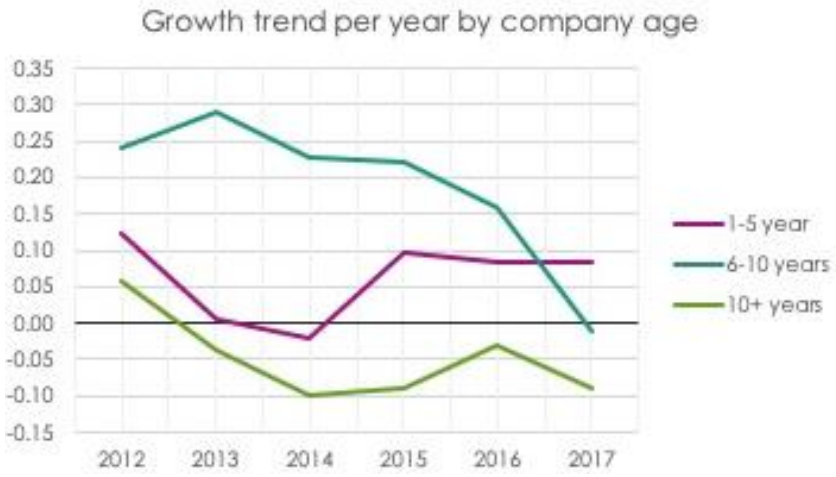
Graph 4. 11 Distribution of net new jobs per year by age category; author's own source elaboration (2020)



The growth trend for each firm was calculated using the following formula $growth = ln\left(\frac{nb\ of\ jobs\ for\ the\ last\ appearance\ of\ the\ firm}{nb\ of\ jobs\ for\ the\ first\ appearance\ of\ the\ firm}\right)$ (Sleutjes et al., 2012)

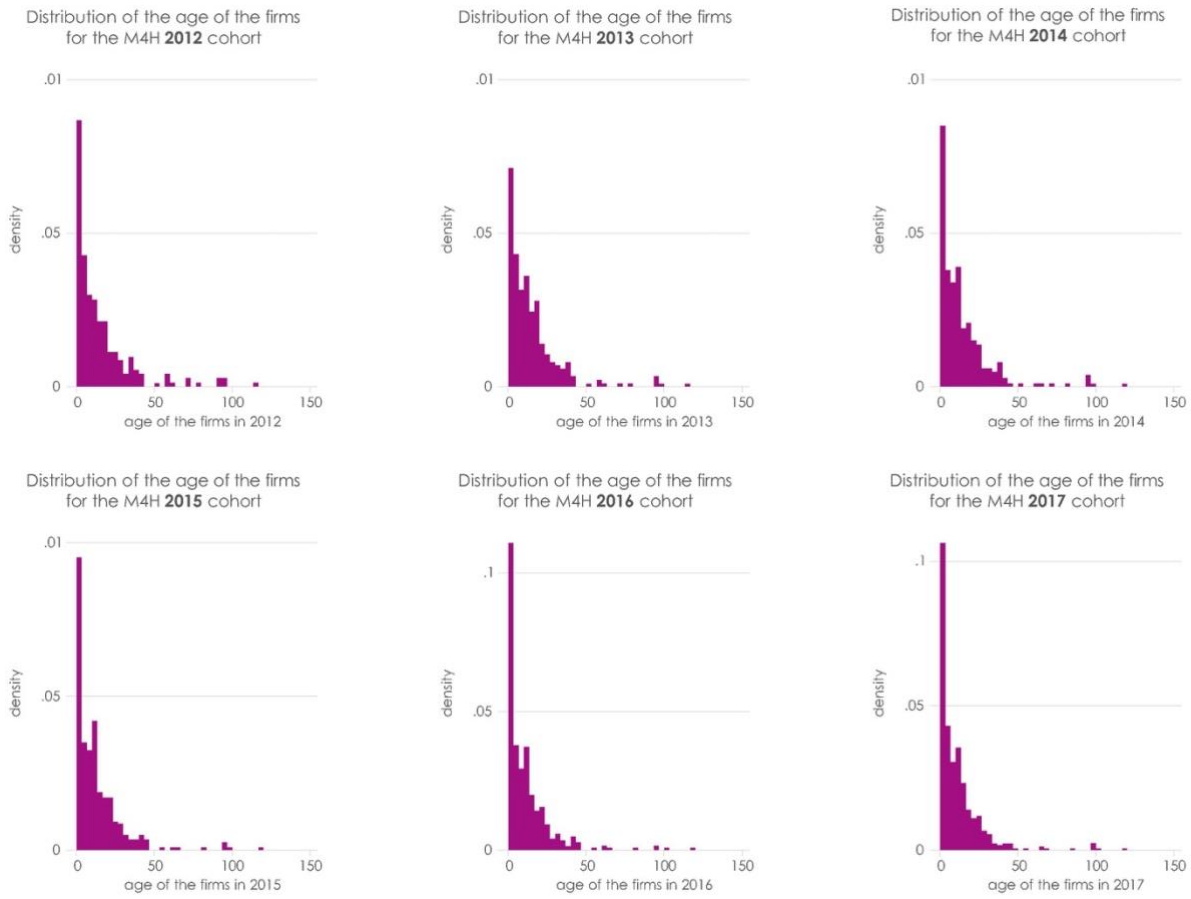
For the observed years an average growth was calculated for the 3 categories: 1-5 years, 6-10 years, 10+ years. A negative growth is observed for the older firms. The 6-10 years category while remaining positive is slowly decreasing. The young firms had a more positive and constant growth trend during the last observed 3 years, *Graph 4.12*.

Graph 4. 12 Growth trend per year by age category; author's own source elaboration (2020)



Between 2012 and 2017, the distribution of the firms by age tends to stay similar: right skewed with a more important population of young firms, *Graph 4.13*.

Graph 4. 13 Distribution of the age of the firms by year between 2012-2017; author's own source elaboration (2020)



For the M4H area, the correlation between the age of the firms and the number of jobs is positive (0,30) and statistically significant at the 1% level. Additionally, there is a negative correlation (-0,19) between the age of the firms and the growth trend, and it is statistically significant at the 1% level. Further on, after running a Chi Square test it was noticed that there is a statistically significant (1% level) relationship between the activity of the firm and their size.

85,5% of the firms from the 2012 cohort are still in M4H in 2017. Out of these firms 20,7% were aged between 1 to 5 years in 2012 and appear in both cohorts.

C. Rotterdam Makers District context

Based on the employed dataset, it is hard to identify employment formation trends for the RDM area. However, it can be noticed that the current size of the RDM tenants tends to be between 1 to 5 employees. In addition, the quantitative results suggest that firms have a shorter stay at RDM, with only 35,7% of the 2014 tenants still present in the area. In comparison, on the other side of the river, it can be noticed that 85,5% of the 2012 cohort was part of M4H for at least 6 years. Furthermore, the results indicate that young firms have a positive contribution to the net new employment for the M4H area. Nevertheless, these young firms don't have a size big enough to surpass the contribution of older firms to employment. It is the older firms that have the higher share in the number of jobs present in the area.

These results are confirmed and explained by the information obtained from the respondents. The RDM area *"is dedicated to smaller firms"* [*int_m*] a trend that started almost 10 years ago when *"everybody was really happy if we could invest in startups, because that was the flavour of the year, 10 years ago"* [*int_l*]. With the *"RDM buildings (...) almost all are full"* [*int_m*], and at the moment there is *"an interesting combination of larger businesses and these innovation dock startups"* [*int_l*]. The way RDM functions is that *"when the company is big enough it leaves the area because RDM does not have the space for bigger companies"* [*int_m, int_g, int_l*]. As a matter of fact, *"one good example of a firm that grew in the area is Ampelman, but it is kind of the only example"* [*int_m*]. Currently among the biggest tenants, Ampelman started as a small company in the maritime sector that emerged from the TU Delft. During its first years as an RDM tenant, *"it started by renting two lots, then three and five, and now has its own production hall that was developed to accommodate further growth of this key niche player"* [*doc_6*]. The story of Ampelaman illustrates how, *"depending on their profile, if companies are successful in RDM they can also grow in the port"* [*int_g*]. In contrast, Dnamo's case exemplifies how not all startups grow into large and established companies, despite their initial potential: *"We have seen a lot of good initiatives and we thought that they would make it and they didn't"* [int_g]. In fact, Dnamo demonstrates the *"come, grow"* [*int_m*] and 'leave' pattern. While not initially successful, this startup has taken several forms during the past years and continues to be part of RDM. 3 young entrepreneurs coming from Delft University [*web_10*] started Dnamo, an incubator encouraging and supporting students from RDM to start their own firm. Due to lack of interest from the technical school students [*int_l*], Dnamo closes a few years after. Later, the founders of Dnamo start RDM Makerspace, located in the Innovation Dock. This business model proves difficult [*int_l*]. The Makerspace is not the expected success story RDM and its founders were looking for [*int_l*]. Further on, the same team of 3 young entrepreneurs starts RDM Next: a startup training for digital skills. The more recent attempt is based on the market observations of the young entrepreneurs who consider *"there is more value for [RDM] in training companies from the port area about how AI, cryptocurrency or cyberattacks… can affect your business"* [*int_l*].

As noted above firms come, grow and leave, however the other case is when *"RDM is growing the firms and M4H is further on welcoming them"* [*int_m*]. As a result, *"there are a few cases where the companies have been growing in RDM and now they are settling in M4H"* [*int_g*]. Nevertheless, M4H presents a different profile in terms of firms. At *"M4H there were already entrepreneurs in the area, creative ones"* [*int_m, int_g*]. While RDM was almost empty when its development started, at M4H, firms of all sizes have been settling for more than a decade [*int_m, doc_7*]. The longevity of firms makes *"M4H to take the long run"* [*int_g*]. On the other side of the river, a mix of creative industries and port related activities exists now. While the *"creative businesses you don't see, but they are in all kinds of warehouses and port and industrial heritage"* [*int_g*], the port activities are more visible. At M4H *"there are still some really good logistics port companies and they still have their contracts. And we don't sell them or buy them out, and they have to remain here until the end of their contract, and they have to do their business and we want to keep the employment as well*" [*int_g*]. In brief, firms *"come, grow"* [*int_m*] and leave because *"for grownups there is no space in the RDM area"* [*int_g*]. However, M4H despite its *"quite complex development"*[*int_g*] is ready to welcome these and other growing firms, because it *"allows to have all assets in one innovation district"* [*int_m*].

4.3 Part 2: Under which conditions does the presence of young firms influence employment creation? *(sub question 2)*

This following part investigates how innovation district's setup is related to the presence of young firms. First, a brief description of the M4H and RDM's assets is presented, second the conditions determining this setup are investigated from 2 different perspectives: the young firms' perspective, and respectively the innovation district's perspective.

A. Innovation district's setup

Rotterdam Makers District, through their organizational team and main driving actors, *"attempts to copy strategies typical to innovation districts and apply them to its context"* [*int_m*]. Based on empirical evidence, the following *table 4.1* summarizes the main resources of the two entities. Despite differences in assets, the merger between RDM and M4H allows them to share and complement each other. The two parties, through their internal organization, share assets in terms of networking and actors. However, the physical assets are being managed by each one's team, this distinction comes as the result of different driving actors [*int_l, int_g*]. These assets build the setup in which a diverse set of actors evolve and interact daily. *Table 4.1* compares and contrasts the two setups available in RDM and M4H, each description is accompanied by the supporting empirical evidence.

Table 4. 1 Comparison between RDM and M4H's setup; author's own source elaboration, based on empirical evidence (2020)

Rotterdam Makers District			
		RDM	*M4H*
Actors Assets	**Driving actors**		
	Descriptions	RDM is fully under the authority of the Port of Rotterdam.	M4H is a mix between the Port of Rotterdam, the City of Rotterdam and private entities.
	Evidence	*"RDM is fully port owned" [int_m, int_l]*	*PoR owns "half of the land, the city is owner of a third of the land, and the rest is private. So this is also quite complex." [int_g]*
	Firms		
	Descriptions	Large firms, SMEs, start-ups, and entrepreneurs are part of RDM's tenants. Their activity is mostly port related.	M4H presents a mix of startups and entrepreneurs from the creative sector and larger companies with activities related to the maritime sector. In addition, companies from the field of innovation and circular economy join this mix.

Actors Assets	*Evidence*	*"I think at the moment we have an interesting combination of larger businesses and these innovation dock startups" [int_l]* All respondents and the employed dataset support this finding.	*"M4H is dedicated to larger companies, mostly in the field of innovation and circular economy" [int_m]* *"Design companies have been settling here for decades already" [int_g]* *Appendix 4* presents a description of the firms' activities.
	Educational institutions		
	Descriptions	RDM partners with education institutions: - Hogeschool Rotterdam with the Rotterdam Academy of Architecture and Urbanism, - the Techniek College Rotterdam, - the IT Campus Rotterdam - STC Group [web_2]. These educational options are a mix between institutions that have relocated their study programs at RDM, and joint partnerships offering training programs on the RDM site	At the moment, M4H does not have an educational institution located on site. However, efforts are made in this direction. But, M4H as part of the Rotterdam Makers District does benefit from the presence of educational institutions located at RDM.
	Evidence	All together, it is the RDM team and the educational institutions that *"are in charge of the project, but the port authority is responsible for what is happening there"* [*int_m*].	*Speaking of the architecture college from RDM: "we think it would be very interesting for the architectural department to move to M4H" [int_l]* *"we really want to get Erasmus University more involved" [int_l & int_g]*
	Research actors		
	Descriptions	Both sides host research partnerships or initiatives. While At RDM these are focused on the maritime field, at M4H the field is much broad (health, construction, circular economy)	
	Evidence	According to RDM and M4H's websites	
	Organizational team		
	Descriptions	RDM has its own team located on site, in addition to the collaboration with M4H.	A program office is located on site, its focus is more on the development of the physical facilities. RDM and M4H work together for marketing, acquisition and communication.
	Evidence	"At RDM there is a managing team, small team" [int_l & int_g]	*"What we say is that the 2 areas work together in terms of software you could say: such as marketing, acquisition, communication. But on the hardware, the physical facilities,at M4H we have a program office in the area as well." [int_g]*

Physical Assets	**Physical assets in the private realm**		
	Descriptions	Within the old industrial heritage there are: - Plots between 60 to 600sqm to rent - Testing facilities - Offices Flexible leasing contracts are available for one-two months, depending on the needs of the tenant.	Within warehouses and port and industrial heritage there are: - Office spaces - Workshops In addition office space is available within the Lee Towers, part of M4H. Longer renting leases are available.
	Evidence	*[int_m, int_l, int_g]; [doc_6]* *"Flexible lease contract: we noticed what it's really important for startups is to get somewhere it's cheap" [int_l]*	*[web_8]* *"These creative businesses you don't see, but they are in all kinds of warehouses and port and industrial heritage." [int_g]*
	Physical assets in the public realm		
	Descriptions	30ha situated on the South bank of the river, accessible from Rotterdam Central Station by car, bike, boat or bus. Amenities: one restaurant, supermarket in the Heijplaat Village	100ha situated on the North bank, accessible by metro, tram, bus, bike or by car from Rotterdam Central Station. Amenities: some restaurants, grocery stores are available in the close proximity
	Evidence	*"It is quite an eccentric location compared to M4H."* [*int_g*] *"RDM it is not this vibrant environment that you would like to have for an innovation district"* [*int_g*] *"RDM is a very small innovation district, it is not a neighbourhood or a proper 'district' but one old shipyard building"* [*int_m*] *"It's safe to say RDM is not urban enough to attract more amenities"* [*int_m*] *Based on observations on site, and secondary sources* [*doc_4*]	*"M4H there were already entrepreneurs in the area (creatives ones) they started the development and amenities kind of were already in the area"* [*int_m*] Based on observations on site, and secondary sources: [*doc_4*]
Network Assets	**Network assets**		
	Descriptions	RDM and M4H, together organize festivals, events or gatherings, around 6-7/ year. Within their organizational team, an 'Innovation Connector' role is present. It links, firms, startups to educational institutions, other firms or other port related authorities. Starting with 2020, an online platform will be available for all the members of the Rotterdam Makers District community. This will allow subscribers to interact, connect and network.	
	Evidence	"*These events come from the team's vision and from the ambitions they have."* [*int_m*] *"We have a new role in our team, the Innovation Connector. We have been working really hard to get parties over here, but then they are here and are saying we need an internship or we need this or that. We see it's really appreciated"* [*int_l*] Speaking about the online platform: *"We hope this will be an extra asset and a reason for the firms to stay here. They can say connect, plugin and I am part of this community, family"* [*int_g*]	

B. What stimulates young firms to be part of the innovation district?

Young firms from innovation districts develop their activities within the setup orchestrated by Rotterdam Makers District. The following part presents how RDM and M4H's setup is aligned with the liabilities and uncertainties depicting the post-entry phase of young firms. As literature outlines innovation districts support young firms to "grow into large established companies" (Rotterdam Makers District, 2018). Rotterdam Makers District *"try to copy the strategies typical for innovation districts"* [*int_m*] and apply them to their own ecosystem [*int_m, int_l, int_g*]. Among these is the support RDM and M4H offer to young firms.

Empirical evidence indicates that RDM's goals encompass the aspiration *"to invest in startups and new business"* [*int_l*]. While strengthening the idea that the entrepreneur's background and structural organization are essential determinants for the growth of a startup, what *"RDM does is to offer help"* [*int_l*]. For young firms that have an idea and want *"to get a little bit more professional what RDM offers becomes more interesting"* [*int_l*]. By focusing on the context within which the firms evolve [int_m], RDM created *"a very inspiring location and if there are visitors coming over, they see the huge location and see that something is happening and what [firms] are working on"* [*int_t*]. In the first place what RDM and M4H offer is real estate: *"We are an area! We offer real estate or lease real estate"* [*int_g; int_l*]. RDM *"offers flexible offices for new companies together with short term contracts"* [*int_m; int_l*]. The flexible lease contract allows firms to *"rent a plot 1 month or 2 months, and then if you go or you need more space because you have a new project, more space can be added. Or if you have to cut costs very soon"* [*int_l*]. This strategy is based on the observation that *"it's really important for startups to get somewhere cheap"* [*int_l*], because *"[startups] look for more room and not much cost"* [*int_l*]. For this reason, *"[firms] can rent these plots that start at 60sqm and go up to 600sqm"* [*int_l*]. By being "*as flexible as possible"* [*int_l*], RDM attempts to make the post entry phase of these firms "*very easy*", where new tenants have their *"own plot with electricity and water"* [*int_l*]. The design of these industrial warehouses offers firms *"more space for research and product development"* [*int_t*]. In addition, RDM has stepped up its assets by offering equipment and *"machines that allow [firms] to work on certain prototypes"* [*int_t*]. Firms appreciate these facilities, however additional *"storage space and maybe some joint storage space, would be helpful"* [*int_t*]. This flexible lease contract proved effective in the case of Ampelmann, that started with *"two lots, but grew in time to three and later even to five lots"* [*doc_6*]. For M4H its warehouses and old terminals are *"on the brink of development."* [*int_g*]. While creative entrepreneurs have been locating in the area, new working spaces are currently adjusted for future tenants: *"In 2020 we just started a new working space, an old fruit terminal actually. It's really a young development"* [*int_l*]. These developments are *"mostly for the scaleups and bigger companies"* [*int_l*] with different leasing contracts: *"They can lease for 5 years or 2 years, and of course there are settlements of reduction for the first year or first 2 years"* [*int_g*].

"However, these companies need more than just space" [*int_g*]. Rotterdam Makers District does not have a dedicated legal or financial support team for young firms. However, they can *"make a lot of connections"* [*int_l*] thanks to the recently integrated 'innovation connector': "*we have a new role in our team, the Innovation Connector. We have been working really hard to get parties over here, but then they are here and are saying we need an internship or we need this or that. And that it is a lot of work but we think it's important. So that's why we defined this new role and we see it is really appreciated"* [*int_l*]. It is the innovation

connector who links firms to students or educational institutions and who orients the entrepreneurs to other parties from the port area, such as municipality or M4H [*int_t, int_l*]. Firms appreciate this proximity and connection with educational institutions that RDM offers because *"schools are nearby and [it allows to] align with potential customers and work on certain developments"* [*int_t, int_l*]. Additionally, through its involvement, Port of Rotterdam is bringing in its network that consequently becomes available for these young firms: *"we are working in the entire Rotterdam region for other facilities for startups. Like Port XL, a scouting and coaching program at the port for startups. This is not necessarily bound to one area, but it is a facility."* [*int_g*]. In addition, there is *"the Erasmus Center for Entrepreneurs, or the Cambridge Innovation Center or we have all kinds of funds"* [*int_g*]. In March 2014 the Erasmus Center for Entrepreneurship (ECE) opened in the Rotterdam Science Tower [*web_6*]. Its presence brings in the network of the Erasmus University Rotterdam [*web_7*] and creates the link between the M4H district and an educational actor. While the presence of ECE can be beneficial for the RDM firms as well, this connection is less perceivable for the moment [*int_l*]. The RDM team wishes to create this link with M4H because *"the Erasmus Center for Entrepreneurship would be one of the great things*" [*int_l*]. Additionally, Rotterdam Makers District is developing an online platform allowing firms to easily connect to possible partners depending on their needs [*int_l*].

Besides offering real estate and creating connections, *"the Rotterdam Makers District team is trying to strengthen the innovation climate with events and tools required for innovative entrepreneurs"* [*int_m*]. Around 6 -7 events are organized every year where firms from RDM and M4H interact with other external partners from municipality, port or other firms from the region. These ventures *"try to involve as many entrepreneurs as possible and we try to create events where they can meet"* [*int_l*]. Moreover, RDM tries to support the interaction between the firms [*int_m, int_l*]. However, as suggested by the respondents, firms rarely interact between them [*int_t, int_l*]. Furthermore, both RDM and M4H promote their tenants *"because they are leasing from the PoR"* [*int_g*].

In brief, Rotterdam Makers District offers access to flexible and cheap space, makes new connections, creates settings for interaction and promotes firms part of their community, with some of these forms of support clearly dedicated to young firms. On the other hand, Rotterdam Makers District does not offer legal or financial support.

C. What motivates the innovation district to welcome young firms?

The following section deals with the relationship between young firms and innovation district's goals. Using empirical evidence, it presents how the presence of young firms aligns with Rotterdam Makers District's motivations.

Rotterdam Makers District first started with RDM's development. 10-11 years ago when this area was redeveloped *"Port of Rotterdam Authority acquired the buildings in 2002, more as a defensive act"* [*int_l*]. The spot was *"becoming a no-go area, while for [Port of Rotterdam] it's still a strategic point"* [*int_l*]. Its proximity to the city motivated the Port Authority *"to make this Makerspace as the area where the port and the city meet"* [*int_l*]. With a 'port in-city in' approach, the Port tries to avoid that this area transforms into a *"hipster [spot] with yuppie apartments"* [*int_l*], as it was the case for London or Hambourg. *"This is crucial because if the port develops further away, it gets out of sight out of mind and it becomes very hard for [the Port] to attract people with new ideas and technologies"* [*int_l*]. This proximity allows the Port to stay visible for future tenants who *"know something about robotization,*

AI…[and they] can go to this port area because the port needs these new technologies and they will make their business there" [*int_l*]. The same *"port in-city in strategy is even more present for M4H, this was the first time that a port authority said 'ok we take a share in this development' so not port out city in, but we take a share and we are going to invest together with the city in this area. While maybe 10 years ago the port would have said we phase out gradually and the city can take over"* [*int_g*]. Through all the actions the Port is taking, the Makers' district becomes a showroom [*doc_5*] and *"a great platform for these ideas"* [*int_m*].

Further on the RDM project evolved into *"an innovation area where [the Port] wanted to invest in startups and new business"* [*int_l*] hoping these businesses *"will help build the port and the smartest port"* [*int_l*]. It started with a pragmatic approach: *"we looked at it quite practically, we have these great warehouses so for who could this be interesting"* [*int_l*]. While RDM is *"building the new generation of manufacturing industries on the ruins of the old port, there is a little bit of romance here"* [*int_m*], M4H *"builds the new generation of manufacturing industries but more focused on mobility, energy, sustainability but with the urban development and housing"* [*int_l*]. With other firms still present in the Heijplaat or Waal-Eemhaven area, RDM chose to *"focus mainly on the innovation parties"* [*int_*l]. Nevertheless the Port *"is looking into Waal-Eemhaven"* [*int_l*], while the Heijplaat area stays into Rotterdam Municipality's responsibility.

Speaking of the RDM business case this became financially successful after 5 years [*doc_5, int_g*]. *"However, the ROI is lower than an average project the port would do. This goes as well for the M4H project"* [*int_g*]. RDM and M4H's development underpin the commercial and social strategies of the Port Authority. It *"accepts a lower ROI, but not a negative one, because it is a very complex development and more social development."* In brief, RDM and M4H combine the desire of the Port Authority to 'stay in the city' and its interest for young and innovative firms that can transform the Port in the near future. With this in mind, Rotterdam Makers District's team selects but also approaches new firms that can fit and *"are interesting"* [*int_m*] for the innovation ecosystem. *"Startups are not always successful, despite some good initiatives"* [*int_g*] and for this reason RDM and M4H need to *"do a lot of acquisition"* [*int_g*]. In order to strengthen the critical mass of economic actors, a team of sales managers is in contact with different networks, because *"it would be very luxurious if we sat down and had the firms coming to us. That's not how it works"* [*int_g*].

4.4 Part 3: How does the presence of young firms contribute to the innovation district's conditions? *(sub question 3)*

A good functioning ecosystem is one where all actors are also feeders. They benefit from being part of the ecosystem but also contribute to its development. With this in mind the following section offers empirical evidence on how these firms 'give back. As identified in Part 1 of this chapter, young firms when they decide to locate in either RDM or M4H, they bring in new employment and consequently new people to the area. Their presence is in line with Rotterdam Makers District's desire to *"have a good vibrant environment"* [*int_g*] and create new employment. In addition, these firms come from various regions, with almost 50% of the firms present at RDM registered at an address outside of the 3089 area. Among these young firms 28% have leading entrepreneurs who studied at TU Delft, 15% graduated from Hogeschool Rotterdam and 8% are from the Erasmus University [*doc_8*]. In addition,

Ampelmann *"was founded in 2008 as a spin-off of Technical University Delft"* [*doc_6*]. Speaking of the firms present in the innovation district *"Some are really ambassadors for the area"* [*int_g*]. The ones that are successful are *"ambassador for Rotterdam"* as well as for M4H and RDM [*int_g*]. Through their presence in the Innovation Dock building, these firms unveil their work to *"visitors who can see that the companies that are here are more than just some startups at the initial phase"* [*int_t*]. In the M4H area the creative firms *"open their doors to the public"*, organize events and *"attract new people to this area"* [*int_g*]. Firms and young firms together collaborate with the innovation district: *"we help each other to make the area visible for the companies and for the public. This is very important"* [*int_g*].

4.5 Part 4: Testing the propositions

The empirical evidence procured a set of heterogeneous research results. This following part will summarize these results by comparing the effects young firms have on employment formation in innovation districts, together with their determinant conditions, in view of the initial hypotheses.

P1: *Young firms from RDM and M4H create new employment.*

This proposition can be accepted based on existing quantitative data. Without focusing on the evolution of this trend, it can be stated that young firms during their first years of life create employment. Based on the qualitative and quantitative data, two scenarios can be noticed in terms of employment formation within the Rotterdam Makers District. The RDM scenario where young firms by choosing to locate in the area bring in new jobs for the duration of their tenancy. However this is not a permanent condition and firms growing up will relocate. As for M4H, young firms have been locating and remaining in the neighbourhood for longer durations. As a result, during their initial years of life, these firms add new employment to the area. However, their employment growth trend does not remain positive along the years.

P2: *Young firms from RDM and M4H grow into large and established companies. (more than 5 years and more than 10 jobs)*

Based on the empirical evidence, with the exception of a few successful stories, it is hard to confirm this hypothesis. For RDM, 61,5% of the firms aged less than 5 years in 2014 are currently employing 1 to 5 people. For M4H out of the total 2012 cohort, 17,7% of the firms were aged less than 5 years in 2012 and are still located at M4H in 2017. 6 years later their size varies between 5 to 10 people, with an average of 7,02 employees and a standard deviation of 2,02. However their average growth trend is 0,11 with a standard deviation of 0,76. This hypothesis deserves further research and it can benefit the innovation district. By understanding who the growing firms are and what determines their growth, innovation districts can tailor their strategies in accordance with firms' evolution.

P3: *Young firms are stimulated by the innovation district's setup and assets.*

This proposition can be confirmed based on the empirical evidence. The employed datasets show an increasing trend within the number of new firms, as well as young firms locating in the innovation districts. Both RDM and M4H have seen an increase in their population of young firms. Based on the collected qualitative data, this tendency is due to the support Rotterdam Makers District is offering to their young tenants. With soft support initiatives put in place, RDM and M4H offer access to cheap and flexible real estate, they create connections and links, organize networking events, and promote these young members of

their community. When choosing to be part of the innovation district, young firms facing uncertainty and numerous liabilities in their first years of life gain access to soft support measures. However, this finding as well could benefit further investigation. This would permit identifying, using a larger sample, which forms of support are more valuable for the young firms and whether new supporting measures would strengthen the relationship with these firms.

P4: *The presence of young firms is relevant to the innovation district's strategies and goals.*

Collected qualitative data allows us to confirm this proposition. Several respondents have indicated that the presence of young firms is valuable and in line with the goals and strategies of the main driving actors. Through its desire to stay present in the city the Port of Rotterdam is interested in supporting these young firms. They strengthen the 'port in-city in' approach and are possible actors in building the port of the future. For this purpose, Rotterdam Makers District leverages its resources and creates stimulating conditions for young firms to evolve.

P5: *The critical mass of economic actors permits the innovation district to support young firms.*

It was hypothesized that a balance between young firms and more established ones enables innovation districts to offer support to young firms. Secondary data presents that *"after attracting the offshore giants, income can be used to cross-fund startups"* [*doc_6*]. However, due to insufficient empirical evidence, this proposition can not be confirmed or dismissed. Throughout the data collection process, respondents have mentioned several times their interest in welcoming scaleups or more established companies. Additionally, having a balanced mix of firms in terms of size and age is also indicated. Nevertheless, it is not possible to validate whether a more heterogeneous population of firms contributes to the support initiatives offered by the innovation district.

P6: *Young firms bring new population and activate the innovation district's area.*

This proposition can be confirmed. Based on empirical evidence the results show that when young firms move to the innovation district's area, they create new employment. Therefore, new jobs and people are attracted to the district. For M4H new jobs result from the young firms that chose to establish there. As for RDM this proposition is confirmed by the increase in the number of young firms that integrate the district. Additionally, in M4H's case the creative firms through their activity attract new visitors to the neighbourhood. By organizing exhibitions or displaying their work they also draw people into the area.

P7: *Young firms create links between the innovation district and the region*.

This proposition can be accepted as well, when the young firms are considered 'ambassadors' of the innovation district. These young firms through their activity and each one's background promote Rotterdam Makers District outside its limits. Firms come from Rotterdam, but also from Delft, Den Haag or Utrecht. Some of the young firms are results from spin-offs outside of Rotterdam and 50% of the RDM sample is registered at an address outside RDM's buildings. For these reasons it can be said links are created between Rotterdam Makers District and the regional ecosystem. However, this research does not discuss how and whether these links actually develop into spillovers effects. Further studies investigating the form and benefits of these links would contribute to the scarce existing evidence.

Chapter 5: *Conclusions and Discussions*

This research studied the relationship between firms and employment formation in innovation districts, with a specific focus on young firms located in Rotterdam Makers District. The increasing attraction towards innovation districts as tools for economic growth and employment creation (Katz and Wagner, 2014) where "young firms grow into large established companies (Rotterdam Makers District, 2018) calls for more insight into the interrelation between employment formation and the presence of young firms combined with supportive measures and general motivations of the innovation district. For this purpose, the main research question examined the extent to which employment formation in innovation districts depends on the presence of young firms on the one hand, and the conditions determining these results on the other.

With a focus on Rotterdam Makers District the following general conclusions can be drawn. First, when young firms choose to locate in an innovation district they bring new jobs into the area. However, this trend varies between RDM and M4H. The south bank scenario can be characterized by a 'come, grow, and leave' process. Where 'leave' should be understood as moving to another location as well as exiting the market. On the other side of the river M4H's scenario reveals that young firms move to the area and stay for longer periods of time. Firms 'come and stay' at M4H, where 'stay' should not always be associated with positive employment growth trends. Empirical evidence suggests that the life span of young firms as part of the RDM community tends to be shorter than for the M4H firms. Nevertheless, on both sides of the river the number of young firms has increased during the past years, and therefore new employment was brought into the area. In short, through their presence these firms have contributed to the number of new jobs localised within Rotterdam Makers District.

Second, the heterogeneous results identified at Rotterdam Makers District level can be explained by the conditions available within the innovation districts and thus determining the presence of young firms. These conditions were identified as the innovation district's setup and assets, stimulating soft support measures available for young firms to overcome initial liabilities, and innovation district's goals and motivations aligned with the presence of these young firms. Rotterdam Makers District makes available cheap and flexible leasing contracts, leverages its network assets to make new connections, stimulates interaction through events and promotes its young firms. These initiatives establish the forms of support available at RDM and M4H. When locating to the innovation district, young firms trying to overcome the first years' liabilities are stimulated by these supporting measures. Equally important, for Rotterdam Makers District, and its driving actors, it is valuable to invest and support these firms. Consequently, the presence of young firms is in line with Port of Rotterdam's desire to stay visible 'in the city' and involved in the development of these areas covered by longer term strategies such as the Stadshavens initiative. Therefore, it is safe to say, that when young firms are stimulated by support initiatives, and the presence of young firms is in line with the goals and strategies of the innovation district and its driving actors, young firms can influence employment formation in the innovation district.

Except for a few success stories, Rotterdam Makers District does not necessarily foster growth in terms of new employment formation, but it enables employment localisation for certain time intervals. The case of Rotterdam Makers District presents heterogeneous results that clearly show there is no 'one-size-fits-all' solution. While intended as a place-based policy, the case of Rotterdam Makers District resembles more to a mix of people and place-

based policy where people do follow jobs, and place interventions strengthen this trend. However, these jobs need to be complemented with place-based initiatives that improve the urban conditions of the area: infrastructure, amenities, or public spaces. For this reason, these young firms bringing new jobs to the district become the mechanism through which placemaking initiatives can contribute to urban and consequently economic development. Therefore, their role is not only in terms of strengthening the employment function of the innovation district, but they also call for a balance between place and people-based initiatives.

Further on, the analysis of these young firms revealed a slow growth trend for the creative businesses. Authors like Richard Florida have identified the 'creative class" as relevant to regional economic dynamism (Florida, 2014; Storper and Scott, 2009). However, the empirical results suggest to strongly keep in mind how the employment formation goals can align with the 'creative' economic model. For example, whereas creative firms attract new visitors to the area, their presence could be strengthened with complementary sectors allowing to achieve the employment formation aimed at the district level. Nevertheless, these creative firms contribute to M4H's unique profile and can become a valuable asset. Rotterdam is known as Europe's architecture capital and is the first field trip that most 1st year architecture students from Europe complete. M4H through its young creators has the potential to strengthen this competitive advantage Rotterdam currently has. Additionally, M4H can raise awareness on the importance of the creative economy while reinforcing Rotterdam's reputation of architecture capital.

Although this study focused on young firms as determinants of employment formation, the focus area was at the innovation district and firm level. For this reason, it is important to consider the vague existing definitions for this novel concept. Rotterdam Makers District can be branded as an innovation district because the existing literature remains blurry in terms of features that differentiate innovation districts from already existing tools for regional development. Based on the discussions with my respondents and the existing literature, I would state that Rotterdam Makers District is first an urban development project. Indeed it incorporates features from the innovation district literature, but these are also defining characteristics of a cluster or an urban development project. While the innovation economy is encompassed by Rotterdam Makers District, it is not the key nor sole ingredient. First and foremost, Rotterdam Makers District aims to develop two different areas into a further neighbourhood for Rotterdam City. Here firms, schools, amenities, housing, public spaces, and infrastructure are clustered for its future users: firms, innovators, residents, students, artists or tourists.

Despite its limitations in terms of datasets, the main conclusion of this study is that when young firms are stimulated by support measures and their presence is in line with the innovation district's goal and motivations, young firms can bring new employees to the innovation district's area. These results suggest the necessity of combining people and place-based initiatives in order to increase and continue attracting new young firms, scaleups, or established companies. Additionally, this study emphasizes the need to incorporate the liabilities depicting the first years of young firms when analysing the potential of innovation districts in terms of employment formation. Moreover, it emphasizes the need to further investigate the hypothesis of the innovation district as a source of economic growth and employment creation.

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Appendix 1: Sources for primary quantitative data

This appendix presents the sources used for building the primary dataset employed by this study.

Table A.1.1 - Sources for primary data collection obtained through desk research; author's own elaboration (2020)

Source name	**Purpose**
https://rdmrotterdam.nl/ondernemen/	RDM website presenting the firms located at RDM
https://m4hrotterdam.nl/havenmakers/	M4H website presenting the firms located at M4H
https://m4hrotterdam.nl/ondernemen-in-m4h/	M4H website presenting the firms located at M4H, similar to previous website but more firms are presented
https://web.archive.org/	Archives of the RDM and M4H website, indicating which firms were part of the project at later dates.
https://www.kvk.nl/english/	Website used for retrieving kvk number for each firm.
https://bedrijvenmonitor.info/	Website used for retrieving firm's characteristics
https://drimble.nl/	Website used for retrieving firm's characteristics
https://openkvk.nl/	Website used for retrieving firm's characteristics
https://www.faillissementen.com/home	Website used for identifying bankrupt firms
https://postcodebijadres.nl/3089 https://postcodebijadres.nl/3029	Website indicating the area for the employed postcodes: 3089, 3029
LISA dataset 2018	Initially used to identify the firms registered within the Rotterdam Makers District area: postcode 3089 and 3029

Appendix 2: Procedure for building quantitative datasets

This appendix presents the procedure employed for building the 2 datasets. For the codes assigned to each document see appendix 5.

1. RDM dataset

The following 8 steps were followed for building the RDM dataset:

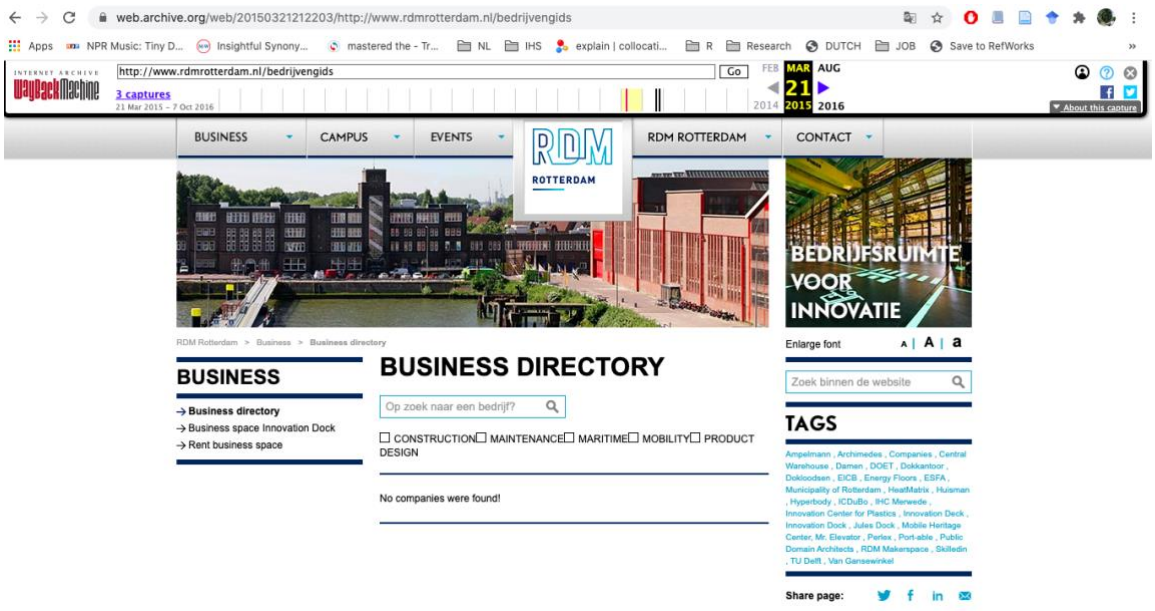
- **Step 1**

Based on [doc_5] an initial dataset was built with the names of the RDM tenants from 2014. For each tenant the kvk number (Chamber of Commerce registration number) was retrieved from the following website https://www.kvk.nl/english/. The data was assembled into a new dataset for the year 2014.

- **Step 2**

The following website https://web.archive.org/web/20150321212203/http://www.rdmrotterdam.nl/bedrijvengids was used to retrieve a mirror of the RDM website from 21-03-2015. This version presents the names of the companies present at RDM. For each firm the kvk number (Chamber of Commerce registration number) was retrieved from the following website https://www.kvk.nl/english/. The data was assembled into a new dataset for the year 2015.

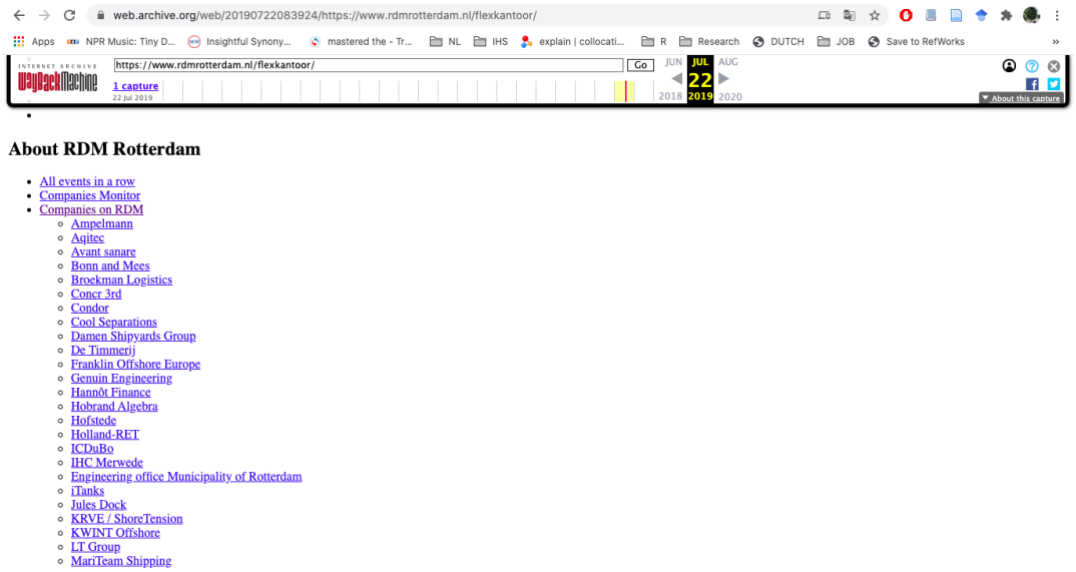
Figure A.1.1 - Screenshot presenting the mirrored website at 21-03-2015; author's own elaboration (2020)



- **Step 3**

The following website https://web.archive.org/web/20190722083924/https://www.rdmrotterdam.nl/flexkantoor/ was used to retrieve a mirror of the RDM website from 22-07-2019. This version presents the names of the companies present at RDM. For each firm the kvk number (Chamber of Commerce registration number) was retrieved from the following website https://www.kvk.nl/english/. The data was assembled into a new dataset for the year 2019.

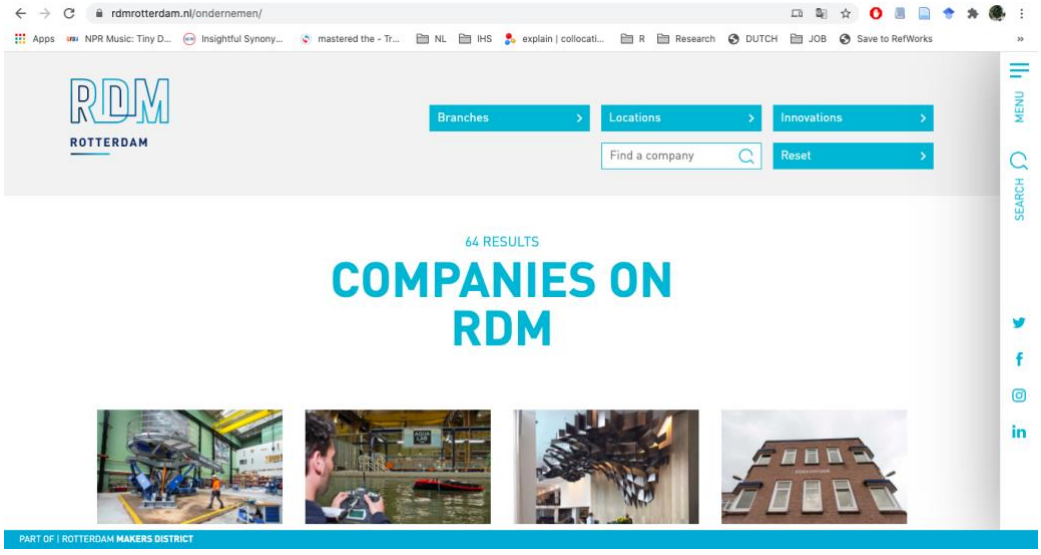
Figure A.1.2 - Screenshot presenting the mirrored website at 22-07-2019; author's own elaboration (2020)



- **Step 4**

The following website https://rdmrotterdam.nl/ondernemen/was used to retrieve the names of the firms present at RDM in june 2020. For each firm the kvk number (Chamber of Commerce registration number) was retrieved from the following website https://www.kvk.nl/english/. The data was assembled into a new dataset for the year 2020.

Figure A.1.3 - Screenshot presenting the mirrored website at 05-06-2020; author's own elaboration (2020)



- **Step 5**

These 4 datasets were merged into one dataset presenting the RDM firms starting with 2014. This resulted in 100 unique firms.

- **Step 6**

Using querying open web apis methods for each unique kvk number data was scraped from the following website https://bedrijvenmonitor.info/. The following information was retrieved for each firm:

- Registration date
- If the firms appears as economically active or inactive
- Postcode of the addressee the firm is registered at
- Geographical coordinates of the addressee the firm is registered at
- Activity code - sbi code
- Number of employed people
- Reference date for the number of employees

- **Step 7**

Data was merged into one dataset. Since few firms from one cohort appear in the next cohort, the resulting dataset was not designed as a panel dataset. Additional variables were created describing whether the firm was part of the 2014, 2015, 2019, or 2020 cohort. The architecture of the dataset is presented in detail in appendix 4.

- **Step 8**

The retrieved data was double checked on the https://drimble.nl/ , https://openkvk.nl/ , and https://www.faillissementen.com/home

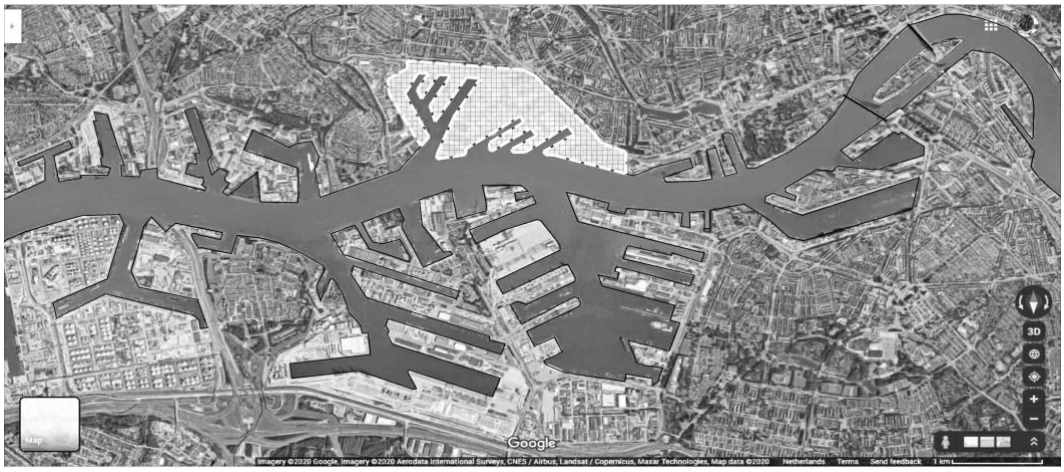
2. M4H dataset

The following 5 steps were followed for building the M4H dataset:

- **Step 1**

From the LISA2018 dataset it was extracted the firms that were registered at an address located in the area defined by the 3029 postcode. Figure A.3.1 shows the geographical area defined by this postcode.

Figure A.2.1 - Area defined by the 3029 postcode; author's own elaboration (2020)



- **Step 2**

From the following website https://bedrijvenmonitor.info/ data was scraped using querying open web apis methods for each unique kvk number present in the initial dataset (LISA2018). The following information was retrieved for each firm:

- Registration date
- If the firms appears as economically active or inactive
- Number of employed people
- Reference date for the number of employees

Based on the kvk number, the retrieved data was merged to the initial dataset. When the reference date for employed people was less or more than the last or first occurrence of a firm within the LISA2018 dataset, a new line was added. On this line the number of employees according to the reference date was added, together with all the other variables for each firm. This led to the 3029_dataset_2017.

- **Step 3**

The following websites https://m4hrotterdam.nl/havenmakers/ and https://m4hrotterdam.nl/ondernemen-in-m4h/ were used to retrieve the names of the firms present at M4H in june 2020. For each firm the kvk number (Chamber of Commerce registration number) was retrieved from the following website https://www.kvk.nl/english/. The data was assembled into a new dataset M4H_2020.

- **Step 4**

From the following website https://bedrijvenmonitor.info/ data was scraped using querying open web apis methods for each unique kvk number present in the M4H_2020 dataset. The following information was retrieved for each firm:

- Registration date
- If the firms appears as economically active or inactive
- Postcode of the addressee the firm is registered at
- Geographical coordinates of the addressee the firm is registered at
- Activity code - sbi code
- Number of employed people
- Reference date for the number of employees

For each firm an auxiliary LISA number was created. Based on the retrieved reference date a variable year was created. Using the LISA number and the year variable allow us to combine the 2 datasets (step 5).

- **Step 5**

3029_dataset_2017 and M4H_2020 datasets were appended into one dataset M4H based on the kvk number. The resulting dataset was set as a panel dataset using the LISA number and the year variable. The architecture of the dataset is presented in detail in Appendix 4.

Appendix 3: Dataset architecture

This annex offers a codebook describing the employed dataset.

RDM dataset

Table A.3.1 - Table presenting the codebook for RDM dataset; author's own elaboration (2020)

Name of the variable	Description	Value	Measurement level
displayname	Name of the firm	text	Qualitative data
website	Website of the firm	text	Qualitative data
reg_date	Date the firm was created	day/month/year format	Ordinal
creation_year	Year the firm was created	year	Ordinal
kvknb	Chamber of Commerce registration number	Numeric label	Nominal
activity_cod	Sbi code indicating the firm's activity.	Numeric label	Interval
vestlat	Geographical coordinates of the addressee the firm is registered at: latitude	Expressed according to the Coordinate Reference System EPSG:4326	Interval
vestling	Geographical coordinates of the addressee the firm is registered at: longitude	Expressed according to the Coordinate Reference System EPSG:4326	Interval
vestpostcode	Variable showing the postcode of the addressee the firm is registered at	String label assigned to each firm	Nominal
refdatejob	Variable showing the date of the latest official declaration. This date is considered to be the reference date when discussing the number of jobs in 2020.According to data sources, data is updated weekly.	day/month/year	Ordinal
workingpeople	Variable showing the number of declared jobs at the latest reference date	From 0 (self-employed) to more than 50 employees	Interval
active_inactive	Indicator variable showing whether the firms is still active in 2020	0 - firm still active 1 - firm inactive	Categorical binary

Using these initial variables the following variables were created:			
Name of the variable	**Description**	**Value**	**Measurement level**
RDM20	Indicator variable showing whether the firms was part of the 2020 RDM cohort	0 - firm not in cohort 1 - firm in cohort	Categorical binary
RDM19	Indicator variable showing whether the firms was part of the 2019 RDM cohort	0 - firm not in cohort 1 - firm in cohort	Categorical binary
RDM15	Indicator variable showing whether the firms was part of the 2015 RDM cohort	0 - firm not in cohort 1 - firm in cohort	Categorical binary
RDM14	Indicator variable showing whether the firms was part of the 2014 RDM cohort	0 - firm not in cohort 1 - firm in cohort	Categorical binary
age_20	Variable indicating the age of the firm at the moment of study: year 2020	Numeric value	Ratio
ageRDM20	Variable indicating the age of the firm in 2020	Numeric value	Ratio
ageRDM19	Variable indicating the age of the firm in 2019	Numeric value	Ratio
ageRDM15	Variable indicating the age of the firm in 2015	Numeric value	Ratio
ageRDM14	Variable indicating the age of the firm in 2014	Numeric value	Ratio
jobs_1_5	Indicator variable showing whether the firms has between 1 to 5 jobs at its latest reference date (2020)	0 - not within the indicated category 1 - within the indicated category	Categorical binary
jobs_6_10	Indicator variable showing whether the firms has between 6 to 10 jobs at its latest reference date (2020)	0 - not within the indicated category 1 - within the indicated category	Categorical binary
jobs_10_20	Indicator variable showing whether the firms has between 11 to 20 jobs at its latest reference date (2020)	0 - not within the indicated category 1 - within the indicated category	Categorical binary
jobs_20_50	Indicator variable showing whether the firms has between 21 to 50 jobs at its latest reference date (2020)	0 - not within the indicated category 1 - within the indicated category	Categorical binary
jobs_50p	Indicator variable showing whether the firms has more than 50 jobs at its latest reference date (2020)	0 - not within the indicated category 1 - within the indicated category	Categorical binary

M4H dataset

Table A.3.2 - Table presenting the codebook for RDM dataset; author's own elaboration (2020)

Name of the variable	Description	Value	Measurement level
name	Name of the firm	text	Qualitative data
year	Indicator variable showing the year for which the data of the firm is presented	year	Ordinal
lisanr_new	Identifier for the firm. Variable obtained by encoding the lisannr variable	Numeric label	Nominal
id	Indicator variable created for allowing an easier visualisation of the data during data inspection processes	Numeric label	Ordinal
kvkdosnr	Chamber of Commerce registration number	Numeric label	Nominal
reg_date	Date the firm was created	day/month/year format	Ordinal
sbi08	Sbi code indicating the firm's activity.	Numeric label	Interval
pc	Variable showing the postcode of the addressee the firm is registered at	String label assigned to each firm	Nominal
xcoord	Geographical coordinates of the addressee the firm is registered at: latitude	Expressed according to the Coordinate Reference System EPSG:28992	Interval
ycoord	Geographical coordinates of the addressee the firm is registered at: longitude	Expressed according to the Coordinate Reference System EPSG:28992	Interval
active_inactive	Indicator variable showing whether the firms is still active in 2020	0 - firm still active 1 - firm inactive	Categorical binary
jobs	Variable showing the number of declared jobs at the latest reference date	From 0 (self-employed) to more than 50 employees	Interval
surface	Variable showing the surface employed by the firm	Numeric value	Ratio

Using these initial variables the following variables were created:			
Name of the variable	**Description**	**Value**	**Measurement level**
age_in_years	Variable indicating the age of the firm in the year indicated on the same line. Obtained from: year-reg_date	Numeric value	Ratio
growth	Variable indicating the growth trend of the firm. Obtained using the formula ln(nb of jobs for the firm's last occurence/nb of jobs for the firm's first occurrence) (Sleutjes et al., 2012)	Numeric value	Ratio
activ_category	Variable obtained by labeling the sbi08 variable, according to Standaard Bedrijfsindeling 2008 version 2018	String label assigned to each firm. Categories: - Agriculture - Business_service - Construction - Culture_sports - Education - Electricity - Financial - Food - Health - Information - Manufacturing - Other_services - Public_admin - Real_estate - Retail - Support_service - Transportation - Water_supply	Nominal
size_category	Variable obtained by encoding the number of jobs/ year for each firm's occurrence	1: self-employed (0 or 1 job) 2: 1-5 jobs 3: 6-10 jobs 4: 11-20 jobs 5: 21-50 jobs 6: 50+ jobs	Ordinal
age_cat	Variable obtained by encoding the age of the firm.	1: 1-5 years 2: 6-10 years 3: 10+ years	Ordinal
job_delta_all	Variable showing the net number of jobs each firm created each year. Obtained for each firm's occurence from the difference between jobs[year_n] - jobs[year-1]. When previous year is not available value equals jobs[year_n].	Numeric value	Ratio
job_delta_positive	Variable showing for each firm's occurrence only the jobs that firms have added to the area. Obtained for each firm's occurence from the difference between jobs[year_n] - jobs[year-1]. When the result is negative, the value is replace with NA	Numeric value	Ratio
year_job_percent	Variable showing the share of jobs for each firm.	Percentage	Interval

Appendix 4: Data analysis

This appendix offers a more extended description of the dataset and of the analysis.

M4H dataset

Table A.4.1 - Table presenting the number of companies/ year and new companies for the area/year for M4H; author's own elaboration (2020)

Year	Number of companies/year	Number of new companies/ year New companies: companies that were not in the area the previous year
2012	214	47
2013	264	47
2014	306	62
2015	393	74
2016	445	78
2017	523	54

Table A.4.2 - Table presenting the number of companies/ year by age category for M4H; author's own elaboration (2020)

Year	Age category	Number of companies by age category	Percentage
2012	1-5 years	73	34,1
	6-10 years	39	18,2
	10+ years	102	47,6
2013	1-5 years	71	27,2
	6-10 years	54	20,6
	10+ years	136	52,1
2014	1-5 years	95	31,1
	6-10 years	62	20,3
	10+ years	148	48,5
2015	1-5 years	130	36,6
	6-10 years	60	16,9
	10+ years	165	46,4
2016	1-5 years	172	40,5

	6-10 years	76	17,9
	10+ years	176	41,5
2017	1-5 years	197	39,7
	6-10 years	96	19,3
	10+ years	203	40,9

Table A.4.3 - Table presenting the number of companies/ year by age between 1 to 5 years for M4H; author's own elaboration (2020)

Year	Nb of companies aged 1 year	Nb of companies aged 2 year	Nb of companies aged 3 year	Nb of companies aged 4 year	Nb of companies aged 5 year
2012	23	15	15	8	12
2013	24	8	17	12	10
2014	39	11	16	19	10
2015	60	18	16	17	19
2016	83	30	21	20	18
2017	68	42	42	21	24

Table A.4.4 - Table presenting the number of companies/ year by size category for M4H; author's own elaboration (2020)

Year	Size category	Number of companies by size category	Percentage
2012	self-employed	122	40,5
	1-5 employees	93	30,9
	6-10 employees	32	10.6
	11-20 employees	19	6,5
	21-50 employees	20	6,6
	50+ employees	15	4,9
2013	self-employed	132	42,4
	1-5 employees	92	29,6
	6-10 employees	29	9,3
	11-20 employees	23	7,4
	21-50 employees	23	7,4
	50+ employees	12	3,8
2014	self-employed	156	45,2

	1-5 employees	95	27,5
	6-10 employees	37	10,7
	11-20 employees	22	6,3
	21-50 employees	18	5,2
	50+ employees	17	4,9
2015	self-employed	185	47
	1-5 employees	108	27,4
	6-10 employees	43	10,9
	11-20 employees	25	6,3
	21-50 employees	17	4,3
	50+ employees	15	3,8
2016	self-employed	223	50,1
	1-5 employees	118	26,5
	6-10 employees	44	9,8
	11-20 employees	24	5,3
	21-50 employees	20	4,4
	50+ employees	16	3,6
2017	self-employed	268	51,3
	1-5 employees	143	27,3
	6-10 employees	40	7,6
	11-20 employees	34	6,5
	21-50 employees	22	4,2
	50+ employees	15	2,8

Table A.4.5 - Table describing the number of jobs/year by young companies (aged between 1-5 years); author's own elaboration (2020)

Year	Mean	Std. Dev	Min	Max	Obs
2012	4,1	9,3	0	66	73
2013	4,4	9,9	0	57	71
2014	3,8	8,9	1	59	95
2015	3	6,6	0	60	130
2016	2,7	6,2	0	73	172
2017	2,7	6,3	0	76	197

Table A.4.6 - Table describing the number of jobs/year by companies aged between 6-10 years; author's own elaboration (2020)

Year	Mean	Std. Dev	Min	Max	Obs
2012	5,8	6,9	1	28	39
2013	5,2	7,1	1	35	54
2014	8,3	13,3	1	67	62
2015	8,9	17,9	1	82	60
2016	7,2	16,9	1	91	76
2017	6,2	16,4	0	105	95

Table A.4.7 - Table describing the number of firms in 2017 by activity category for young firms; author's own elaboration (2020)

Year	Activity category	Number of firms	Percentage
2017	agriculture	1	0,56
	business_Service	47	26,9
	construction	15	8,4
	culture_sports	8	4,4
	education	8	4,4
	food	5	2,8
	health	9	5
	information	15	8,4
	manufacturing	9	5
	other_service	5	2,8
	real_estate	2	1,1
	retail	28	15,7
	support_service	11	6,1
	transportation	14	7,8
	water_supply	1	0,5

Table A.4.8 - Table describing the number of firms in 2016 by activity category for young firms; author's own elaboration (2020)

Year	Activity category	Number of firms	Percentage
2016	agriculture	1	0,8
	business_service	32	26,2
	construction	8	6,5
	culture_sports	7	5,7
	education	3	2,4
	food	7	2,4
	health	9	7,3
	information	13	10,6
	manufacturing	6	4,9
	other_service	2	1,6
	real_estate	4	3,2
	retail	16	13,1
	support_service	8	6,5
	transportation	6	4,9

Table A.4.8 - Table describing the number of firms in 2015 by activity category for young firms; author's own elaboration (2020)

Year	Activity category	Number of firms	Percentage
2015	agriculture	1	1
	business_service	18	19,5
	construction	7	7,6
	culture_sports	8	8,7
	education	2	2,1
	food	5	5,4
	health	6	6,5
	information	10	10,8
	manufacturing	4	4,3
	other_service	1	1
	real_estate	3	3,2

	retail	17	18,4
	support_service	5	5,4
	transportation	4	4,3

Table A.4.9 - Table describing the number of firms in 2014 by activity category for young firm; author's own elaboration

Year	Activity category	Number of firms	Percentage
2014	agriculture	1	1,4
	business_service	11	16,1
	construction	6	8,8
	culture_sports	6	8,8
	education	1	1,4
	food	2	2,9
	health	7	10,2
	information	4	5,8
	manufacturing	3	4,4
	other_service	1	1,4
	real_estate	2	2,9
	retail	17	25
	support_service	3	4,4
	transportation	4	5,8

Table A.4.10 - Table describing the number of firms in 2013 by activity category for young firms; author's own elaboration (2020)

Year	Activity category	Number of firms	Percentage
2013	business_service	12	22,2
	construction	3	5,5
	culture_sports	4	7,4
	education	3	5,5
	food	3	5,5
	health	4	7,4
	information	3	5,5
	manufacturing	2	3,7

	real_estate	1	3,7
	retail	13	24
	support_service	2	3,7
	transportation	4	7,4

Table A.4.11 - Table describing the number of firms in 2012 by activity category for young firms; author's own elaboration (2020)

Year	Activity category	Number of firms	Percentage
2012	Business_service	7	13,4
	construction	2	3,8
	culture_sports	3	5,7
	education	4	7,6
	food	1	1,9
	health	3	5,7
	information	5	9,6
	manufacturing	1	1,9
	retail	17	32,6
	support_service	2	3,8
	transportation	7	13,4

The following correlations have been executed.

Table A.4.12 - Table describing the correlation between age of the firm and the number of jobs; author's own elaboration (2020)

pwcorr: **age_in_years jobs**, star (0.01)		
	age_in_years	*jobs*
age_in_years	1	
jobs	0.3009*	1

Table A.4.13 - Table describing the correlation between age of the firm and the growth trend; author's own elaboration (2020)

pwcorr: **age_in_years growth**, star (0.01)		
	age_in_years	*growth*
age_in_years	1	
growth	-0.1909*	1

Table A.4.14 - Table describing the correlation between surface employed by the firms and the number of jobs; author's own elaboration (2020)

pwcorr: **surface jobs**, star (0.01)		
	surface	*jobs*
surface	1	
jobs	0.3476*	1

After running a Chi Square Test between activity category and the size category variables, the results show that the χ 2 associated with the obtained table has 85 degrees of freedom and is 1.6e+03 . The observed differences are significant at the 1% level. Therefore, there seems to be a relationship between the activity of the firm and the size. Figure A.4.15

Figure A.4.15 - Results Chi Square Test between activity category and size category; author's own elaboration (2020)

```
. tab size_category activ_category_new, chi2
```

	activ_category_new					
RECODE of jobs	agricultu	business_	construct	culture_s	education	Total
self-employed	5	402	150	223	34	1,907
1-5 employees	5	359	30	23	12	1,586
6-10 employees	2	78	8	10	10	545
10-20 employees	0	42	9	19	26	365
20-50 employees	1	40	22	9	43	326
50+ employees	0	30	17	1	25	282
Total	13	951	236	285	150	5,011

	activ_category_new					
RECODE of jobs	electrict	financial	food	health	informati	Total
self-employed	0	6	44	104	86	1,907
1-5 employees	2	20	70	87	74	1,586
6-10 employees	0	12	4	17	21	545
10-20 employees	0	12	11	2	11	365
20-50 employees	3	15	5	1	0	326
50+ employees	18	4	8	17	0	282
Total	23	69	142	228	192	5,011

	activ_category_new					
RECODE of jobs	manufactu	other_ser	public_ad	real_esta	retail	Total
self-employed	143	31	2	46	392	1,907
1-5 employees	95	0	0	22	591	1,586
6-10 employees	61	0	0	0	239	545
10-20 employees	48	0	2	7	114	365
20-50 employees	36	1	3	0	87	326
50+ employees	42	0	28	0	47	282
Total	425	32	35	75	1,470	5,011

	activ_category_new			
RECODE of jobs	support_s	transport	water_sup	Total
self-employed	92	140	7	1,907
1-5 employees	65	131	0	1,586
6-10 employees	29	51	3	545
10-20 employees	22	32	8	365
20-50 employees	7	45	8	326
50+ employees	3	37	5	282
Total	218	436	31	5,011

```
Pearson chi2(85) =  1.6e+03   Pr = 0.000
```

RDM dataset

Table A.4.16 - Table describing the 2020 RDM cohort, based on the number of jobs at present time; author's own elaboration (2020)

RDM cohort 2020		
Category	**Number of firms**	**Percentage**
Between 1 to 5 jobs	42	77,77
Between 6 to 10 jobs	5	9,25
Between 11 to 20 jobs	1	1,85
Between 21 to 50 jobs	5	9,25
More than 50 jobs	1	1,85
TOTAL	**54**	**100**

Table A.4.17 - Table describing the 2019 RDM cohort, based on the number of jobs at present time; author's own elaboration (2020)

RDM cohort 2019		
Category	**Number of firms**	**Percentage**
Between 1 to 5 jobs	24	64,8
Between 6 to 10 jobs	5	13,5
Between 11 to 20 jobs	2	5,4
Between 21 to 50 jobs	4	10,81
More than 50 jobs	2	5,4
TOTAL	**37**	**100**

Table A.4.18 - Table describing the 2015 RDM cohort, based on the number of jobs at present time; author's own elaboration (2020)

RDM cohort 2015		
Category	**Number of firms**	**Percentage**
Between 1 to 5 jobs	13	72,2
Between 6 to 10 jobs	2	11,11
Between 11 to 20 jobs	2	11,11
Between 21 to 50 jobs	0	0
More than 50 jobs	1	5,55
TOTAL	**18**	**100**

Table A.4.19 - Table describing the 2014 RDM cohort, based on the number of jobs at present time; author's own elaboration (2020)

RDM cohort 2014		
Category	**Number of firms**	**Percentage**
Between 1 to 5 jobs	21	75
Between 6 to 10 jobs	2	7,14
Between 11 to 20 jobs	2	7,14
Between 21 to 50 jobs	2	7,14
More than 50 jobs	1	3,57
TOTAL	**28**	**100**

Table A.4.20 - Table describing the correlation between the age of the firms and the number of employees at the reference date; author's own elaboration (2020)

pwcorr: **age_20 workingpeople**, star (0.01)		
	age_20	*workingpeople*
age_20	1	
workingpeople	0.3407*	1

Table A.4.21 - Table presenting the number of companies/ years by age category for RDM; author's own elaboration (2020)

Year	**Age category**	**Number of companies by age category**	**Percentage**
2020	1-5 years	26	48,15
	6-10 years	10	18,52
	10+ years	19	35,19
2019	1-5 years	15	40,54
	6-10 years	10	27,03
	10+ years	12	32,43
2015	1-5 years	4	22,22
	6-10 years	10	55,56
	10+ years	4	22,22
2014	1-5 years	17	60,7
	6-10 years	5	17,86
	10+ years	6	21,43

Table A.4.22 - Table describing the age of the firms variable; author's own elaboration (2020)

Variable	Mean	Std. Dev	Min	Max	Obs
age20	11,76	12,92	0	88	81
workingpeople	61	319,67	0	2714	93

For the *workingpeople* variable, the maximum of 2714 is brought in by Rotterdamse Electrische Tram N.V. However, this result is not taken into account for the RDM area, since this value corresponds to the entire number of people employed by this entity. Other outliers are VolkerRail Nederland B.V., Radio Holland Group B.V., and TNO. They have been included since they appeared on the RDM website. Nevertheless, it should be taken into account that these entities were part of the RDM tenants as partners for different research projects.

Appendix 5: Interview guideline

The interview questions were based on the operationalization of the variables (van Thiel, 2014) and were grouped around 5 main themes: structure and goals of the innovation district, actor assets, physical assets and networking assets, development process of the firms located in RDM and M4H. All the interviews were following the same outline. This appendix presents the questions for each theme.

Structure and goals of the innovation district

- Can you please describe the functional structure of RDM?
- Can you please describe the functional structure of M4H?
- Could you please explain what determined the merger of RDM and M4H?
- The Rotterdam Makers District consists of the former shipyard of the Rotterdamsche Droogdok Maatschappij (RDM) on Heijplaat and the M4H area on the north bank. What determined this delimitation? Are there any plans to expand it and include the area in the proximity of the former shipyard?
- Can we set the innovation district on the map? What are its limits? How far do the spillovers go? Is it possible to actually define some boundaries?
- Can you please describe the collaboration between RDM and M4H? Are they trying to become one innovation district, one project? Or do they intend to keep each one's specificities, since the activities of the firms are different from one another? Are they sharing resources, how? What is the link between this merger and the desire of the Port of Rotterdam to stay closer to the city, port in-city in approach?
- What conditions would you say are specific to M4H? How does M4H support the young firms part of the M4H community? Does M4H have a dedicated team for supporting young firms? What conditions you would say are specific to the M4H context?
- In the case of RDM, the presence of the Port of Rotterdam is essential. Does the Port Authority have the same level of involvement for M4H, since the city and private actors are also involved?
- What are the motivations of the Port Authority to develop these 2 areas? Are these motivations similar for both areas?
- According to "From shipyard to brainyard" article Port of Rotterdam is not achieving the ROI that the port authority is accustomed to. Is it still the case today? If yes, are the motivations still the same? What about M4H, is the PoR achieving its ROI?
- Does the Port of Rotterdam take more initiatives in terms of urban development for M4H, as it was the case with RDM and the taxi boat, or the involvement of other parties is making the Port Authority to remain more on the sidelines?
- Can you please describe the process of selecting the firms located in the RDM?
- How long firms stay in the RDM area? Are growing firms incentivized to remain within RDM or M4H's area? If yes, how? If this is not the case, why?
- Literature supports the idea that a favorable ecosystem is the one where entrepreneurs are also 'feeders', providing their input to the ecosystem within which they evolve. How would you describe the involvement of the entrepreneurs located in the RDM ?
- In terms of employment growth, the firms from M4H show a very small trend. However, firms from M4H appear to stay longer in the area, compared to RDM where firms exit sooner. How is Rotterdam Makers District dealing with these trends (trying to be more selective when choosing the firms/ offering support/ balancing between young firms and more established ones/ other)?

Actors assets

- When looking at the firms located in the surrounding area of the former shipyard, there is an important majority of firms focused on port activities. Is RDM in touch with these firms? Are there any collaborations between the entrepreneurs located within the innovation district and the firms located in the surrounding area? Is RDM trying to create new links between these firms?
- The firms located within the surrounding area have been showing a growth trend since 2013, could this also be linked to the presence of RDM and its young entrepreneurs?
- When discussing the partnerships with educational institutes, how is RDM supporting and encouraging this transition from study programs to future employees or even firm owners?
- Theoretical and empirical evidence support geographic proximity as beneficial for knowledge spillovers, therefore I would like to know how students transition or move from the educational context (Hogeschool) towards the professional context provided by the firms located in the RDM? During their studies how do students perceive this proximity between school and firms, are they aware of this link/connection with existing firms?

Physical assets

- How does the process of developing the public and private realm function? Is it a process that continually develops? Is there a team dedicated to this? How is Rotterdam Makers District creating this urban environment that firms seem to appreciate when choosing their location?
- Looking at both RDM and M4H, when discussing the physical conditions what would you say it translates into a favorable input for entrepreneurs to grow?
- Literature supports the idea that a 'higher quality of place' attracts more successful firms. How is RDM involved in creating this urban environment that firms seem to appreciate when choosing their location? Are there any joint development projects between RDM and local authorities from the surrounding area?
- Did the presence of RDM have an (direct/indirect) impact on the local community from the surrounding area of the innovation district? More amenities/ public transport/ green areas/ employment?
- Is M4H also offering flexible renting contracts for young firms?
- These young firms are bringing new employees to the area. How is Rotterdam Makers District attempting to create a "higher quality of place" that can attract new firms to the area? Are firms coming first, and people after? Or is it the other way round?

Networking assets

- Networks are essential for entrepreneurs; how would you say RDM contributes to creating these networks? How does RDM support cross-fertilization? Is there a team dedicated to this? Innovation districts support the idea of 'bringing people together', how does this apply to the RDM's strategies?
- Is RDM also contributing to training for the skills required by the innovation economy describing the firms located within their area? How is RDM contributing to this aspect: facilitating training, organizing events…
- How many events are organized each year?

Development of the firms

- Within Rotterdam Makers District context, what would you say are the conditions that RDM or M4H organizes for firms to develop?
- What actions does Rotterdam Makers District conduct in order to support firms during their development?
- Do you feel that firms located within RDM are fully aware of the benefits of being so close to a large pool of future skilled labour? Do firms advertise jobs within the Hogeschool? Are entrepreneurs looking for skilled employees within the Hogeschool or they are still using outside networks for this task?
- Can you please explain the choice of RDM as a location for your firm? How long have you been there?
- Would you say that being located in the RDM innovation district contributed to your firm's growth, or this happened organically independent of being located in the RDM?
- Did your firm experience a growth in terms of number of employees since being located in the RDM innovation district?
- Did the conditions offered by RDM (such as networking events/ flexible spaces/ variety of firms located in the RDM environment/ study programs for future employees/ other factors) influence your firm's development process? Please explain how
- What would you say your firm needs in order to continue its development?
- How would you describe your firm's collaboration with other firms from Rotterdam Makers District, what about other firms from the port area?
- Would it be interesting if RDM/ M4H brought in other companies from the same area of activity?

Appendix 6: Sources for secondary qualitative data

This annex presents the sources of the secondary qualitative data. All these sources are also detailed in Appendix 10.

- Rotterdam Makers District. 2019b. M4H in Cijfers MONITOR 2019 TOELICHTING OP DE SAMENVATTING. Available at: https://m4hrotterdam.nl/wp-content/uploads/2020/02/Toelichting-Monitor-M4H-in-cijfers-2019.pdf [Accessed 15-05-2020] - coded as **[doc_1]**
- Rotterdam Makers District. 2018a. Rotterdam Makers District. Available at: https://www.rotterdammakersdistrict.com/images/LOWRES_DM_makersdictrict_brochure_missie-visie_verkort.pdf [Accessed 10-04-2020] - coded as **[doc_7]**
- Rotterdam Makers District. 2018b. Spatial framework Merwe-Vierhavens Rotterdam Future in the Making. Rotterdam: Available at: https://m4hrotterdam.nl/wp-content/uploads/2019/11/M4H_brochure_spreadsdigitaal_Engels.pdf [Accessed 10-04-2020] - coded as **[doc_3]**
- Peek, G. and Stam, K., 2019. Single and double loop learning in Rotterdam Makers District: The future of urban development and the Resilient City. Real Corp. Available at: https://d1wqtxts1xzle7.cloudfront.net/58836400/Single_and_Double_Loop_Learning_in_Rotterdam_Makers_District.pdf?1554796399=&response-content-disposition=inline%3B+filename%3DSingle_and_Double_Loop_Learning_in_the_R.pdf&Expires=1598404728&Signature=TYES0ME3Dmcq4~i-GGhUErerXj3GZXDEA3VHX~EJTD5k6Tq8iHl9SfylczzTMDWdOzSANN48vKvuH17BRFNrvytWNizyOLXqezp40Uz36Tyt~6mB84YwbAxXNPhutmyyPxgJJeI2LXrKXKyWh9e2JgnZ7-fRK1KFqur9U-Kfy8-wdGfAG2Ekh~nlbfc2T51~wz4SB0QUm4N6pNW-jah2BOcNgdvy1yu91fnQgVZfywl8Ts9wO2czNJYe-TLJXVpx8KGuY0YCfrEfJicBZzLUJJAMixLArZrAogdDrVeF0krdSmdUFA4HVE5lcgomJ2rwcy6Iwlx6y3dmVcR0oI0pPQ__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA [Accessed 15-05-2020] - coded as **[doc_4]**
- van Tuijl, E. and Otgaar, A., 2017. Sustainable competitiveness and the transformation of a former shipyard: RDM Campus (Rotterdam). Available at: https://www.researchgate.net/profile/Erwin_Tuijl/publication/313560344_RDM_Campus_Rotterdam/links/589e225e92851c7fb4bb1c9e/RDM-Campus-Rotterdam.pdf [Accessed 20-07-2020] - coded as **[doc_6]**
- Vries, I.M. 2014. From Shipyard to Brainyard
  The redevelopment of RDM as an example of a contemporary port-city relationship. Available at: https://www.researchgate.net/profile/Isabelle_Vries/publication/298420144_From_Ship_Yard_to_Brain_Yard_the_redevelopment_of_RDM_as_an_example_of_a_contemporary_port_city_relationship/links/56e95a0208aedfed738989fd/From-Ship-Yard-to-Brain-Yard-the-redevelopment-of-RDM-as-an-example-of-a-contemporary-port-city-relationship.pdf [Accessed 20-07-2020] - coded as **[doc_5]**
- https://twitter.com/RDMRotterdam/status/954005787889864704 - coded as **[doc_2]**
- https://www.linkedin.com/in/jurjenlengkeek/ coded as **[web_10]**
- https://www.portofrotterdam.com/en/news-and-press-releases/rdm-rotterdam-and-m4h-rotterdam-together-form-the-makers-district - coded as **[web_9]**
- https://m4hrotterdam.nl/ondernemen-in-m4h/ coded as **[web_8]**

- https://ece.nl/about/ - coded as **[web_7]**
- https://www.erasmusmagazine.nl/en/2015/08/06/could-the-ece-campus-be-rotterdams-answer-to-google-hq/ - coded as **[web_6]**
- https://issuu.com/stadshavensrotterdam/docs/m4h_development_strategy_summary_is - coded as **[web_5]**
- https://www.straatbeeld.nl/nieuws/270715/stadshavens-rotterdam-biedt-ruimte-aan-unieke-test--en-showstraat - coded as **[web_4]**
- https://rdmrotterdam.nl/ondernemen/ - coded as **[web_3]**
- https://www.rdmrotterdam.nl/campus/ - coded as **[web_2]**
- https://www.rdmrotterdam.nl/programmabureau-rdm/ - coded as **[web_1]**

Appendix 7: Codebook employed for qualitative data analysis

This appendix offers an insight into the coding process. The following table presents the employed codes together with a definition of the code, a description of how and when the code might occur, the label of the code together with its ID, and its containing theme (Swanson and Holton, 2005). Since pattern matching techniques were employed for the analysis, following this table allowed to compare theoretical patterns to the empirical evidence.

For triangulation purposes, multiple sources of data were employed, as presented in Appendix 3.

5 main themes were identified based on the employed conceptual framework: *employment formation, presence of young firms, innovation district's setup, stimulating conditions for young firms,* and *relevance of young firms for the innovation district's goals and motivations*. For analysis purpose 2 auxiliary themes were also added: *RDM* and *M4H*.

Table A.7.1 - Table presenting employed codes for data analysis; author's own elaboration (2020)

Theme	Id	Label	Definition	Description
RDM	**A**	rdm	Code introducing characteristics available only for RDM district.	This code allows us to differentiate whether respondents refer to the global project Rotterdam Makers District, or only RDM. e.g. *"port of Rotterdam is leading the development"*
M4H	**B**	m4h	Code introducing characteristics available only for M4H district.	This code allows us to differentiate whether respondents refer to the global project Rotterdam Makers District, or only M4H. e.g. *"These creative businesses you don't see, but they are in all kinds of warehouses and port and industrial heritage."*
Innovation district's setup: Actors Assets	**C**	id_actor_educ	Code referring to educational institutions that reinforce or/and drive the activity of the innovation district (Katz and Wagner, 2014).	It describes any study program, educational activity, partnerships between the innovation district's actors. e.g. *"we really want to get Erasmus University more involved"*
	D	id_actor_resch	Code referring to any research-oriented activity (Katz and Wagner, 2014).	It describes the actors, partnerships, or resources dedicated for research
	E	id_actor_sup	Code referring to actors part of the district that are enabling support measures for the economic actors (Katz and Wagner, 2014).	It describes the actors in charge of supporting the economic actors. It can include incubator, accelerators, proof-of-concept centers e.g. *"Dnamo is a nice example. It's an incubator on the applied science."*
	F	id_actor_pub	Code referring to public actors involved in the project	It includes the City of Rotterdam, Port of Rotterdam, or civil society (when mentioned) e.g. *"M4H is a mixture of the municipality, POR and privately*

				owned plots"
	G	id_actor_team	Code referring to the organizational actors managing day to day activities in the district.	It includes the team managing the project. It differentiates from the id_actor_sup code by including actors that are not necessarily involved in 'support' activities e.g. *"RDM team focuses on the context within which the firms evolve"*
Innovation district's setup: Physical Assets	**H**	id_real_estate	Available real estate, testing facilities, or other facilities owned by the driving actors and employed by the actors (Katz and Wagner, 2014)	It includes all reference to real-estate assets as defined. e.g. *"RDM offers flexible offices for new companies together with short term contracts"*
	I	id_public_space	Presence of amenities, public spaces, access to public transport within the innovation district's area (Katz and Wagner, 2014)	It includes all references to assets that are public and can be employed by all users (innovation district's actors, residents, visitors). e.g. *"When looking at the public space and supporting amenities for the RDM they are not there so much"*
Innovation district's setup: Networking Assets	**J**	id_partnership	Activities describing knowledge spillovers emerging within and from the innovation district.	It includes references to collaboration between firms from the district. e.g. *"Not that much interaction between the companies"*
	K	id_networking	Organized events or activities with the purpose of reinforcing the network of the involved actors (Katz and Wagner, 2014)	It includes all references to events, festivals or activities dedicated for enhancing the actor's network. Ex: *"Events are organized by RDM team in collaboration with the university."*
Stimulating support measures	**L**	id_support	Forms of support that include:hard and soft measures, as defined in Chapter 2.	It complements *id_actor_sup, id_actor_team* codes by including any support measure also from outside the district, and made available by Rotterdam Makers District. e.g. *"for us it is very interesting to help them"*
	W	firm_attractive	Forms of support that are stimulating young firms to locate in the innovation district.	It describes all references to support measures from the firm's perspective. e.g. *"RDM offered more space for research and product development"*
Innovation district's setup: Actors Assets: Firms	**N**	scaleup	Growing firms aged more than 5 years and having more than 10 employees (Erasmus Center of Entrepreneurship, 2020)	It describes all references to scale-up firms. e.g. *"Now, everybody is looking for the scaleups, that maybe in the end these are the companies that will help build the port and the smartest port "*
	O	established_business	Firms aged more than 10 years, more than 20 employees and are in the market for a longer time.	It describes all references to large and older firms. e.g. *"I think at the moment we have an interesting combination of larger businesses and these innovation dock*

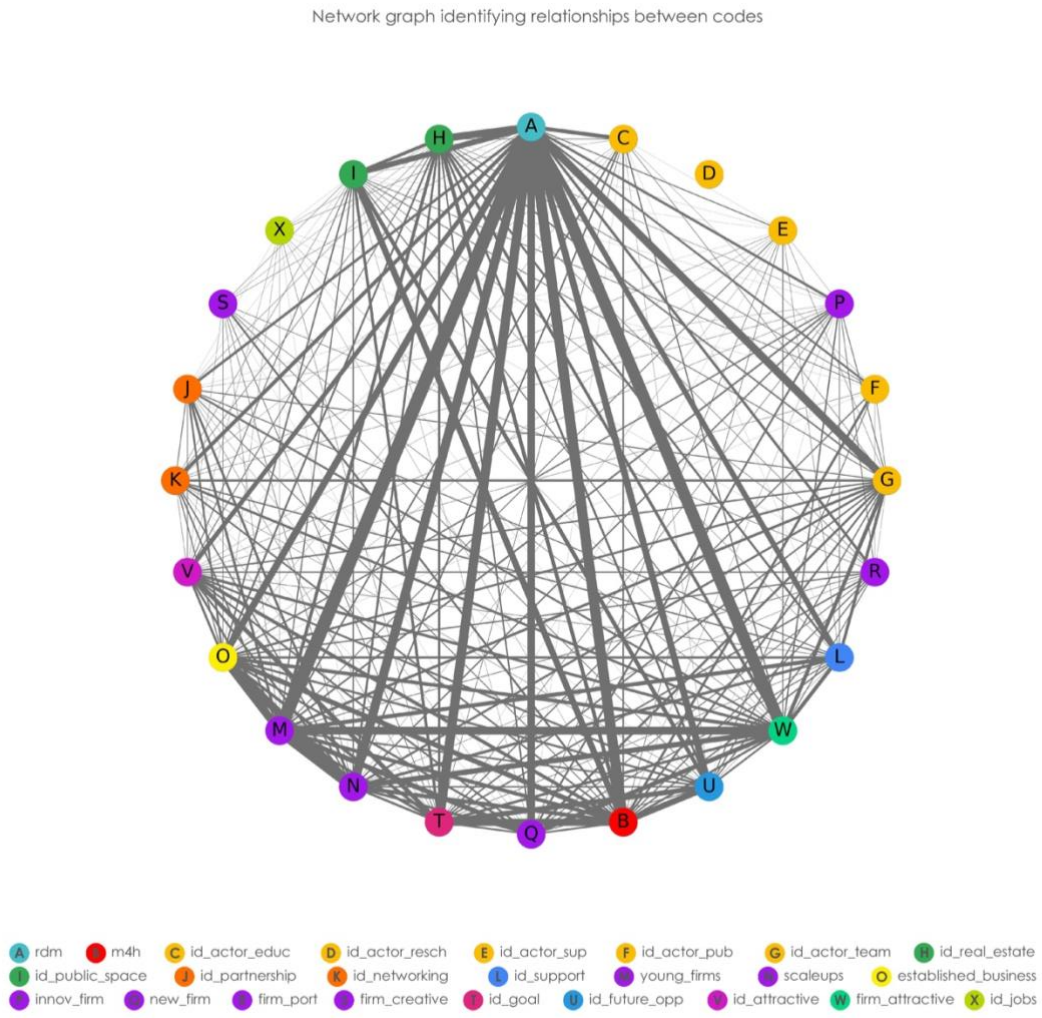
				startups"
	P	innov_firm	Firms “developing cutting-edge technologies, products, and services for the market.” (Katz and Wagner, 2014, p.11)	It includes all references to activities related to the innovation economy. e.g.*"if I know something about robotization, AI...I can go to this port area because the port needs these new technologies and I will make my business there"*
	Q	new_firm	Firms just moving to the Rotterdam Makers District.	It includes all references to firms that are new to the Rotterdam Makers District community. e.g. *"RDM & M4H - work together when attracting and locating firms"*
	R	firm_port	Firm that have an activity related to the maritime sector	It includes all references to firms involved in maritime activities. e.g. *"RDM is suitable for smaller companies and in connection with port industries"*
	S	firm_creative	Firms with an activity within the creative sector: designers, artist, architects, manufacturing..(Cities of Making, 2018)	It includes all references to creative firms. e.g. *"M4H there were already entrepreneurs in the area, creatives ones”*
Presence of young firms	**M**	young_firms	Firms with an age between 0-5 years at the moment of the study	It describes all references to young firms. e.g. *"[startups] look for much more room and not much cost"*
Relevance of young firms for the innovation district’s goals and motivations.	**T**	id_goal	Goals and motivations of the main driving stakeholders.	It describes all references to projects, actions that are contributing to achieving goals. e.g. *"The ‘port in city in’ strategie is even more present for M4H. The port is trying to stay in the city."*
	U	id_future_op	Future development opportunities identified by the main driving stakeholders and related to strategies and motivations.	It describes all references to future actions, projects that can help the main driving actors achieve their goals. e.g.*"by running a boat between RDM and M4H this would allow the people to enter the city directly through M4H"*
	V	id_attract	Presence of young firms fits the additional goals and motivations of the innovation district and its driving actors (Wagner et al., 2019)	It describes all references to young firms that can contribute to the goals and motivations of the main driving actors. e.g. *"real estate person would also approach a certain firm that is interesting for RDM"*
Employment formation	**X**	id_jobs	New jobs created by the young firms.	It describes all references to employment formation within Rotterdam Makers District. e.g. *“they can grow in the port area”*

Appendix 8: Word Network Graph

The following figure presents the interconnections between the employed codes as presented in Appendix 7. Each code is represented by a node. Each connection between 2 nodes represents the co-occurence of the 2 codes when examining the units of analysis presented in Appendix 9. In other words, if one unit of analysis has been assigned two labels, this results into a connection between two codes, and consequently a link between two nodes. In addition the links are weighted based on the number of co-occurrences of two codes.

This representation is aimed to visually triangulate the relationships between the main concepts of the employed theoretical framework. It can be noticed that the innovation district (nodes A and B) does leverage its assets (nodes C, D, E, F, G, H, I, J, K) into strategies (node U) and support measures (node L). These are attractive (node W) for young firms (node M) but not only (nodes N, O, P, Q, R, S, T). Additionally, these strategies and support measures are in line (node V) with the innovation district's goals and motivations (node T).

Figure A.8.1 - Network graph identifying relationships between codes; author's own elaboration (2020)



Appendix 9: Qualitative data analysis

This appendix presents the analysis of the qualitative data. The collected data was divided into units of analysis and coded following a deductive approach. Pattern matching techniques were applied in order to connect theoretical patterns to empirical evidence. Labels were assigned based on the table presented in Appendix 7. Units of analysis were assigned multiple labels, which resulted in different relationships between the codes. These links are presented in the word network graph (*Appendix 8*).

comment	src	codable unit																									
			RDM	M4H	Actors Assets					Physical Asset		Networking Asse		ID supp	Firms							Innovation District Goals			Stimulat	Employ
		id label:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
		label:	rdm	m4h	id_actor_educ	id_actor_resch	id_actor_sup	id_actor_pub	id_actor_team	id_real_estate	id_public_space	id_partnership	id_networking	id_support	young_firms	scaleups	established_business	innov_firm	new_firm	firm_port	firm_creative	id_goal	id_future_opp	id_attractive	firm_attractive	id_jobs
	int_m	"when the company is big enough it leaves the area because RDM does not have the space for bigger companies"	A							H							O									
	int_m	"Smaller and larger events"	A						G				K												W	
	int_g	"crossovers, we think are really valuable for innovation."																P							W	
entrepreneurs coming from Delft University	web_10	https://www.linkedin.com/in/jurjenlengkeek/	A												M				Q							
	int_m	"M4H is dedicated to larger companies, mostly in the field of innovation and circular economy"		B												N	O				S	T			W	
	int_l	"We have been working really hard to get parties over here, but then they are here and are saying we need an internship or we need this or that."	A						G										Q			T				
	int_g	"My former program manager launched Rotterdam Innovation District for the merge of M4H and RDM, but we thought this name is not correct."	A	B																						
	int_m	"RDM is suitable for smaller companies and in connection with port industries"	A												M			P	Q	R		T			W	
	int_l	"if I know something about robotization, AI...I can go to this port area because the port needs these new technologies and I will make my business there"	A															P	Q	R				V		
	int_l	"We can help by being as flexible as possible. Like I said if you need this project you need double size or triple size we can help with that."	A							H				L	M										W	
	int_g	"And it's full of creative industries."		B																	S					
	int_g	"Of course a successful port can be successful if there is another successful city. This was a turning point a few years ago when we drew up the strategy for Rotterdam Makers District"	A	B						H	I											T		V		
	int_g	M4H firms: "Design companies have been settling here for decades already and we thought the profiles are quite complementary."	A	B																	S	T	U			

Innovation Districts: between young firms and employement formation

comment	src	codable unit																									
			RDM	M4H	Actors Assets					Physical Asset		Networking Asse		ID supp	Firms							Innovation District Goals			Stimulat	Employ
		id label:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
		label:	rdm	m4h	id_actor_educ	id_actor_resch	id_actor_sup	id_actor_pub	id_actor_team	id_real_estate	id_public_space	id_partnership	id_networking	id_support	young_firms	scaleups	established_business	innov_firm	new_firm	firm_port	firm_creative	id_goal	id_future_opp	id_attractive	firm_attractive	id_jobs
	int_g	"This is not the only innovation district in the region of course."	A	B																							
	int_g	RDM firms: "So the accessibility and the proximity to urban areas is vital for these firms."	A								I					N	O								W		
	int_t	"It would be helpful to have more central storage space and maybe centralize it by having some joint storage space"	A							H				L	M	N											
	int_m	" It is hard to say something about RDM on the direct environment (context)"	A								I																
	int_m	"RDM is located in a port area, which makes it different from other innovation districts located in city centers"	A								I											T	U	V			
	int_g	"I might say that startups are not always successful"	A	B											M												
	int_l	talking about the warehouse space:"It's like student housing and you have to make sure they get on together. It has been a challenge but we are getting better and better."	A						G					L	M	N	O	P	Q								
	int_m	"development together of RDM and M4H can create an impact on the direct environment, but it' s not yet there "	A	B							I											T	U				
	int_l	talking about FutureFlux event: "It's not the success I was hoping, but we are getting there and the other events are also helping"	A										K										U				
	int_g	RDM: "It is quite an eccentric location compared to M4H. "	A								I																
goals and motivations	doc_3	M4H Future in the making (Rotterdam Makers District, 2018)		B																		T	U	V	W		
	int_g	bridge connection between RDM and M4H: "There is no space at RDM, plus the density of people at RDM and Heijplaat is very low, so it doesn't make sense."	A	B							I																
	int_g	"So we thought if we made RDM such a successful area, then it should merge more with other surrounding areas also offering facilities but also offering more space for companies who are successful and growing from startup to scaleup and grownups. "	A								I				M	N	O					T	U				

comment	src	codable unit																								
			RDM	M4H	Actors Assets					Physical Asset		Networking Asse		ID supp	Firms							Innovation District Goals			Stimulat	Employ
		id label:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
		label:	rdm	m4h	id_actor_educ	id_actor_resch	id_actor_sup	id_actor_pub	id_actor_team	id_real_estate	id_public_space	id_partnership	id_networking	id_support	young_firms	scaleups	established_business	innov_firm	new_firm	firm_port	firm_creative	id_goal	id_future_opp	id_attractive	firm_attractive	id_jobs
	int_g	"Next year we will have a new, and I'm really happy with that, we will have a new water connection between RDM and M4H. This will be a regular line between them. This is very important for both areas."	A	B							I															
	int_t	"RDM offered more space for research and product development"	A							H					M	N			Q						W	
	int_g	" I might say the current situation doesn't make it that easy. We had here some new plans for offices for startups and grownups."		B															Q						W	
	int_g	RDM firms: "Of course we have the whole port area, so startups that are successful in for example energy transition, or whatever industry or logistics, they can look at the whole port."	A							H					M		O			R		T				
	int_l	"At RDM there is a managing team, small team, and our main partners are the Rotterdam University of Applied Science and the Technical School and Port of Rotterdam"	A		C			F	G																	
	int_t	"This would allow us to learn from each other because sometimes we are confronted with similar challenges and this would allow us to learn without being competitive."	A									J			M	N			Q						W	
	int_m	"RDM team together with the universities team are in charge of the project but the port authority team is responsible for what is happening there"	A		C			F	G																	
	int_m	"real estate person would also approach a certain firm that is interesting for RDM"	A						G								N		Q	R				V		
	int_g	"When I'm talking about the Rotterdam Makers District, then I am talking about the area, but of course there is more than real estate. "	A	B						H	I			L								T				
	int_m	"by running a boat between RDM and M4H this would allow the people to enter the city directly through M4H"	A	B							I											T	U			
	int_l	"Therefore there are different structures in charge of M4H (combination")		B				F																		

Innovation Districts: between young firms and employement formation

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	int_g	M4H: "Already we see that unfortunately 2 entrepreneurs have been closing their doors."		B							I															
	int_l	"like the Erasmus Center for Entrepreneurship. This would be one of the great things if we could combine with M4H."	A	B			E															T				
	int_g	"The other reason is that M4H is almost half of it a brownfield area that has to be developed, and the profile of this area was already on the creative industries on the making industries."		B						H	I										S	T	U			
	int_g	"RDM is more maintained, we have to keep up attracting new businesses."	A						G										Q							
	int_l	"One of the conclusions of the founder is that there is a difference of attitude within the students at the applied science level than at the university level. Students at the applied science are more practical, they are great if you have the idea and they will build it and make it work, but they are not at the start of new ideas. While at the University level, the students are more independent, self thinking and also a little bit older."	A		C										M				Q						W	
	int_l	" at M4H the team is lead by Isabelle Vries and the partners are Port of Rotterdam and the municipality "		B				F	G																	
	int_l	"We are planning to make a few changes on the catering side: the canteen for students "	A		C				G		I															
	int_t	"Schools are nearby and align with potential customers and work on certain developments"	A		C										M	N									W	
	int_t	"[RDM] just relate me to some external website or other schools"	A		C									L	M	N										
	int_t	"Not that much interaction between the companies"	A									J			M	N									W	
	int_l	"but if the business is growing there is always a need for commercial people"	A		C											N	O						U		W	

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	int_g	"But I think it's on the port authority and the municipality to keep up the investments in infrastructure and real estate. But we certainly will see delays in our developments."	A	B				F		H	I															
	int_m	"It's a matter of space... there is not enough space to locate more study programs "	A		C					H																
	int_l	"during these 10 years a lot of parties emerged in the RDM area and that we can say you go to them...or they can help you deal with the municipality, or you go to the M4H"	A						G				K	L											W	
	int_l	" if you want to get a little bit more professional what RDM offers becomes more interesting"	A							H				L	M	N	O		Q						W	
	int_g	"but now we are also making a digital platform that allows them to connect with each other and say what do they need (employees, students, housing...), but also work together on projects or knowledge. "	A	B										L	M	N	O									
RDM firms	web_3	https://rdmrotterdam.nl/ondernemen/	A												M	N	O									
	int_t	"[RDM] it allowed us to attract certain staff, align some educational systems"	A		C										M	N									W	
	int_g	"It is true RDM and M4H are totally different areas."	A	B																						
	int_m	"RDM has a direct impact on the regional economy, and the regional innovation ecosystem"	A																			T		V	W	X
	int_l	"We have a few events: 2-3 key events with specific target groups: one is for getting younger kinds enthusiastic about technology. Another one is FutureFlux event that has been going for 4 years now."	A						G				K												W	
	int_g	"This means we also have the task to build new houses. So this is really unique in the ambition that we have"		B							I												U			

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	int_g	M4H team: "This office focuses on the physical parts, such as master planning, pre-conditions for development, building new infrastructure and so on. We are now making an impact assessment for the area. So this is more the M4H team for area development. "		B					G	H	I															
	int_g	"Then for grownups there is no space in the RDM area."	A							H							O									
	int_g	"And this is my opinion as well, that it is not about “is it port related or not”, but it is about the techniques. We are applying in the next economy techniques like digitalization, robotization, 3D printing...these are techniques that are valuable for the healthcare industry, creative industry, but also the port related industry. So it is really about crossovers and applying new techniques and developing new products with those techniques. "																		R	S				W	
list of tenants	doc_5	(Vries, 2014)	A												M	N	O					T				
	int_m	"Larger events for the entire city, or actors outside RDM "	A						G				K									T			W	
	int_t	"In september an intern from the study programs will be here. This is the first one, before that there were interns coming from the other side of Rotterdam"	A		C										M	N									W	
	int_g	talking about the limits of the ID: "That is correct and that’s exactly the reason why we don’t mention this area as an innovation district."	A	B																		T				
number of new firms RDM	doc_2	https://twitter.com/RDMRotterdam/status/954005787889864704	A																Q							
	int_l	"the Makers’ district becomes a great area a platform for these ideas."	A															P	Q			T	U	V	W	
	int_l	"But by now there are a lot of parties working on the marketing for the maritime sector…"	A												M	N	O			R			U		W	
	int_l	"RDM has the heritage of the shipbuilding, it’s building the new generation of manufacturing industries on the ruins of the old port, there is a little bit of romance here"	A							H								P		R		T				

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	int_g	"These creative businesses you don't see, but they are in all kinds of warehouses and port and industrial heritage."		B						H											S					
	int_l	"at M4H there are 2-300, but they differ a lot"		B											M	N	O	P	Q							
	int_l	"becoming a no-go area, while for us it's still a strategic point. "	A					F		H	I											T				
	int_g	M4H: "So the mixing is also one of the success factors, we say. Of course we have to prove it. We are working hard on the zoning plan, the first houses have to be built. But this is our ambition."		B							I												U	V		
	int_l	"There was this initiative Stadshaven that had bigger ambitions. I think this determined all the port related areas that could be areas where port and city could meet. As you make up the balance after 10 years, it was very clear that some port areas were on their way to becoming municipalities like Rijn-Maashaven, where there's not much port activity going on over there. Like "port out - city in" initiatives."	A	B				F														T				
	int_l	"For the past year we have been trying to organize events." between RDM and M4H	A	B					G				K													
	int_l	"For a startup to be prosperous and grow I am convinced the entrepreneur or the team are the most important."	A												M											
	int_g	"this is more than the innovation district itself."	A	B																					W	
	int_l	"RDM is totally owned by the Port of Rotterdam"	A					F																		
	int_g	M4H: "The PoR accepts this because it is a very complex development and more social development. So the PoR accepts a lower ROI, but not a negative one."	A	B																		T	U	V		
	int_l	"About 10-11 years ago we started redeveloping the RDM area - this was a former shipyard building, it went bankrupt in the 80s and the Port of Rotterdam Authority acquired the area in 2002, more as a defensive act."	A					F		H												T				

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	int_m	"There's only the village … located close to RDM, "I don't think there's so much interaction with the village"	A																							
	int_l	"But there were these 2 areas that were in between (RDM and M4H) and this determines the Makers District, where the port and city meets"	A	B																		T				
	int_l	"We had a meeting with the Board of the University of Applied Science and we were discussing what it would be interesting to do for the next 10 years. "	A																			T				
	int_l	"We really try to get involved as many entrepreneurs as possible and we try to create events where they can meet. "	A											L	M	N	O	P	Q						W	
	int_m	"When looking at the public space and supporting amenities for the RDM they are not there so much"	A								I											T	U			
	int_g	"We are outside the dykes and the other areas are inside so this is another complication we are facing. The infrastructure takes a lot of investments. "		B							I															
	int_g	" RDM was empty, there were almost no leasing contracts when the project started."	A							H																
	int_m	"Smaller events only for the firms and the area alone"	A						G		I		K		M	N	O								W	
	int_g	"During the open house days, we are working with them and they are willing to open the doors. So we help each other to make the area visible for the companies and for the public. This is very important."		B								J			M	N	O					T		V		
	int_m	"Not so many study programs are located in RDM, there are only 3 programs located there "	A		C																	T				
	int_g	"But of course it would be really valuable to have educational or knowledge institutes here."		B	C																	T				

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	int_l	"Initiative, that also in the end was kind of ok. 10 years ago we had all this infrastructure with tools and it was revolutionary and became part of the community and it worked quite well. But it didn't flourish as much as we hoped it could do it. If you look at other Makerspace it's a tough business model. So they stopped Makerspace"	A				E								M				Q						W	
	int_g	"But on the other hand, if companies are successful in RDM they can also grow in the port. Depends on their profile."	A														O			R			U			
	int_g	"We started the merger because RDM was quite successful in attracting younger companies,"	A												M											
	int_m	"Rdm team focuses on the context within which the firms evolve"	A						G	H		J	K	L	M	N	O	P								W	
	int_l	"Dnamo is a nice example. It's an incubator on the applied science. While YesDelft is doing really good, Dnamo did not make it."	A				E								M				Q						W	
	int_g	"Designing and creative industries could be helpful for the technical industry and the other way around. Quite good example is the Studio Roosegaard that collaborates with the construction industry to develop beautiful outdoor spaces."		B																R	S		U			
	int_g	" RDM is quite eccentric, so we thought RDM could profit from the M4H area, and the other way around as well."	A	B							I												U			
	int_l	mixing RDM and M4H: " To this if we mix it with education and we can spread that vibe.. it will really boost the RDM."	A	B	C																		U			
	int_g	"It is the best accessible area because it is on the north bank, we have a subway and it is totally surrounded by urban areas."		B																		T				
	int_l	"It is very tempting to say why don't we combine them? But the municipality at the moment is not involved in the RDM as a strategic partner"	A	B				F															U	V		

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	int_l	"There are quite a few firms that are in the area. We focus mainly on the innovation parties, but there are also other firms."	A															P		R						
	int_g	"RDM is growing the firms and M4H is further on welcoming them."	A	B											M		O		Q			T	U			
	int_m	"RDM & M4H - work together when attracting and locating firms"	A	B					G						M	N	O		Q					V		
RDM repport	doc_8	distribution of entrepreneurs from RDM																								X
	int_l	collaboration between firms: "We try to.."	A						G			J													W	
	int_g	vibrant environement: "And we think that for M4H we can reach this by adding housing."		B							I												U			
	int_t	"It would be helpful if they had a kind of a platform and maybe invite students to come over: the best of the students are allowed to come here and give presentations and then the companies here can do a short presentation and they can network and develop connections and start working with the startups located in the RDM (...) This is something that I would really like"	A		C										M	N										
	int_l	"One of the goals that we had was to have the 2 river sides connected because they are really 2 different areas"	A	B							I											T	U			
	int_m	"RDM is a very small innovation district, it is not a neighbourhood or a proper 'district' but one old shipyard building"	A							H																
	int_l	"we very much wanted to make this Makerspace as the area where the port and the city meet."	A	B				F														T		V		
	int_l	" they started RDM Next, which is more a digital training platform and they say there is more value for us in training companies from the port area about how does AI, cryptocurrency or cyberattacks… can affect your business"	A				E								M			P	Q						W	
	int_m	"project team (5-6 people: real estate manager + event people)"	A						G	H			K	L												

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	int_g	"They signed lease contracts because they wanted to grow, but now a few months later we get these calls that they have to delay their investments and ambitions. This is pity for everyone."	A	B											M	N	O									
	int_g	"It would be very luxurious if we sat down and had the firms coming to us. That's not how it works."	A	B															Q							
	int_l	"[investing in startups] 10-11 years ago this trend was not as important as it is today"	A						G					L	M				Q					V		
	int_l	50% of firms are registered outside RDM: "But if I would take a guess I would say 80% of the firms have their headquarters within RDM, so this number is a bit of a surprise for me"	A												M	N	O	P	Q							
	int_g	M4H team: "What we say is that the 2 areas work together in terms of software you could say: such as marketing, acquisition, communication. We organize events to meet and greet the companies. "	A	B					G																	
	int_g	"It is a lot of work in progress, and again I think it's very difficult to predict things. I think the educational institutes will really look different to real estate now, especially since covid enhanced the digital trends. I don't think that any university will invest now in a new building. But I am not sure."		B	C					H																	
	int_t	"[RDM influenced the]Relation with some commercial activities"	A									J	K		M	N									W	
	int_l	"[for service businesses] it's interesting to sit there because they are close to their clients"													M	N	O			R				V	W	
	int_g	"But offices now...these days are very difficult. Well we will see what covid brings in, but I think we are going to be in a really heavy time. But it's very difficult to predict."	A	B																			U			
	int_g	" Because at RDM there are the educational institutes university of applied science and all kinds of testing facilities which are also valuable, probably for the M4H area."	A	B						H					M	N	O					T	U			

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	int_g	"And of course there are a few companies, a lot of companies, those that are successful they are ambassadors outside of Rotterdam."		B													O					T		V		
	int_g	at M4H: "For this we have more possibilities to add amenities, or public transport.		B							I															
	int_g	"Like Port XL, a scouting and coaching program at the port for startups. This is not necessarily bound to one area, but it is a facility."					F							L										V	W	
	int_g	"unique that a port says ok let's do it together with the city and add housing. "	A	B						H	I											T	U			
	int_t	"It's a very inspiring location, if there are visitors coming over, they see the huge location and see that something is happening and what we are working on"	A							H					M	N									W	
	int_g	"This community platform will be launched after the summer, and we know from the companies that they are looking for such a thing, where they can communicate with each other. It has to be open source but it is specially for the educational institutes and the companies in this area."	A	B								J	K	L	M	N	O									
	int_l	"[startups] look for much more room and not much cost"								H					M				Q						W	
	int_g	"Of course there are no boundaries between districts. We have here close by Schiedams which is a good cluster for all kind of food company, but also port related companies. But yes the innovation districts are everywhere, in the center, at Erasmus university, erasmus medical center. "																								
	int_m	"RDM team is trying to strengthen the innovation climate with events and tools required for innovative entrepreneurs"	A						G				K	L				P							W	
RDM team composition	Web_1	https://www.rdmrotterdam.nl/programmabureau-rdm/	A						G																	
	int_m	"It's safe to say RDM is not urban enough to attract more amenities"	A								I												U			

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	int_g	M4H: "We heavily need horeca, cafes, bars restaurants."		B							I															
	int_l	"In our team there is not a special department for financial, or admin support."	A				E		G					L												
	int_l	"At the beginning I was really convinced that if you need office space you will not come to RDM."	A							H													U			
	int_t	"we take part in some of the events"	A										K		M	N										
	int_t	speaking of space: "Right now we depend on schools"	A		C					H					M	N										
	int_l	when mixing M4H with RDM: "What you see is that it is not about the type of business that you are in, but it's about the entrepreneurial spirit."	A	B									K		N	N	O							V	W	
	int_m	"try to copy the strategies typical for innovation districts and apply them to RDM"	A				E		G	H	I	J	K	L	M	N	O	P								
	int_l	"we did not want to build 2 campuses because we were afraid they would cannibalize"	A	B																						
	int_g	M4H: "So now we have some people who are trying to make these connections and try to meet them and see what they are doing, what they need."		B					G			J		L	M	N	O									
	int_l	"We try to get the firms involved as much as possible. The events are more than just come over and get a beer. We bring in speakers, or the firms present…"	A						G			J	K	L	M	N	O								W	
RDM investing in value creation	visit_1	visit and discussion with RDM guide - january 2020	A												M	N	O			R		T		V	W	
	int_m	"port of Rotterdam is leading the development"	A						G																	
	int_l	"You can rent these plots that start at 60sqm and go up to 600sqm"	A							H				L	M				Q						W	
	int_g	"In M4H it is more difficult because we also have private entities here, such as ECE and we don't know what kind of startups they are housing over there."		B			E		G						M	N	O									
RDM study programs	web_2	https://www.rdmrotterdam.nl/campus/	A		C																					

Innovation Districts: between young firms and employement formation

comment	src	codable unit	RDM	M4H	Actors Assets					Physical Asset		Networking Asse		ID supp	Firms							Innovation District Goals			Stimulat	Employ
		id label:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
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	int_l	"we can not take a bad startup and make it successful."	A											L	M											
	int_g	"it is a really hard life to be a startup. But we do a lot of acquisition, we have a few sales managers who are really traveling and communicating with a network."	A	B					G				K						Q							
	int_g	M4H mix: "we think that by doing this we can have a good vibrant environment."		B																		T	U			
list of tenants	doc_6	(van Tuijl and Otgaar, 2017)	A												M	N	O					T				
	int_g	"the other assumption is, of course it has to be proved, that these markets inspire each other or exchange knowledge with each other."	A	B																R	S		U			
	int_l	"it's trial and error and step by step"	A						G																	
	int_g	"this is unique for the port that they committed themselves at an area development that also takes the housing part in consideration."	A	B						H	I											T	U			
	int_g	M4H: "We are transforming this area while there are still port functions and activities and heavy logistics. This makes it more complex."		B						H	I									R			U			
	int_t	"[visitors] can see that the companies that are here are more than just some startups at the initial phase"	A							H					M	N	N								W	
	int_g	"While on the other hand the creative business is more settled in M4H."		B															Q		S					
	int_g	speaking about firms "Some are really really ambassadors for the area."		B											M	N	O					T				
	int_g	"These amenities are very important because they are the success factors for innovation districts. So meet and greet, horeca, cafes, attractive public space and public transport are key."	A	B							I														W	
	int_l	"Also the supermarkets reopened in Heijplaat."	A								I															
	int_g	"A lot of companies still do their job but we are also seeing the first companies fading out because of covid."	A	B											M	N	O									

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	int_t	"Plus machines that allow us to work on certain prototypes"	A							H				L	M	N									W	
	int_g	talking about existing firms at M4H: "This is also why we say that M4H takes a long run, plus it's a big area."		B													O						U			
	int_g	"We have seen a lot of good initiatives and we thought that they would make it and they didn't."	A	B											M		O									
	int_l	"[office space] we are going to work on in the next few years"	A						G	H												T	U			
	int_l	"Rotterdam University of Applied Science got involved into the project, this was the first step towards building a campus"	A		C					H	I															
	int_g	M4H team: "That is a cooperation between the city of Rotterdam and the port authority. So I represent both institutions"		B				F	G																	
	int_g	"We try to find a balance between this" firms first-amenities after/ amenities first-firms after		B							I								Q							
	int_g	"At RDM businesses are changing, are growing, are not successful so of course you have to keep up the marketing and sales and your services and so on."	A												M	N	O		Q							
	int_g	M4H: "We are owners of half of the land, the city is owner of a third of the land, and the rest is private. So this is also quite complex."		B				F																		
	int_l	"why would you want to come to the port? So we have to determine our strengths and values and we think that there's a lot in prototyping and first scale production, because then you need room to manoeuvre and large infrastructure… so that's what we have been working on for the past 10 years."	A						G									P	Q	R		T		V	W	
	int_l	" It is really interesting to mix those 2 areas"	A	B									K										U			
	int_m	"RDM buildings are almost all full"	A							H																

Innovation Districts: between young firms and employement formation

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	int_m	"connection between the 2 innovation districts is not yet there, we speak about one innovation district but to be honest it is not."	A	B																			U			
	int_g	M4H: "we have this ambition to make it a more urban area, so we have to make these connections with the surrounding area."		B							I											T	U	V		
	int_g	"But yes there are a few cases where the companies have been growing in RDM and now they are settling in M4H."	A	B													O		Q							
	int_m	"I don't think RDM has a large impact on the surrounding neighbourhood, but there might be something to do there"	A																				U			
	int_l	"But most of the connections are between larger firms"	A									J					O								W	

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(van Tuijl and Otgaar, 2017)	doc_6	"Ampelmann is high-tech offshore company that develops, constructs and leases new types of offshore access solutions (‘making offshore access as easy as crossing the street’). It was founded in 2008 as a spin-off of Technical University Delft. It searched for a suitable place for its business and found the right facilities on the RDM Campus: large production spaces, cranes to lift new installations and water access to try new floating concepts. It benefited from the flexible lease contracts in the RDM Innovation Dock and started as a small company with the lease of two lots, but grew in time to three and later even to five lots. Nowadays, it will even get its own production hall on the RDM Campus; the former ‘submarine construction hall’ will be converted to accommodate further growth of this key niche player. This example is often used to show that (and how) the flexible lease contracts work, but gives also a ‘new story’ in line with the profile of the former shipyard that has been used for business promotion and may have helped in attracting other firms of the offshore sector."	A																							X
	int_m	"[RDM] is dedicated for smaller firms "	A												M				Q						W	
	int_m	"They are completely different, but this is a strength"	A	B																		T				
	int_m	"These events come from the RDM’s vision and from the ambitions they have."	A						G																	
	int_l	"M4H is a mixture of the municipality, POR and privately owned plots"		B				F																		
	int_l	"for us it is very interesting to help them"	A						G					L								T	U	V	W	
	int_t	"[we also need] commercial people are needed,the RDM has no access to it or to commercial interns"	A		C										M	N										

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Stadshavens initiative	web_5	https://issuu.com/stadshavensrotterdam/docs/m4h_development_strategy_summary_is		B				F														T	U			
	int_g	"The other characteristic is that it is very big. We say it's as big as the whole city triangle of Rotterdam."		B																						
	int_m	"Startups probably come from Delft university and grow in the RDM "	A												M				Q			T	U		W	
	int_m	"More diverse firms for M4H - however not all firms will be embraced in the area"		B											M	N	O				S			V	W	
	int_g	" Especially in the creative industries, they are really doing events and attracting people to this area."		B											M	N	O				S	T		V		
	int_g	M4H: "It will be very nice to have some educational institutions and we are working already with the University of Applied Science, but they are on the other side of the river."	A	B	C																					
	int_l	"I think at the moment we have an interesting combination of larger businesses and these innovation dock startups"	A						G						M	N	O					T	U	V	W	
	int_l	"Not actively trying to involve the firms from the surrounding are in the RDM strategies."	A									J							Q							
	int_t	"[we] have an extra space rented: office in the floating office area + the testing part downstairs + storage"	A							H					M	N									W	
	int_l	"But the Heijplaat firms, this has been very much related with RDM. There has been a lot of development within the housing market."	A																							
	int_m	"depends on the economic situation which might lead to less firms or startups and therefore the selection process can become less strict"	A						G										Q							
	int_l	"we have a new role in our team, the Innovation Connector"	A						G					L											W	
	int_g	"it is a totally different environment than other port areas. It is very close to Erasmus University, Delft, …. "		B																						
ECE network	web_7	https://ece.nl/about/		B			E						K											V	W	

Innovation Districts: between young firms and employement formation

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	int_g	"We want to have a mix of industries, new businesses and housing"		B						H	I				M	N	O						U			
	int_l	"This organization Stadshavens (there was a small team) what was their agenda? because on one hand the city is in the lead, on the other hand you have the port, so you don't need another project team"	A					F																		
	int_l	"there were also areas like Waal-Eemhaven where there was much more port activity, with no urban development."	A					F														T	U			
	int_m	"[activity within RDM]this is another reason why M4H and RDM were connected."	A	B							I											T				
	int_t	"Only 1 company where we get people from. But for the rest I would say everybody is doing its own job, not necessarily collaborating with them because they are completely not interesting for us."	A									J			M	N										
	int_l	"I think these educational institutions will also lend at M4H."	A	B	C																					
	int_l	"We try to be as flexible as possible"	A						G	H				L											W	
	int_l	"The idea is that it is very easy to start: within a giant warehouse you have your own plot with electricity and water. Of course you can not do everything, but there are a lot of options"	A							H					M				Q						W	
	int_t	about collaboration with other firms: "There are some collaborations but not that much."	A									J			M	N									W	
	int_g	"The other feature that we have is a challenge that we have. This part it's not only going to be transformed into an innovation district, it's going to be an urban district"		B																		T	U			
	int_l	"What is really interesting is that in the past years we also started developing office space"	A						G	H									Q				U			

Innovation Districts: between young firms and employement formation

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	int_g	"We've already talked to Erasmus University, but it is quite difficult, because these institutions are also looking for clustering."		B	C																					
	int_l	"for M4H they also build the new generation of manufacturing industries but more focused on mobility, energy, sustainability but with the urban development and housing"		B							I										S	T	U		W	
	int_g	RDM: "First of all it is a good business case, after 5 years we can say we are now successful, financially speaking."	A																			T		V		
	int_g	M4H: "However the ROI is lower than an average port project would do. This goes as well for the M4H project."	A	B																		T				
	int_l	"Now, everybody is looking for the scaleups, that maybe in the end these are the companies that will help build the port and the smartest port "	A						G							N			Q			T	U	V		
	int_t	"Right now there are no programs linking or connecting the students from RDM to the firms within RDM"	A		C										M	N										
	int_l	" we looked at it quite practically: we have these great warehouses so for who could this be interesting"	A							H									Q					V	W	
	int_g	" the werkplaats is mostly for the scaleups and bigger companies, and this is a different contract they have, so they can lease for 5 years or 2 years, and of course there are settlements of reduction for the first year or first 2 years."		B						H				L		N	O							V		
ECE moved to M4H	web_6	https://www.erasmusmagazine.nl/en/2015/08/06/could-the-ece-campus-be-rotterdams-answer-to-google-hq/		B	C		E						K											V	W	
	int_g	"M4H is on the brink of this development. We just started. In 2020 we just started a new working space, an old fruit terminal actually. It's really a young development."		B						H	I												U			
	int_t	"we hired extra staff because now we have the space for developing new products"	A							H					M										W	X

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RDM and M4H joining forces	web_9	https://www.portofrotterdam.com/en/news-and-press-releases/rdm-rotterdam-and-m4h-rotterdam-together-form-the-makers-district	A	B																		T	U			
	int_g	"there is not a borderline between these kind of markets." RDM & M4H sector	A	B																R	S					
	int_l	"I know a few startups who now work at RDM and actually moved to Heijplaat with their family. "	A								I															
	int_g	"Also for marketing wise, profile wise, we have chosen to change it into Rotterdam Makers District."	A	B																						
	int_m	"Events are organized by RDM team in collaboration with the university."	A		C				G				K												W	
	int_g	"Also there are companies that are successful in the international market and they are ambassadors for Rotterdam and for this area. And of course they contribute to the employability of people. They contribute to Rotterdam's economy"		B								J			M	N	O					T		V		X
	int_g	"The 'port in city in' strategie is even more present for M4H. The port is trying to stay in the city."	A	B																		T		V		
	int_m	" firms would approach the RDM team that will further decide if the firm fits the context (like the industry) of RDM"	A						G						M	N	N		Q			T	U	V	W	
number of new firms - M4H repport	doc_1	M4H repport (Rotterdam Makers District, 2019)		B															Q							
	int_l	"at the beginning everybody was really happy if we could invest in startups, because that was the flavour of the year, 10 years ago."	A						G						M				Q			T		V	W	
	int_l	" Dnamo didn't make it, but the guys that started Dnamo later started RDM Makerspace"	A				E								M				Q						W	
	int_l	talking about the divers firms from RDM and M4H: "And I think that's good, but the best chance for synergy is to get parties that are a little bit connected."	A	B											M	N	O	P	Q							

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	int_g	M4H: "We drew a mobility strategy and this means we also want to invest in mobility hubs, but this is really dependent on other public parties as well"		B				F			I															
	int_m	"RDM and M4H are trying to be connected and develop them as one innovation district"	A	B									K									T	U			
	int_g	"But M4H needs big investments. I can't predict now what will happen next year."		B						H	I															
	int_g	talking about existing firms at M4H: "But we gradually transform it and we have to keep in mind that these companies have to function during the transformation. So this is one of the complexities."		B							I						O			R			U			
	int_g	"We are also working with some special teams where there are the universities of the Netherlands, but I can say too much about this. We hope that one of those cooperation or joint partnerships will settle here some day. But there is nothing sure yet."		B	C																	T				
	int_t	"in some cases like us we are in the energy business and if there were companies coming from the hydrogen industry I wouldn't mind – it's not direct competition and we could even collaborate"	A												M	N			Q						W	
	int_g	"RDM it is not this vibrant environment that you would like to have for an innovation district."	A								I															
	int_g	"There is the ECE, or the CIC, or we have all kinds of funds."					E							L											W	
	int_l	"Flexible lease contract: we noticed what it's really important for startups is to get somewhere it's cheap"	A							H				L	M				Q						W	
joining forces and resources - makers district brochure	doc_4	makers district brochure (Rotterdam Makers District, 2019)	A	B					G													T	U			
	int_m	"One good example of a firm that grew in the area is Ampelman But it is kind of the only example"	A														O			R		T		V		

comment	src	codable unit																								
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		label:	rdm	m4h	id_actor_educ	id_actor_resch	id_actor_sup	id_actor_pub	id_actor_team	id_real_estate	id_public_space	id_partnership	id_networking	id_support	young_firms	scaleups	established_business	innov_firm	new_firm	firm_port	firm_creative	id_goal	id_future_opp	id_attractive	firm_attractive	id_jobs
	int_g	"But in the end I would say there are great front runners here who are really good ambassadors for us."		B								J			M	N	O					T		V		
	int_m	"Additionally they try to support the meetings between firms"	A						G			J		L	M	N	O								W	
	int_l	"What we can also do is to make a lot of connections"	A						G				K	L	M										W	
	int_l	" There was a period when there were a lot of 'second-hand car' businesses that are not necessarily our core area. But the POR is looking in the Waal-Eemhaven area. "	A																	R						
	int_l	"RDM startups are collaborating with other RDM startups"	A									J			M										W	
	int_t	"Companies in related areas could be helpful but definitely not direct competitions."	A												M	N			Q						W	
	int_l	"But there is a lot of uncertainty for the firms that are funded by external parties "	A												M	N	O									
	int_l	"At the moment we are working very hard on the digital version of the innovation connector. It's like a Marktplaats, ebay kind of version, where we want to really connect all the entrepreneurs in the area "	A						G					L											W	
	int_l	"Therefore there are different structures in charge of RDM (fully port)"	A					F																		
	int_l	"there are not that many cases where port and city meet. If you look at other areas like Londond, Hambourg..., these port areas become hipster with yuppie apartments"	A	B						H	I												T		V		
	int_l	"at RDM there are 65 entrepreneurs"	A												M	N	O	P	Q							
	int_g	"this mix is quite exciting and hard because it's not always fitting environmentally with the housing"		B						H	I				M	N	O						U			
	int_l	"I very much believe in the Festival kind of setting, where the RDM opens up"	A						G	H																
Physical Assets	doc_4	(Peek and Stam, 2019)	A	B						H	I		K													
	int_l	"We organize RDM network events 4 times/year (BBQ, start of the year..)"	A										K												W	

Innovation Districts: between young firms and employement formation

comment	src	codable unit																								
			RDM	M4H	Actors Assets					Physical Asset		Networking Asse		ID supp	Firms								Innovation District Goals			Stimulat	Employ
		id label:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
		label:	rdm	m4h	id_actor_educ	id_actor_resch	id_actor_sup	id_actor_pub	id_actor_team	id_real_estate	id_public_space	id_partnership	id_networking	id_support	young_firms	scaleups	established_business	innov_firm	new_firm	firm_port	firm_creative	id_goal	id_future_opp	id_attractive	firm_attractive	id_jobs
	int_g	talking about RDM: "however we saw that we couldn't offer all kinds of amenities and facilities to these young firms."	A								I			L	M								U		W	
	int_l	talking about startups: "What we can do is help"	A						H					L	M										W	
	int_g	M4H team: "But on the hardware, the physical facilities, at M4H we have a program office in the area as well. "		B					G	H	I															
	int_g	"At M4H it is quite complex. There are still some really good logistics port companies at M4H and they still have their contracts. And we don't sell them or buy them out, and they have to remain here until the end of their contract and they have to do their business and we want to keep the employment as well."		B				F		H	I						O			R		T	U			X
	int_g	online platform: "We hope this will be an extra asset and a reason for the firms to stay here. They can say connect, plugin and I am part of this community/ family. It is the same platform as for RDM. "	A	B								J	K	L	M	N	O								W	
	int_l	"[for M4H] we've been moving back and forth about redeveloping it because it's been very difficult to get all these parties together and have them on the same page with ambitions etc."		B				F		H	I												U			
	int_g	M4H mix: "that is what is missing a bit at RDM, where after 5 o' clock is closed."	A								I															
	int_l	"some of the larger firms are more in the logistics area, like Franklin is working with Ampelman"	A									J					O								W	
	int_t	"[RDM] is a very open community"	A																						W	
	int_l	"very flexible. You can rent a plot 1 month or 2 months, and then if you go or you need more space because you have a new project, more space can be added. Or if you have to cut cost very soon."	A							H				L	M										W	

Innovation Districts: between young firms and employement formation

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			RDM	M4H	Actors Assets					Physical Asset		Networking Asse		ID supp	Firms							Innovation District Goals			Stimulat	Employ
		id label:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
		label:	rdm	m4h	id_actor_educ	id_actor_resch	id_actor_sup	id_actor_pub	id_actor_team	id_real_estate	id_public_space	id_partnership	id_networking	id_support	young_firms	scaleups	established_business	innov_firm	new_firm	firm_port	firm_creative	id_goal	id_future_opp	id_attractive	firm_attractive	id_jobs
	int_m	"The idea of an innovation district is that there's life around, however that's not feasible for RDM - if you come there at night there's nothing to do and difficult to access"	A								I												U			
	int_g	"You see at RDM profiles of the companies that are settling there are more port related or on the construction and technical markets."	A																Q	R		T		V		
	int_l	"we really want to get Erasmus University more involved"	A		C																	T				
M4H looking for space	web_8	https://m4hrotterdam.nl/ondernemen-in-m4h/		B						H									Q						W	
	int_l	"The good thing about developing an area as RDM is that it's trial and error. There is no blueprint for success.."	A																							
	int_g	"Also organizing events is nice 2-3 times a year"		B					G				K													
	int_m	" [M4H] to bigger firms this allows to have all assets in one innovation district"		B												N	O					T			W	
	int_l	"we defined this new role and we see it's really appreciated"	A						G					L	M	N	O	P	Q						W	
	int_g	"It was the first time that a port authority said 'ok we take a share in this development' so not port out city in, but we take a share and we are going to invest together with the city in this area. While maybe 10 years ago the port would have said we phase out gradually and the city can take over. "	A	B						H	I											T		V		
	int_l	"This is crucial because if the port develops further away, it gets out of sight out of mind and it becomes very hard for us to attract people with new ideas and technologies."	A	B				F												R		T	U	V		
	int_g	PoR "Of course we are working in the entire Rotterdam region for other facilities for startups"	A	B										L								T			W	
	int_g	"For RDM is quite more visible what companies are there.We promote them because they are leasing from the PoR."	A						G					L	M	N	O									

comment	src	codable unit																								
			RDM	M4H	Actors Assets					Physical Asset		Networking Asse		ID supp	Firms							Innovation District Goals			Stimulat	Employ
		id label:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
		label:	rdm	m4h	id_actor_educ	id_actor_resch	id_actor_sup	id_actor_pub	id_actor_team	id_real_estate	id_public_space	id_partnership	id_networking	id_support	young_firms	scaleups	established_business	innov_firm	new_firm	firm_port	firm_creative	id_goal	id_future_opp	id_attractive	firm_attractive	id_jobs
	int_g	RDM firms: "But for the startups that are not on the scaleup size like 5000sqm, they find it and we also think, for these companies it's better if they are in the proximity of an urban fabric, because of the public transport, the knowledge institutes and so on..."	A								I				M	N	O						U		W	
	int_m	"There is a synergy between schools and firms and there are a lot of internships"	A		C										M	N	O									
	int_m	"There is a team part of the Port Authority that works on site everyday - a project team (5-6 people: real estate manager + event people)"	A						G																	
	int_l	"We have been focusing on technical skills, because you might think that's what you need,"	A		C																				W	
	int_g	"However these companies need more than just space. "		B										L	M	N	O									
	int_m	"RDM offers flexible offices for new companies together with short term contracts"	A							H									Q						W	
	int_l	"what we are trying right now is to see if we can get the innovators working in similar areas closer to each other so they can interact more"	A						G	H		J											U	V	W	
	int_m	" M4H there were already entrepreneurs in the area (creatives ones) they started the development and amenities kind of were already in the area"		B							I				M	N	O				S					
	int_m	"RDM was trying to attract companies and amenities followed."	A						G		I								Q						W	
	int_l	"the first step in creating this innovation area where we wanted to invest in startups and new business"	A												M				Q			T		V	W	
M4H creation	web_4	https://www.straatbeeld.nl/nieuws/270715/stadshavens-rotterdam-biedt-ruimte-aan-unieke-test--en-showstraat		B				F																		
	int_g	M4H: "Also there are some private plots as well."		B				F																		
	int_g	"We are an area! We offer real estate or lease real estate"	A	B						H				L								T				

comment	src	codable unit																								
			RDM	M4H	Actors Assets					Physical Asset		Networking Asse		ID supp	Firms							Innovation	District Goals		Stimulat	Employ
		id label:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
		label:	rdm	m4h	id_actor_educ	id_actor_resch	id_actor_sup	id_actor_pub	id_actor_team	id_real_estate	id_public_space	id_partnership	id_networking	id_support	young_firms	scaleups	established_business	innov_firm	new_firm	firm_port	firm_creative	id_goal	id_future_opp	id_attractive	firm_attractive	id_jobs
	int_l	"overall branding for the entire area is Rotterdam Makers District because innovation is everywhere but we like to focus more on the new generation of manufacturing industries that has great potential for the port of the future"	A																Q	R		T				
	int_g	M4H:"But we are investing in public infrastructure. So this year the first project starts on reprogramming the infrastructure and get more green and more infrastructure for pedestrians and cyclists. Because it is a port area and it is accessible for heavy trucks, so we are transforming this."		B							I									R						
	int_l	"Makers District is the umbrella brand we use internationally and within it we have RDM and M4H (at the national level)"	A	B																						
	int_l	"we think it would be very interesting for their architectural department to move to M4H, because M4H it's only getting started and it's much more interesting as a setting for education, but also from a business skills point of view - because this is essential for architectural skills'	A	B	C																					

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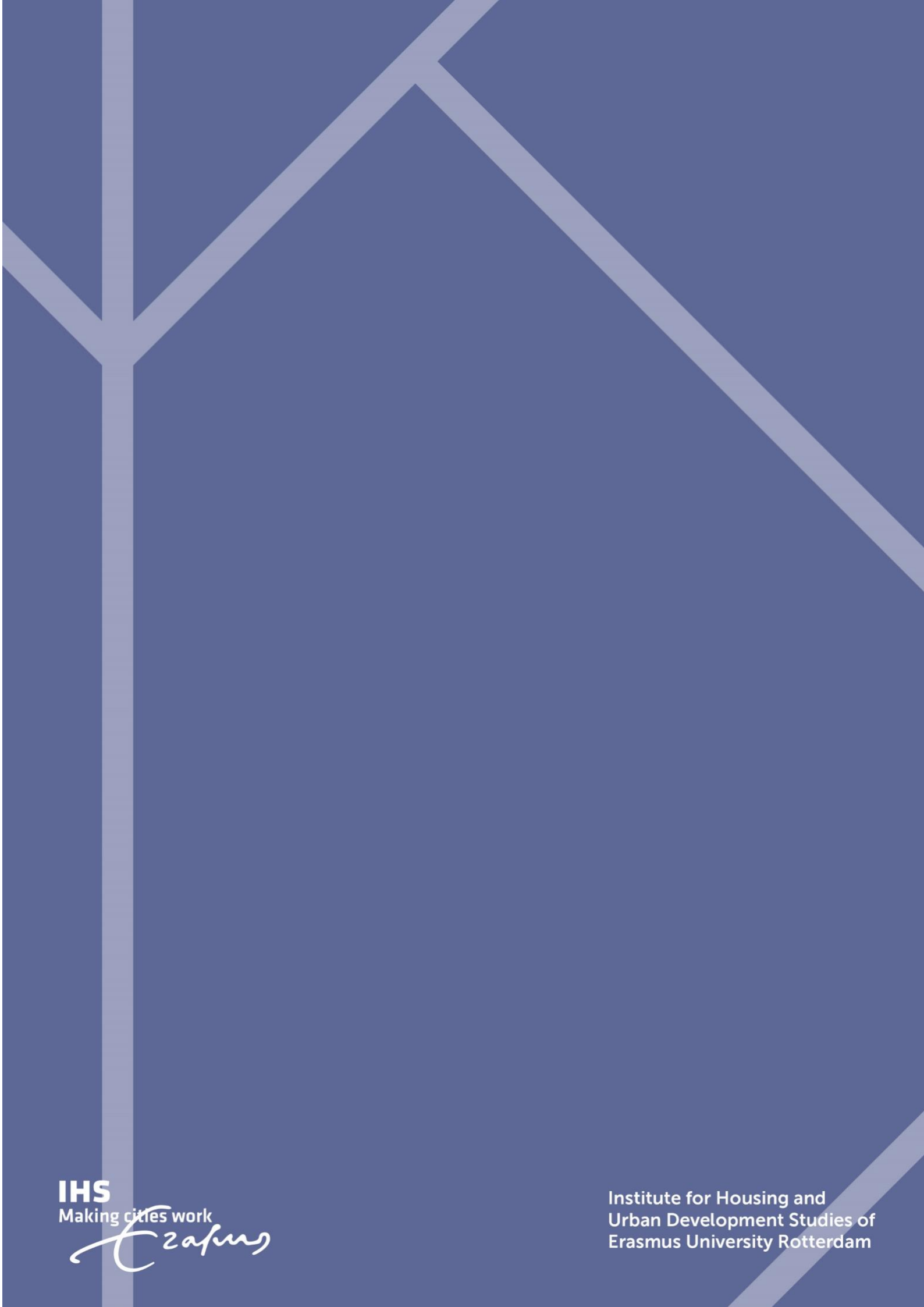
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