



# The Brabant Ecosystem

## Analysis of the entrepreneurial ecosystem

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# Management Summary

This report provides data-driven insights into the scope, characteristics and dynamics of the Brabant ecosystem and its subregions by using the *entrepreneurial ecosystem* framework. The elements of the ecosystem and its outputs are quantified and benchmarked to other regions in The Netherlands and Europe. The following conclusions can be drawn:

## **Ecosystem strength and regional differences**

From a national perspective Brabant has a solid ecosystem with a slightly below national average level of productive entrepreneurship. However, this hides the substantial heterogeneity within the province: the four regional ecosystems within Brabant differ significantly from each other, both in outputs (level and industry concentration of start-ups) and in strengths and weaknesses of the ecosystem elements. SE-Brabant has the strongest ecosystem of the four Brabant subregions, both in ecosystem elements and outputs. Mostly due to stronger knowledge development, transfer of this knowledge through networks and ecosystem leadership. This can partly be explained by the presence of both a Technical University and several firms with large R&D budgets.

## **Peer comparison**

Compared to peers, there is room for improvement for W-Brabant and NE-Brabant in knowledge development and building stronger networks. For M-Brabant this improvement can be found in developing a more entrepreneurial culture, stronger leadership and a stronger presence of intermediary services. SE-Brabant's weakest element is the presence of talent in the region, and in comparison to international peers its knowledge, networks and leadership elements are rather weak.

While Brabant is one of the stronger ecosystems in The Netherlands, it is not among the top entrepreneurial ecosystems in Europe. Even though SE-Brabant has, from a national perspective the highest levels of (private) R&D, knowledge development is significantly lower than other top-performing ecosystems. The same can be said when it comes to talent.

## **Monitoring of the ecosystem**

In general, this report is based on indicators that enable benchmarking of the Brabant regions to relevant other regions in The Netherlands and Europe. Therefore, somewhat narrow definitions of entrepreneurial outputs and ecosystem elements are used. For future in-depth monitoring several indicators are proposed to further deepen the understanding of the presence and development of ecosystem elements and outputs. In addition, it is advised for regional stakeholders to find common ground in formulating the main goal of the Brabant ecosystem and the events and results that should work towards this goal.



# 1. Introduction

Entrepreneurship is of great importance for regional economies. It not only creates new value in the form of new goods and services, but also challenges incumbent firms to innovate. A strong ecosystem enables entrepreneurship, in the form of startups, scale-ups and entrepreneurial employees. High levels of entrepreneurship contribute to regional economies through increased productivity and employment and makes regions more adaptive.

Strength of regional ecosystems can be measured through the lens of the *entrepreneurial ecosystem* framework. Within this framework the ecosystem is defined as an interdependent and dynamic set of actors and elements which make productive entrepreneurship possible. Entrepreneurship is defined as the process in which individuals are able to realize opportunities for innovation. This report aims to provide data-driven insights in both the set of actors and elements that make up the ecosystem as well as the outputs the ecosystem produces.

In Brabant several organisations such as Braventure, de Brabantse Ontwikkelings Maatschappij (BOM) and Provincie Noord-Brabant are working together in strengthening and monitoring the ecosystem and its outputs. As several stakeholders are involved in this process, a data-driven base on which dialogue with these stakeholder about how the ecosystem of Brabant should develop is needed. In addition, the Brabant ecosystem consists of several regional ecosystems with their own distinctive strengths and weaknesses. The Brabant ecosystems are not studied in a vacuum: results of Brabant and its subregions are benchmarked against other (inter)national regions.

This report starts by providing context on the entrepreneurial ecosystem framework and the method used for analysis. Next, a general overview is given of the level of entrepreneurship (i.e. start-up landscape) in Brabant. After that, each of the ecosystem elements is further explored and the ecosystem of Brabant and its sub regions are benchmarked against other regions in The Netherlands and Europe. The report concludes with suggestions on how the ecosystem can be effectively monitored and improved.

The analyses are mostly based on quantitative research. To review findings and to provide more qualitative insights into the ecosystems of the subregions in Brabant, several interviews with regional stakeholders are conducted.





# 2. Method

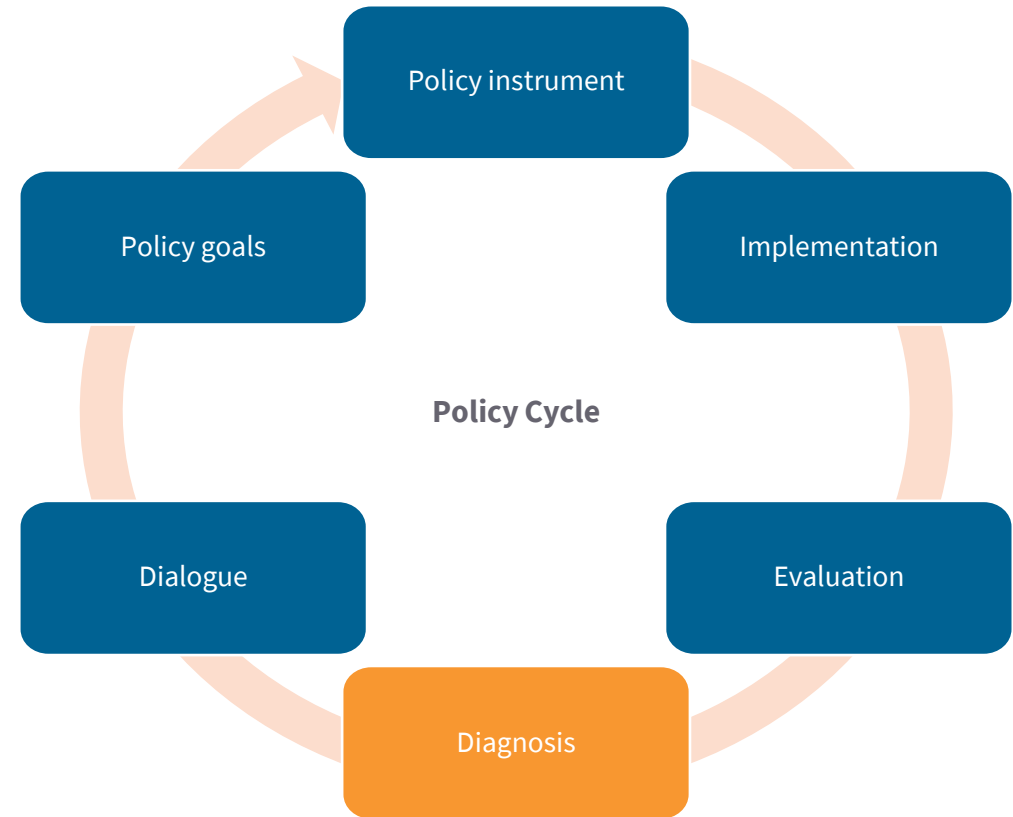


# Method

## Diagnosis is the first step in the policy cycle

The goal of this report is to provide **data-driven insights** in the scope, characteristics and dynamics of the Brabant ecosystems.

- A data-driven basis (diagnosis) opens opportunity for effective dialogue, which is considered to be essential for setting regional policy goals and effective implementation of interventions.
- Data sources are used by which the elements and outputs of the ecosystems are comparable across regions.
- This research does not aim to provide a total overview of all existing forms of entrepreneurship and ecosystem actors in Brabant. Rather, it provides insights on which policy goals and instruments and future monitoring of the ecosystem can build upon.
- An effective way of providing these insights is through the lens of the *Entrepreneurial Ecosystem* framework.

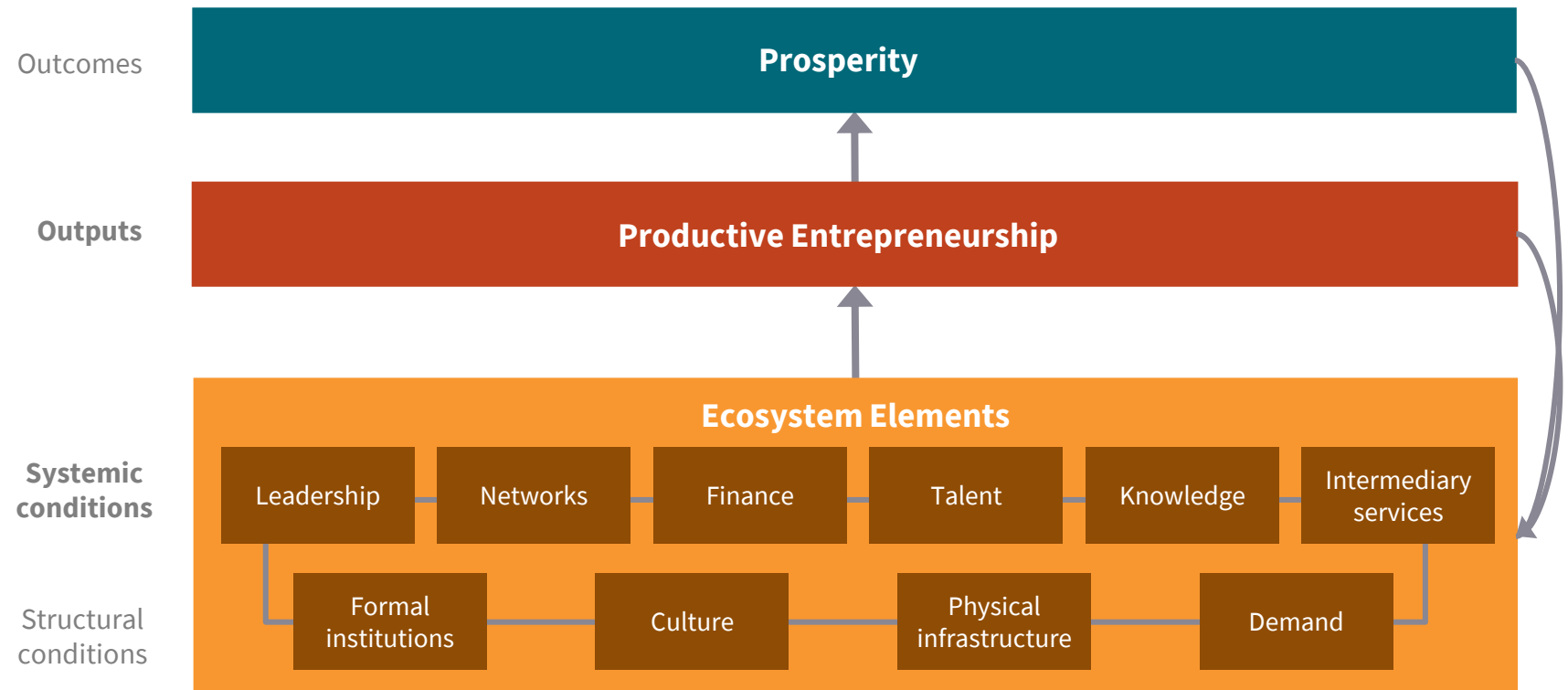




# Method

## Looking at entrepreneurship through an ecosystem lens

- An Entrepreneurial Ecosystem (EE) provides insight in the conditions for productive entrepreneurship.
- The EE relies on the interdependencies between actors and factors in the ecosystem, one single element is not sufficient for influencing entrepreneurship output significantly.
- In this report, we focus on systemic conditions and output. We focus in a lesser way on structural conditions, as systemic conditions can be influenced by regional actors and public policy.
- We measure outputs in the quantity and nature (e.g. industry or technology focus) of new firms that intend to innovate and grow (i.e. startups).





# Method

## The strength of the ecosystem is defined by ten interdependent elements

All ecosystem elements have their own mechanisms in which they make entrepreneurial activity possible, but are interdependent on one another. This means that entrepreneurship in a region can only thrive when each of these elements are sufficiently in place.

Systemic conditions		Structural conditions	
<b>Networks</b>	The connectedness of businesses for new value creation. When actors in a region are well connected it allows for information, labour and knowledge to flow effectively and it helps new firms to build social capital.	<b>Formal institutions</b>	The rules of the game of society expressed as the quality and efficacy of governance. It is the regulatory framework in which entrepreneurs operate.
<b>Leadership</b>	The presence of actors taking a leadership role in the ecosystem. Leadership is essential to provide the actors in the ecosystem a certain direction to work towards and make the ecosystem function more effectively.	<b>Culture</b>	The degree to which entrepreneurship is valued in a region. A measure to capture the regional entrepreneurial culture, consisting of entrepreneurial motivation, social norms and importance to be innovative.
<b>Talent</b>	The prevalence of individuals with high levels of human capital. Human capital is a critical input for entrepreneurship and is strongly linked to new firm formation.	<b>Infrastructure</b>	Physical infrastructure such as the accessibility by road, railways and flights. High accessibility makes interaction between actors more likely, which is essential for entrepreneurship.
<b>Finance</b>	The availability of capital for new firms. Capital is an important condition for starting a new firm and scaling up existing firms.	<b>Demand</b>	Potential market demand. Regional purchase power and potential demand are of importance for entrepreneur as it is only possible to market products if the population has the financial means to buy them.
<b>Knowledge</b>	Investments in new knowledge. The creation of new knowledge provides new business opportunities and is therefore an important source for entrepreneurship.		
<b>Intermediaries</b>	The presence of intermediary services. Expressed in both the presence and accessibility of intermediate business services and the presence of entrepreneur-specific services such as incubators and workspaces.		

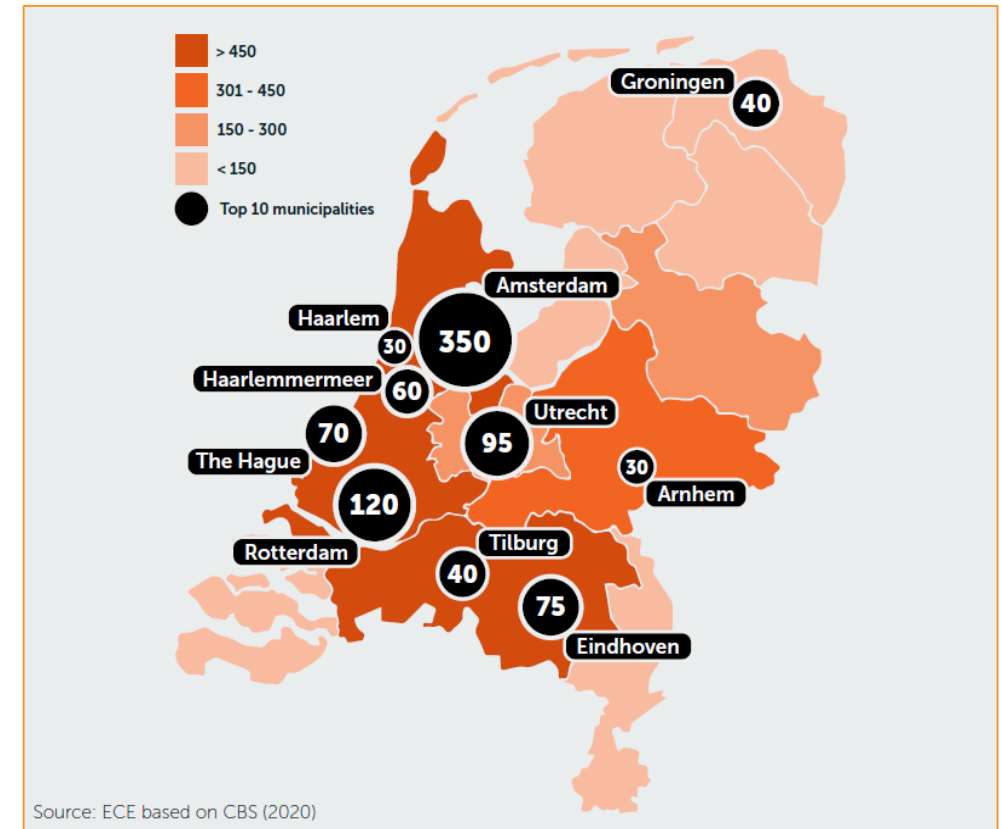




# Productive Entrepreneurship in Brabant

## Measuring start-ups and scaleups is a matter of definition

- Entrepreneurship is a broadly defined term. In total, Brabant contains a population of **253.230** firms; **15%** of all Dutch firms.\*
- Each year **~20.000 new firms** are started in Brabant.
- However, the output of an entrepreneurial ecosystem is *productive* entrepreneurship, which is a subset of total entrepreneurship. Consequently, a different measure than the total number of new firms must be used.
- In the past 10 years **699** new firms have been classified as young innovative (tech) start-ups by Dealroom\*\*\*. These are firms that are classified as “designed to grow fast”.
- Scale-ups can be measured with varying definitions: according to the CBS there are **~5.000** high growth firms a year in Brabant, with more than 10 employees and a growth rate above 10% in employees year over year for three consecutive years. According to the Erasmus Centre for Entrepreneurship, there are **more than 450 scale-ups** with a growth rate of more than 20% of which **135** in Tilburg and Eindhoven (right)\*\*. According to Dealroom, there are **37 start-ups that have reached more than 50 employees** within 10 years of founding.
- In this report, we choose to base the start-up population primarily on dealroom.co data combined with additional data from Braventure, as this is a population of firms that *is intended to scale* and many population characteristics are (partially) known, such as funding, technology and industry focus.



\* CBS. Data on number of companies from 2020. Data on new companies from 2019. Data on high growth firms from 2019.

\*\* ECE (2020). Other conditions for scale-ups are the same as high growth firms: more than 10 employees and a 20% year over year growth for three consecutive years.

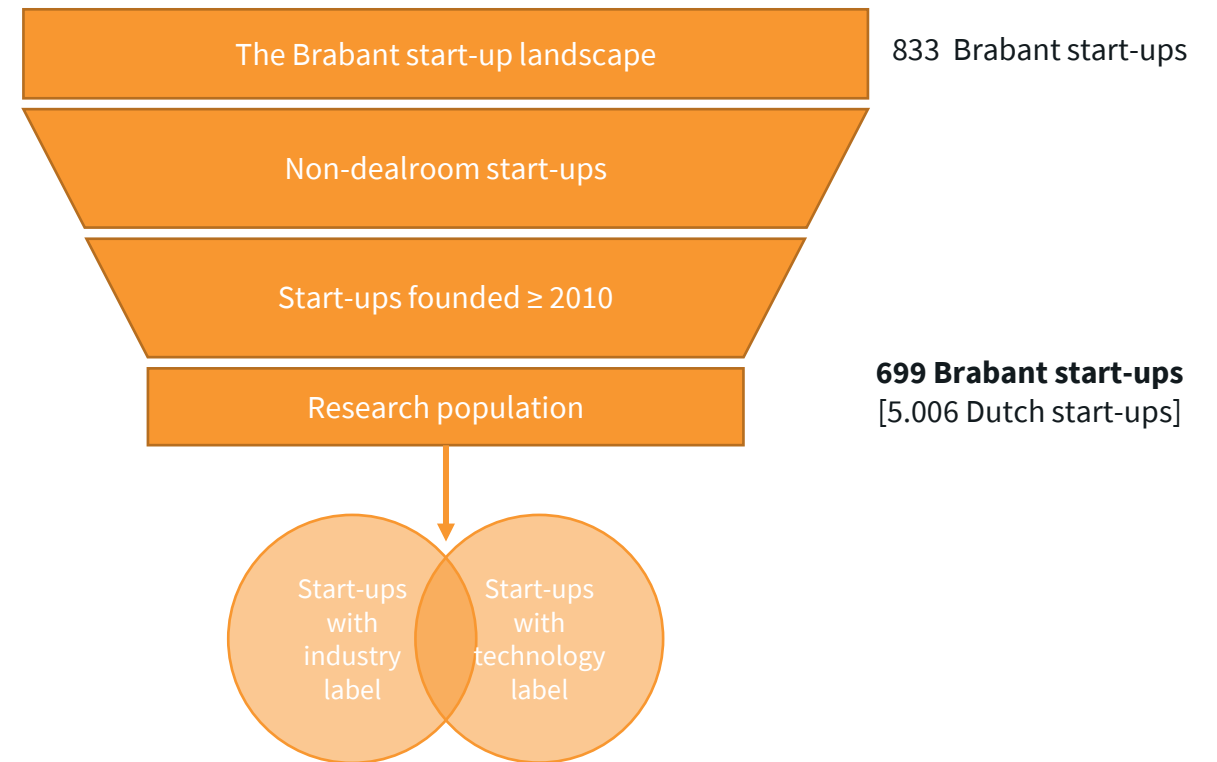
\*\*\*172 of these 699 start-up have been sent to Dealroom/Techleap by Braventure and are being added to the database.



# Method

## Output of the ecosystem: selection of comparable start-up data

- To fulfil the constraints of measuring productive entrepreneurship *and* being able to objectively compare regions. The research populations consist of all start-ups listed in the Dealroom.co database. This database captures innovative and growth-oriented firms and ignores companies without growth ambitions. It thus is a good measure for productive entrepreneurship.
- In total, there are 833 known innovative, growth-oriented start-ups in Brabant. Data on these start-ups is gathered by Braventure and is constructed from Dealroom data and in-house business intelligence.
- In the next chapter an overview is given of the total population of start-ups in Brabant. However, to make start-up data consistent with other regions, non-dealroom start-ups are filtered. Also, for further analysis only start-ups founded after 2009 are used.
- In total the research population in the Netherlands consists of **5.006** start-ups, of which **699** have their origin in Brabant.
- In some analyses start-ups are categorised within industries, or whether these start-ups use certain technologies in their business model. A subset of the research population was categorised within an industry or technology.



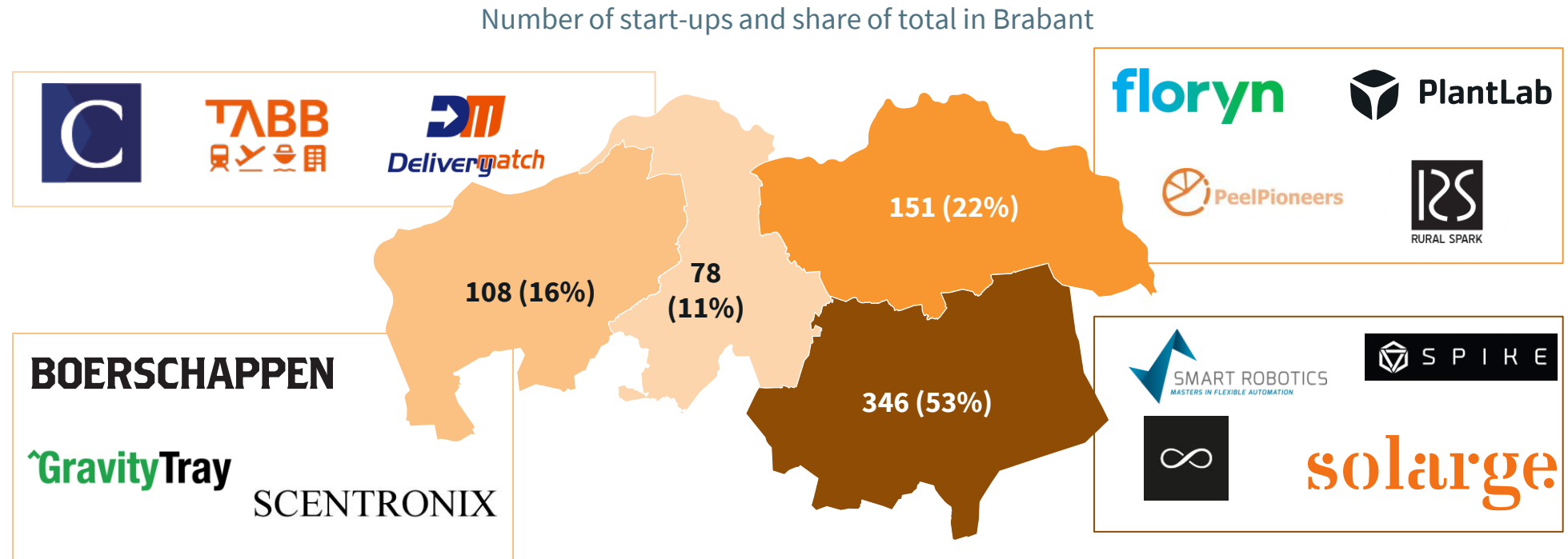
# 3. Overview of the start-up and scale- up landscape



# The Brabant start-up landscape

## Number of start-ups by region, with example start- and scaleups

- Braventure, the Brabant wide ecosystem accelerator of start-ups, has identified 833 local start- and scaleups.\*
- Start-ups concentrate around Eindhoven but each region has a sizable population.



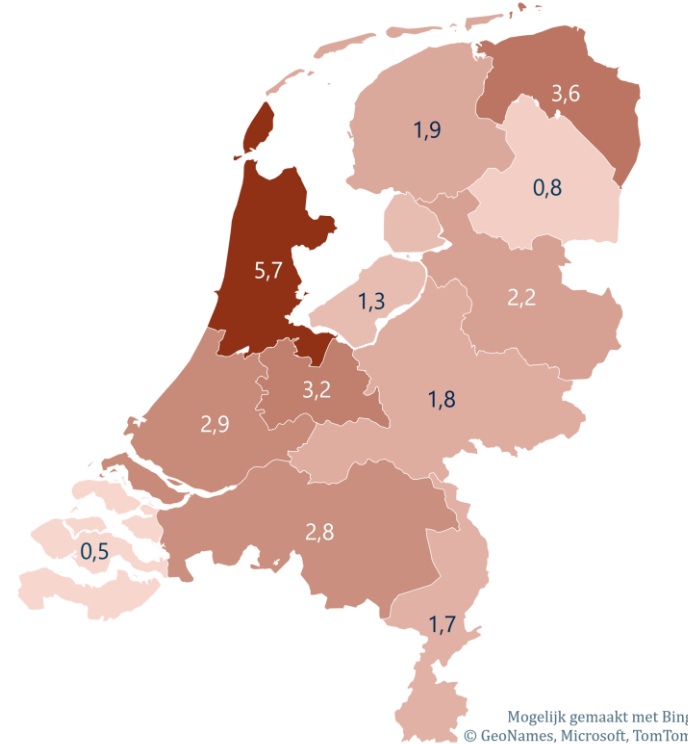


# The North-Brabant Ecosystem

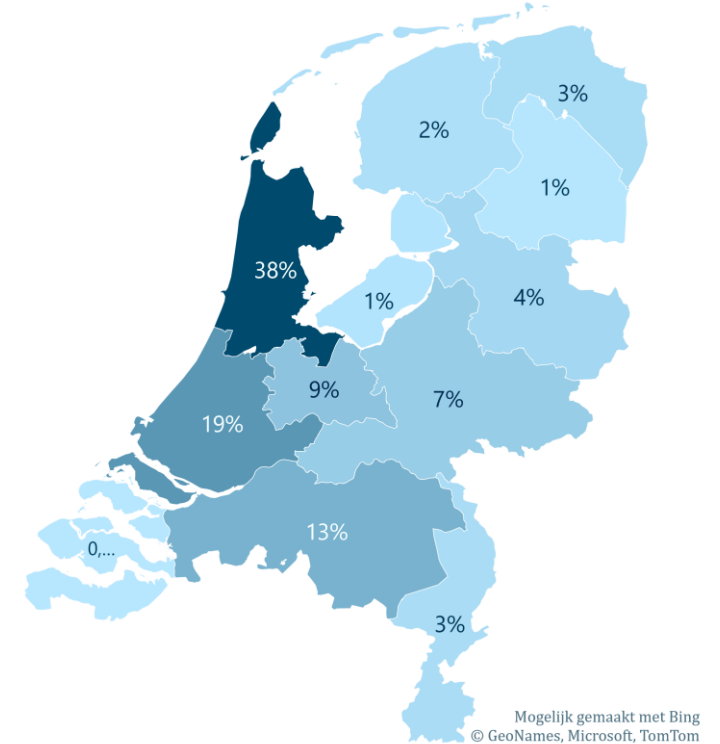
## Brabant has the third largest population of start-ups

- Brabant has established 699 (13%) of the known Dutch tech start-ups\* since 2010. **This is the third largest population** in The Netherlands.
- Considering the firm population density this is a **start-up presence slightly below the national average**.

#start-ups (per 1.000 firms)



% share of start-ups ≥2010



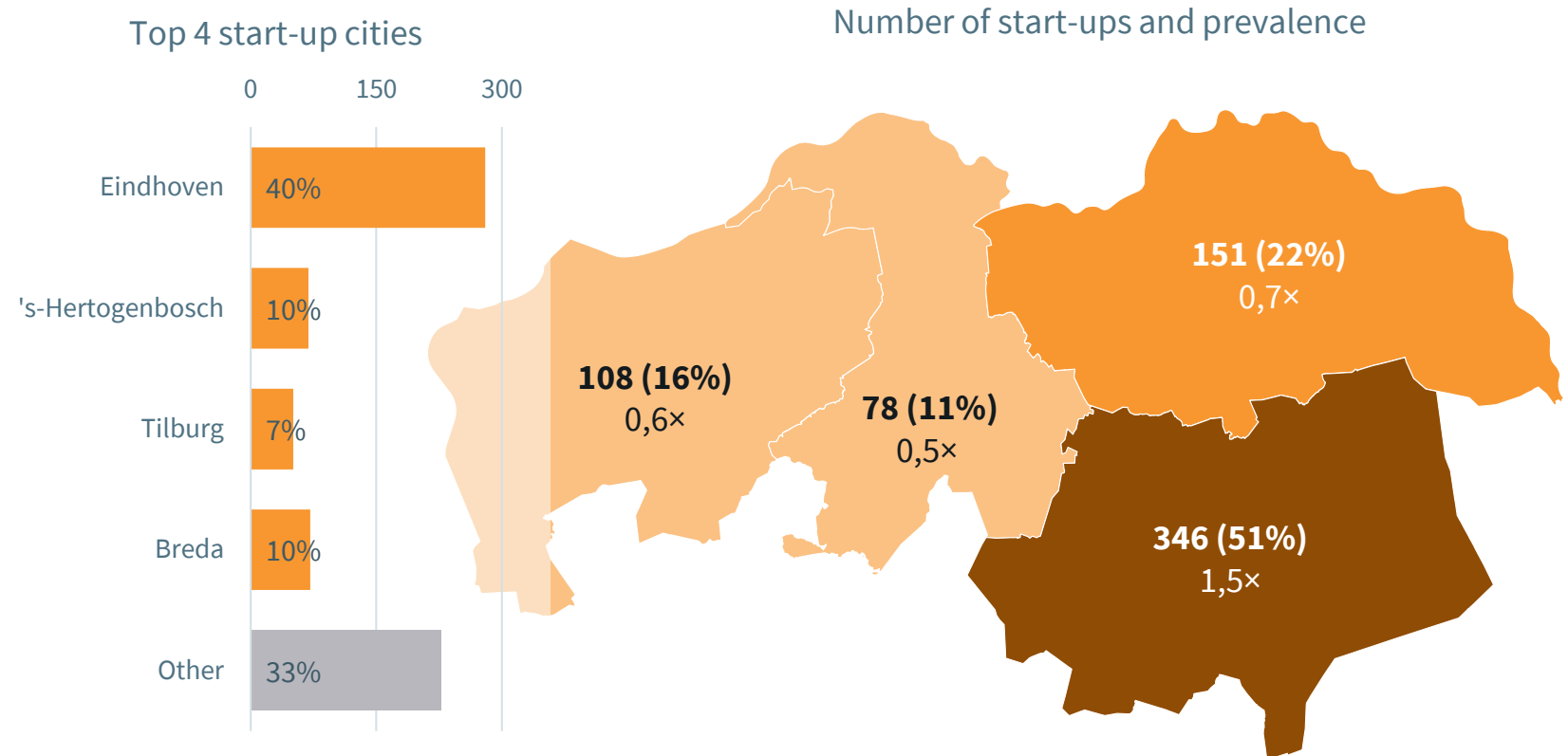




# Start-up distribution

## Start-up concentration matches agglomeration, Brainport is start-up hub

- **51% of Brabant's tech start-ups\* are located in SE-Brabant.** Distribution correlates with agglomeration and the company demographics of the region.
- Start-up concentrations are **co-located with the institutes of higher education** in the region (universities and universities of applied science), which explains why 65% of start-ups establish in Breda, Tilburg, Den Bosch and Eindhoven.
- **The Brainport region is 1,2× as likely to generate a new tech start-up** compared to the national average (prevalence\*\*). In this, the region ranks just behind the Greater Amsterdam area, Delft area and Groningen area.
- Other regions in the province are less likely to generate start-ups from their ecosystem compared to the national average.



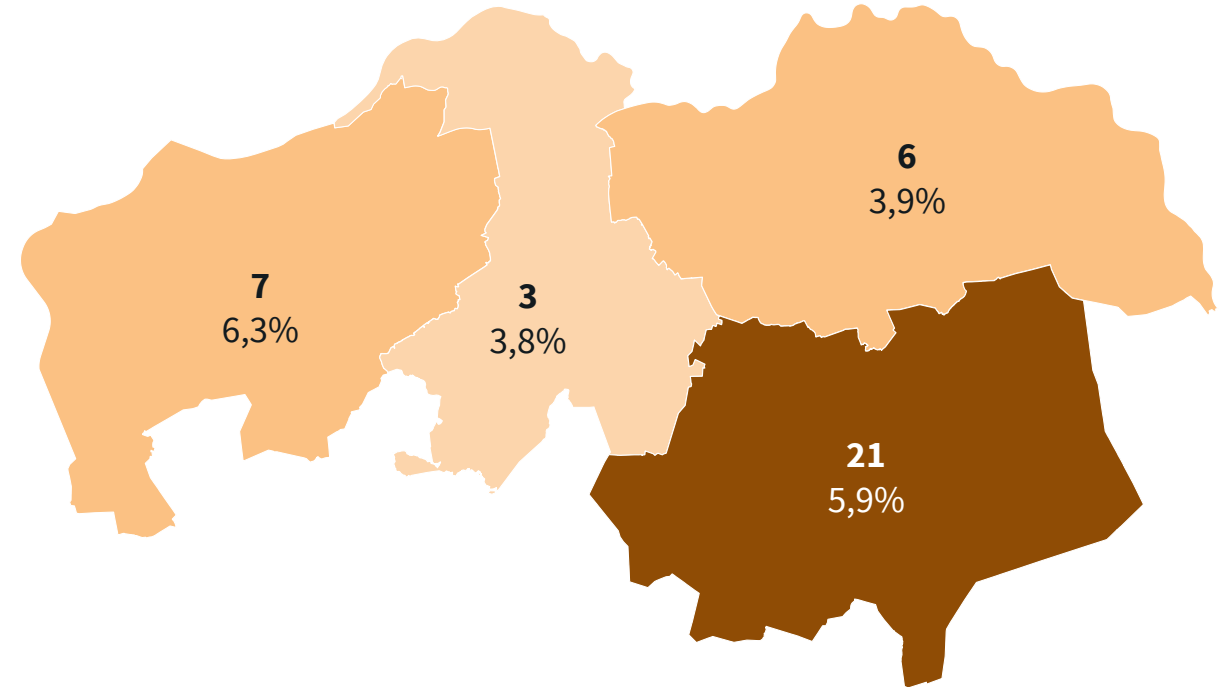


# Scaleups

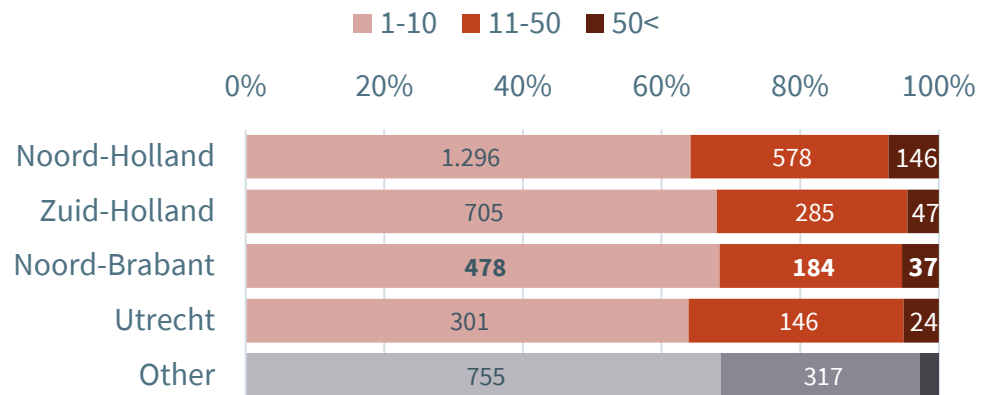
## Scaleup rate and prevalence comparable across Brabant and with NL

- The size distribution of tech start-ups is comparable to other strong start-up regions in the Netherlands. 5,3% of start-ups in Brabant have managed to grow past 50 employees in size (scale-ups), equal to the national average.
- SE-Brabant has the largest population of scale-up firms in Brabant. Scale-up prevalence is higher than the national average. The share of scale-ups (as percentage of the start-up population) differs over Brabant, but the sample is too small to draw conclusions.

Number of scaleups and share of total tech start-ups



Start-ups by size in employees





# Industry concentration

## Each region in Brabant has specific industry concentration

- In total **609** of 699 are categorised into one or more industries. To give an overview of industry concentrations the distribution of the counts of these industries is given per region. As one start-up can be categorised into more than one industry, the total number of counts listed per region can exceed the total number of start-ups.
- Per subregion, Brabant has several **industry concentrations** compared to other Dutch regions.
- In general, fintech, SaaS (Software as a Service), marketing and Healthtech are leading industries for Dutch Start-ups. Brabant has a relatively small number of Fintech start-ups.
- **Healthtech start-ups are overrepresented** in both SE-Brabant and NE-Brabant.
- A large share of all Dutch start-ups in both **Energy and Semiconductors** is from SE-Brabant. NE-Brabant has additional concentrations in Foodtech startups.
- Accounting for the relatively small share of start-ups in both W-Brabant and M-Brabant, start-ups in W-Brabant are somewhat concentrated within the Marketing industry, while Mobility start-ups are somewhat overrepresented in M-Brabant.

Startup distribution per region and industry

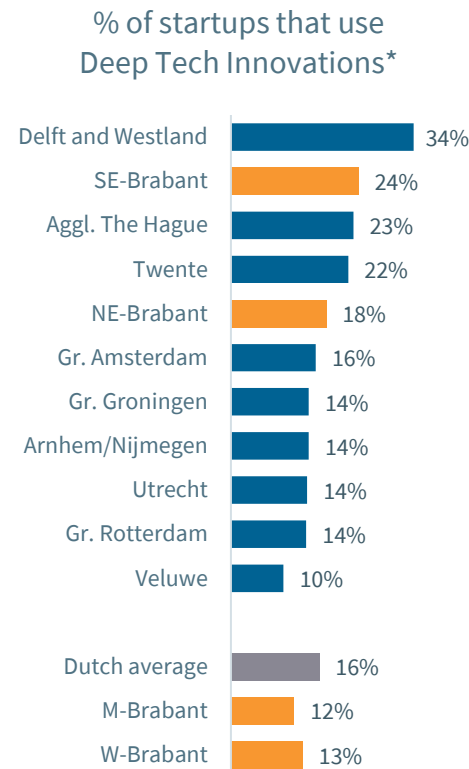
	Gr. Amsterdam	Gr. Rotterdam	Utrecht	SE-Brabant	Aggl. The Hague	Delft and Westland	Gr. Groningen	Arnhem/Nijmegen	Twente	Veluwe	NE-Brabant	...	W-Brabant	M-Brabant
Fintech	183	35	41	16	27	4	9	8	7	5	10		4	3
SaaS	296	94	63	51	40	32	24	6	27	20	19		14	23
Marketing	203	45	37	13	20	3	11	6	8	3	12		16	5
Healthtech	117	33	51	43	26	22	17	34	23	7	20		5	3
Foodtech	80	26	15	23	12	8	4	7	5	33	28		14	4
Mobility	89	32	29	25	10	25	11	10	7	6	11		5	10
Travel	77	7	8	5	5	2	4	2	2	1	3		4	0
Energy	85	51	33	50	21	41	11	25	14	9	11		5	3
Ecommerce	150	22	24	45	17	5	4	8	6	2	15		13	4
Education	78	18	22	10	14	5	10	7	3	3	2		4	3
Security	42	12	12	7	21	3	8	2	11	4	4		0	0
Robotics	10	11	10	15	5	17	3	1	4	4	4		3	1
Semiconductors	14	2	2	20	1	10	0	3	7	0	0		0	0



# Technology overview

## Brabant has a relatively high share of Deep Tech startups

- Startups are labeled as **Deep Tech** startups when they are aiming to provide a technology solution based on substantial scientific or engineering challenges. Often, these startups require lengthy research and development and large capital investments before products and/or services can be commercialized.
- Both SE-Brabant and NE-Brabant have **an above average share of deep tech** start-ups compared to the Dutch average.
- Most of the Brabant startups with a technology label are working on **AI and Data Science** solutions, followed by **hardware** (such as 3d and nanotech technology) and **IoT**, more so than in the rest of the Netherlands. Start-ups working on mobile apps and blockchain are underrepresented in Brabant.



Distribution of used technologies per region

	Gr. Amsterdam	Gr. Rotterdam	Utrecht	SE-Brabant	Aggl. The Hague	Delft and Westland	Gr. Groningen	Arnhem/Nijmegen	Twente	Veluwe	NE-Brabant	...	W-Brabant	M-Brabant
AI & DS	429	137	127	66	82	50	18	28	18	10	28		9	7
Hardware	86	21	25	34	15	34	3	8	20	6	9		6	2
Mobile app	89	37	29	6	15	6	7	5	3	3	7		3	1
IoT	58	33	16	24	14	24	9	9	12	7	10		3	3
AR & VR	26	16	2	7	14	8	2	5	5	1	4		2	2
Blockchain	55	8	10	4	15	1	7	4	3	3	5		2	1

\*In total 147 of 699 of all Brabant start-up are categorised into either Deep Tech and/or one of the other technologies. Deep tech is seen as a separate category. As one start-up can be categorised into more than one technology, the total number of counts listed per region can exceed the total number of start-ups.



# Crossover analysis

## Brabant applies relatively more hardware technology in different industries

- Certain crossovers between industries and technologies are present in the Dutch start-up landscape, with **AI and Data Science being the most widely used** technology in most industries.
- When crossovers in the total Dutch population are observed, there are several crossovers more likely to exist than others. For instance, most start-ups working with blockchain technology are in the fintech industry, while IoT is most often used in mobility, robotics, energy and Healthtech.
- Brabant's **hardware and IoT focus** is especially prevalent in Healthtech, Ecommerce and Semiconductors. A relatively large share of AI and Data Science companies are active in Healthtech and Robotics.

Distribution of used technologies per industry in Brabant and the rest of The Netherlands

	Fintech	SaaS	Marketing	Healthtech	Foodtech	Mobility	Travel	Energy	Ecommerce	Education	Security	Robotics	Semiconductors
<b>Brabant</b>													
AI & DS	8	30	14	28	1	11	1	10	8	1	6	15	1
Hardware	3	6	1	10	2	2	0	4	7	1	1	4	7
Mobile app	1	2	2	4	3	3	0	0	4	0	0	0	0
IoT	3	2	0	13	1	2	0	3	11	0	3	6	0
AR & VR	1	2	2	3	0	1	0	0	0	0	0	1	0
Blockchain	8	1	3	0	0	1	0	2	0	1	2	0	0
<b>Rest of NL</b>													
AI & DS	76	411	117	135	59	56	22	81	34	35	47	69	13
Hardware	12	47	9	56	7	20	1	30	19	6	9	17	23
Mobile app	30	36	13	30	15	28	17	11	28	21	5	1	0
IoT	7	51	5	31	14	33	4	31	18	2	18	28	8
AR & VR	5	24	9	17	0	6	1	3	5	8	3	9	1
Blockchain	60	27	6	1	5	5	0	9	5	0	9	3	1





# 4. Overview of the Brabant Ecosystem strengths



# Entrepreneurial Ecosystem Index

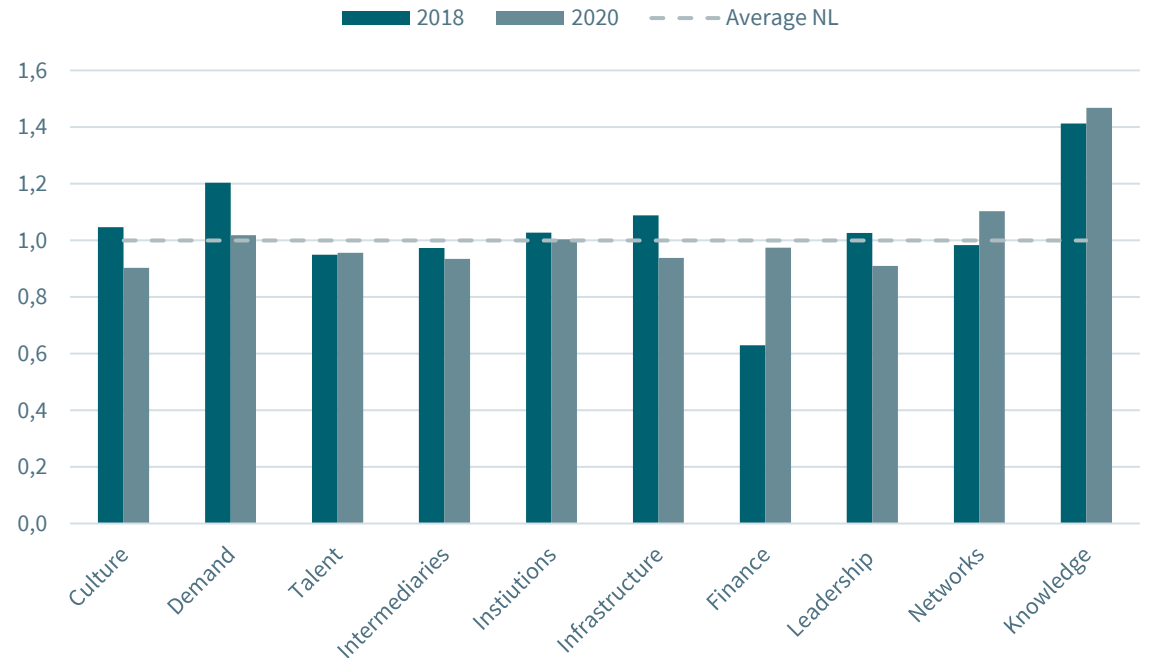
## Brabant has a strong ecosystem, but has diminished in relative strength

- A starting point for analysis is the *Entrepreneurial Ecosystem Index* (EE Index). This index quantitatively measures the strength of each ecosystem element for each region in The Netherlands relatively to the Dutch average. A description of the used methodology can be found in the appendix. Scores are relative to the Dutch average and normalised around 1 and higher scores equal a stronger ecosystem elements.
- The province of Brabant has a solid ecosystem: the total index score, constructed as the sum of the scores of the ten ecosystem elements, is just above 10. Meaning that the **ecosystem of Brabant is stronger than the national average**.
- Elements **Knowledge, Networks and Demand have an above average score** in the 2020 analysis, while the ecosystem elements **Leadership, Culture and Intermediaries are relatively weak**.
- However, scores of most elements (and thus the total index score) have (slightly) decreased in the last 2 years. Especially scores for infrastructure and demand have seen a steep decline. This means that the strength of these ecosystem elements have diminished *relative to the other Dutch regions*.

Brabant EE Index Scores 2018 and 2020



Index scores of Entrepreneurial Ecosystem elements in North-Brabant - 2018 & 2020



Note: the methodology of the construction of the infrastructure element has changed between 2015 and 2018



# Entrepreneurial Ecosystem Index



## Large discrepancy between regional ecosystems in Brabant

- The *Entrepreneurial Ecosystem Index* can be constructed for all the Dutch so-called COROP-regions. North-Brabant consists of four of these COROP-regions. Three of the regions in Brabant score below average on the index, while SE-Brabant is considered one of the strongest ecosystems in The Netherlands.
- In addition, the ecosystem of SE-Brabant has increased in relative strength compared to 2018, while the other ecosystems have seen a relative decline. SE-Brabant hence has a significantly different ecosystem than the other regions in Brabant.
- SE-Brabant has seen **an increase in the scores of the elements Knowledge and Networks**. The latter has also seen an increase in regions W-Brabant and M-Brabant.

Scores of ecosystem elements in Brabant

	W-Brabant	Δ	M-Brabant	Δ	NE-Brabant	Δ	SE-Brabant	Δ
Institutions	1,00	↗	1,00	↗	1,00	↗	1,00	↗
Culture	0,91	↘	0,92	↗	0,92	↘	0,95	↗
Infrastructure	0,99	↘	0,90	↘	0,97	↘	0,92	↘
Demand	1,01	↘	0,86	-	0,98	↘	1,15	↘
Finance	0,97	↗	0,97	↗	0,97	↗	0,97	↗
Talent	0,91	↘	0,93	↘	0,97	↗	1,02	↗
Knowledge	0,80	↘	0,77	↘	0,94	↘	2,75	↗
Intermediaries	0,95	↗	0,93	↘	0,91	↗	0,95	-
Networks	0,56	↗	0,69	↗	0,65	↘	2,19	↗
Leadership	0,34	↘	0,55	↘	0,46	↘	1,98	↘
Total score	8,46	↘	8,53	↘	8,77	↘	13,90	↗

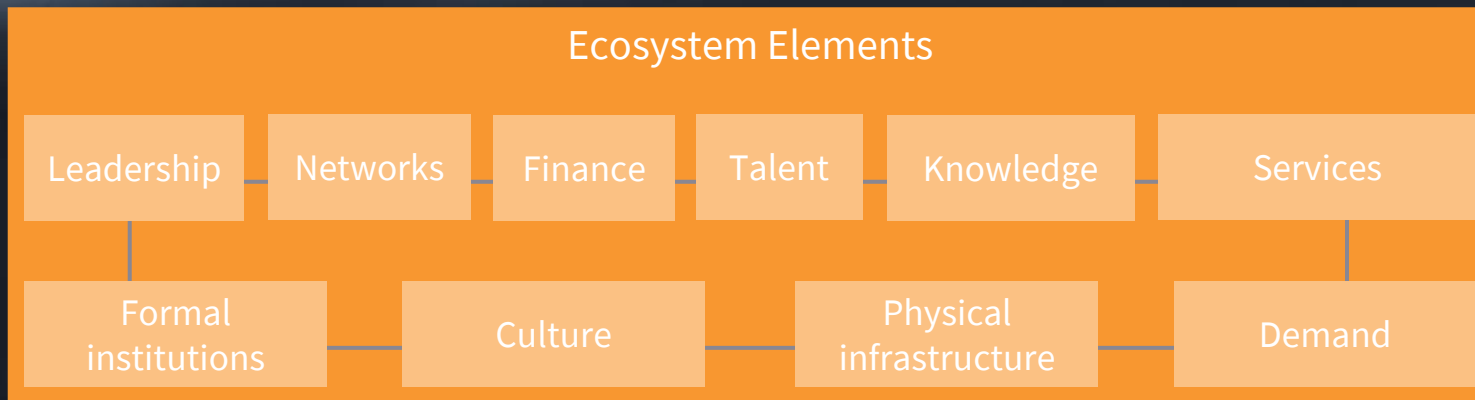
Note: delta (Δ) is based on the change of element scores between 2018 and 2020

 = Score < 0,95  
 = Score > 1,05





# 4. Deep dive into ecosystem elements





# Deep dive

## Deepen ecosystem understanding with additional indicators

- The scores in the Entrepreneurial Ecosystem Index give a general overview of the strength of North-Brabant and its sub-regions. However, it only measures the element scores relative to the Dutch average and within a relatively narrow definition.
- Therefore, for the deep dive into the elements the used data sources are further explored and additional sources are used to give a better understanding of each sub region its strength and weaknesses.

Systemic conditions	Entrepreneurial Ecosystem Index indicators	Source(s)	Additional deep dive indicators
<b>Networks</b>	Number of connected Dutch firms per 1.000 firms in innovative projects (volginnovatie, H2020), average over 3 years.	Rijksdienst voor Ondernemend Nederland (RVO) 2016 – 2018	H2020 network analysis and <i>name-generator</i> approach.
<b>Leadership</b>	The number of coordinators on H2020 innovation projects per 1000 firms, average over 3 years.	RVO 2018 + CORDIS 2020	H2020 network analysis and qualitative approach.
<b>Talent</b>	Percentage of population that has finished higher education	CBS 2019	Concentration and trends of students per domain.
<b>Finance</b>	Intensity (average investment per firm) and prevalence (number of firms that receive investments per 1.000 firms) of investments on province level, average over 3 years.	Nederlandse Vereniging van Participatie-maatschappijen 2016 - 2018	Investments and funding rounds of start-ups. Overview of start-ups funds in the region.
<b>Knowledge</b>	Intensity (average investment per firm) and prevalence (number of firms that invest per 1.000 firms) of wage and capital investments for R&D.	RVO 2018*	R&D budgets of private organisations and H2020 recipient analysis.
<b>Intermediaries</b>	Percentage of firms in intermediary services	CBS 2019	Overview of incubators and other start-up specific organisations.

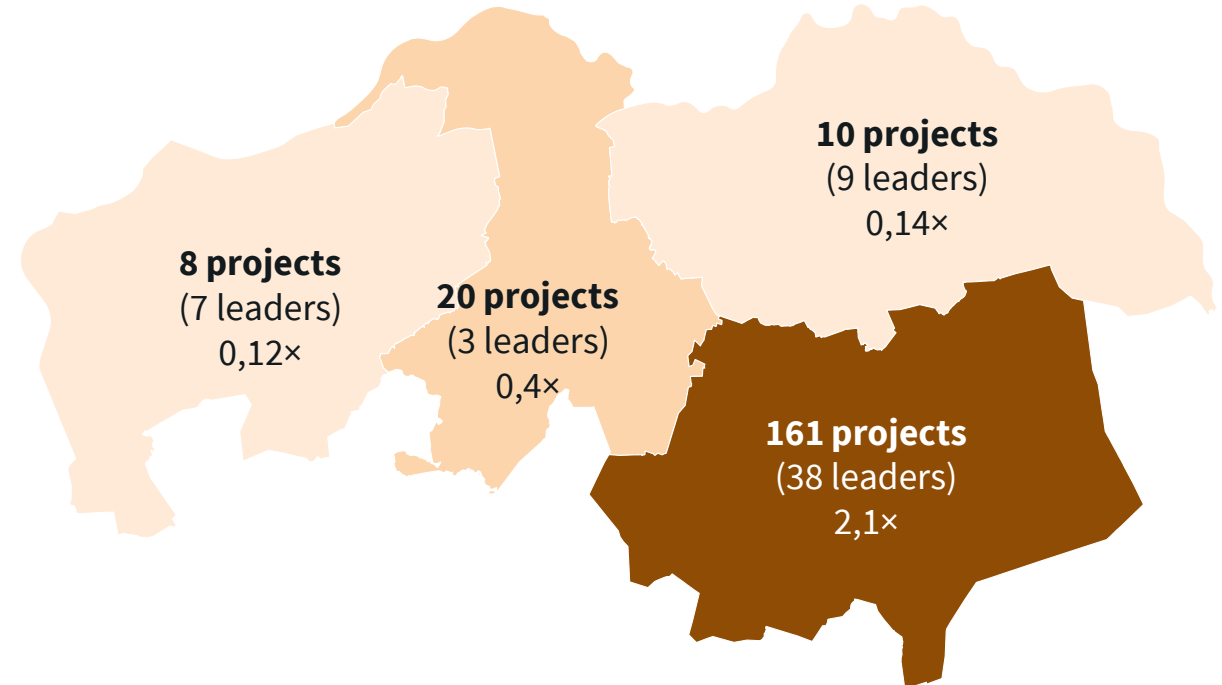




## Research and innovation leaders are concentrated around Eindhoven

- Leadership in research and innovation measured through the coordination of projects under the European innovation programme Horizon2020 (2014-2020)\* shows that **SE-Brabant is the main coordinator** of international innovation projects, due to the presence of the TU/e. This type of leadership concentrates in universities of technology.
- Leaders of H2020 projects are twice more prevalent compared to the national average in Brabant.

Distribution and prevalence of innovation projects and leaders



Top leaders (≥10 projects)	# Projects (67% of total)
TU/e	96
Tilburg University	18
ASML	10
Philips Electronics	10



## Quality of (informal) leadership matters

### W-Brabant

- W-Brabant is characterised by a large share of SMEs in production with a relatively low knowledge intensity. Hence, there are no natural (knowledge) leaders in the ecosystem.
- There are, however, a few large production facilities where R&D takes place (COSUN, Aviolanda) and which have opened up in recent years for more knowledge transfer. These organisations could potentially play a leadership role.
- In addition, REWIN has conducted multiple efforts in strengthening (SME-)networks.

### M-Brabant

- M-Brabant is unique in its positioning as a region with a university with no faculties in which cooperation with (young) firms is more naturally observed (such as beta faculties). Hence, Tilburg University traditionally has not had a leadership role in the ecosystem.
- However, there is more and more focus on entrepreneurship and the role of the university in the ecosystem.
- In addition, cooperative efforts of several municipalities and other public and private organisations are facilitated by Midpoint Brabant.

### NE-Brabant

- NE-Brabant has a fragmented economy with a large share of SMEs, there are no natural corporate leaders in the region.
- The region relies on informal networks of business leaders to stimulate regional developments.
- There are several successful (ex-)entrepreneurs that feel connected to the region and are active in developing the ecosystem, mostly in the form of providing investments.

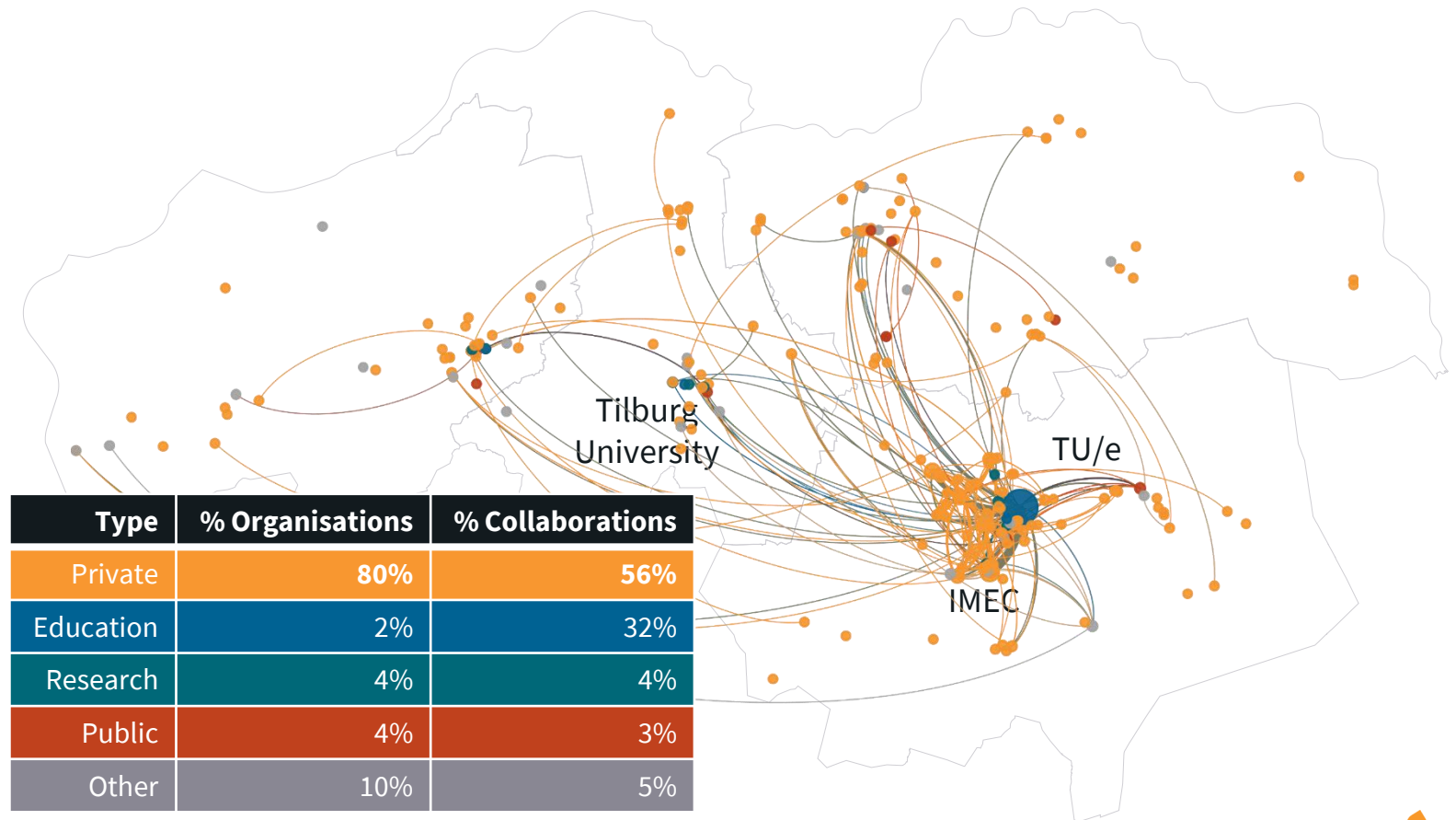
### SE-Brabant

- SE-Brabant relies heavily on ecosystem leadership by a combination of business leaders and public officials, born from the economic downturn following the Philips divestments and the collapse of DAF.\*
- Leadership is organised within the Brainport foundation, in which the triple helix is fully represented.
- Brainport facilitates any cooperative effort for regional development between firms and public private partnerships as a neutral party.



## Innovation networks concentrate in SE-Brabant around Eindhoven

- Most of the network activities and collaborations **concentrate around the high tech cluster in SE-Brabant**.
- Innovation networks (measured with this method) have a lot of involved private organisations, they **centre around (technical) research and higher education institutes**.
- The **TU/e takes the central position** in the network, with the highest number of collaborations with partners from the region.
- Tilburg University takes a less central position, which is often the case for universities not primarily focused on technology research.
- The most central research institute is IMEC-NL.
- Universities of applied science hardly show in European collaboration networks. HAS, Breda & Fontys have only a few collaborations in H2020 networks. They however play an important role in (local) collaborations with SMEs.

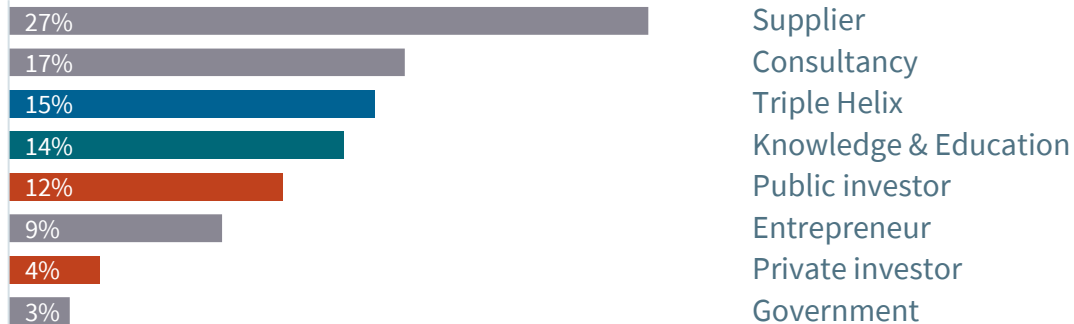




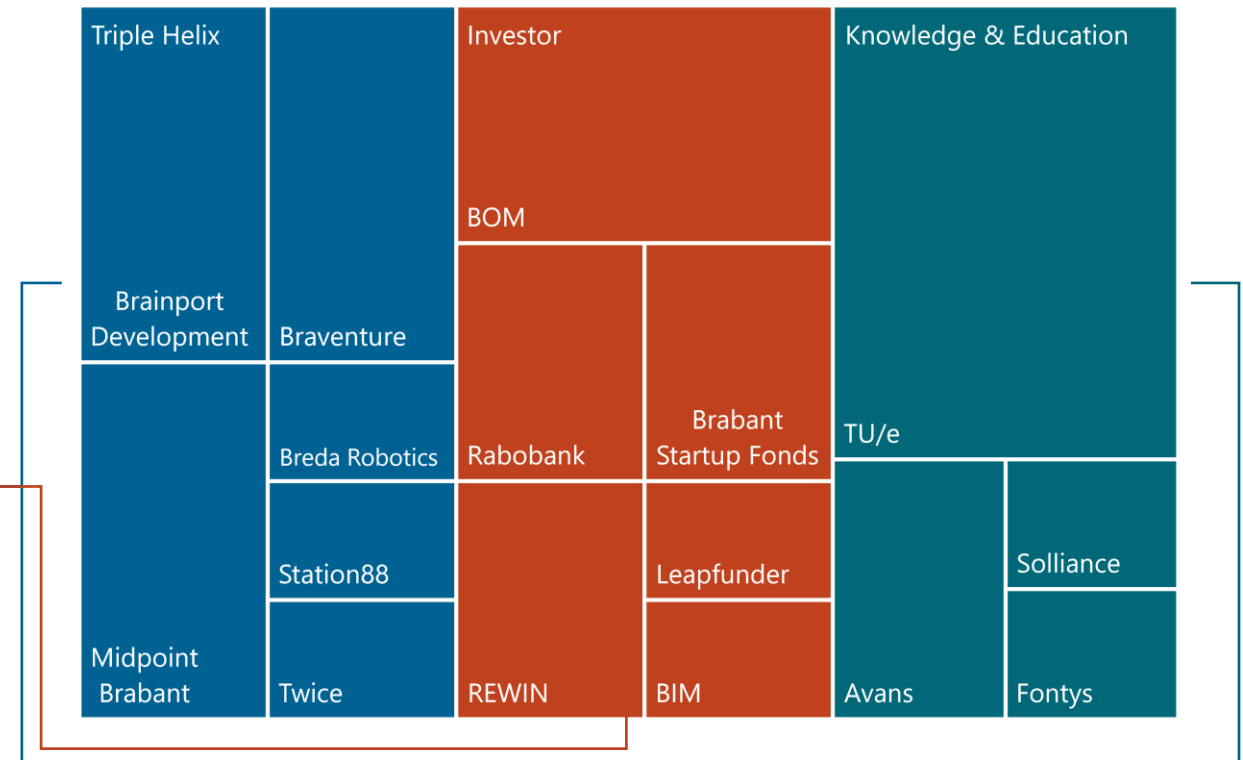
## Entrepreneurs primarily cooperate with private partners

- We asked 21 entrepreneurs to name the most important partners in their network. They provided **78 names and organisations** (not unique).
- Entrepreneurs name mostly their **suppliers and advisors as important partners** in their network. Triple Helix organisations or universities are named third and fourth.
- The reasons for entrepreneurs to call on triple helix organisations are diverse, citing advice, need for facilities, network, or funding.
- Entrepreneurs that list knowledge and education organisations as partner mostly do so because of knowledge transfer reasons.

Important network partners (n=78)



Most mentioned organization in Triple Helix, Investor and Knowledge & Education categories





## Ecosystem support: Knowledge & Education organisations important in networks

- We asked representatives from different regions of Brabant to name the top organisations that support entrepreneurship in the region and to characterise their networks. They named 34 non-unique organisations. Their characterisations are listed right.
- Only six organisations were named by both entrepreneurs and regional representatives. These are: BOM, Brainport Development, TU/e, Braventure, Avans and Fontys.
- Regional representatives emphasise an important role for facilities such as housing, public transport and airports.

Important ecosystem supporters (n=34)



### W-Brabant

- Given its structure, there are no natural network leaders or communities which formal networks are built around. Networks in the region are more informal in nature. Triple Helix organisations in the region are currently actively strengthening these informal networks.

### M-Brabant

- Within the region several municipalities form a formal network within the triple Helix organisation Midpoint. Several ecosystem development efforts have been set up within this structure.
- The networks around Tilburg University are strengthening, given the increased focus on and enabling entrepreneurial activity within the university and the region.

### NE-Brabant:

- Networks gather around communities and workspaces and through groups of entrepreneurs willing to “repay” the region with long term investments.
- Networks are informal in nature and less formally structured as the population of firms in the region almost solely consists of SMEs

### SE-Brabant:

- The informal networks are strong in the region. High tech firms in the region are international companies that do not necessarily compete, which makes cooperation easier.
- Network events are used to e.g. provide funding for start-ups, (the funding/equity tables), but the process is informal and there is no public organisation or process management, except for involvement of Brainport development.

### Brabant:

- Regional start-up ecosystem interests sometimes clash on a provincial level, municipalities and sub provincial triple helix organisations have conflicting strategies on some fronts.





## Large high tech companies act as network hubs

- Private organisations with high collaborative scores are listed in the table on the right.
- These are not necessary companies that have the highest number of network ties, nor do they have the highest research volume (in €).
- Rather, they have **central positions in the network**, connecting multiple different projects and organisations through their collaborations. These centrally positioned organisations are generally high tech companies in SE-Brabant.
- Private companies account for 56% of participations (599 of 1.067) and 60% of the projects (467 of 782) have a private company participating. This level of private involvement at this scale is unique for Brabant.

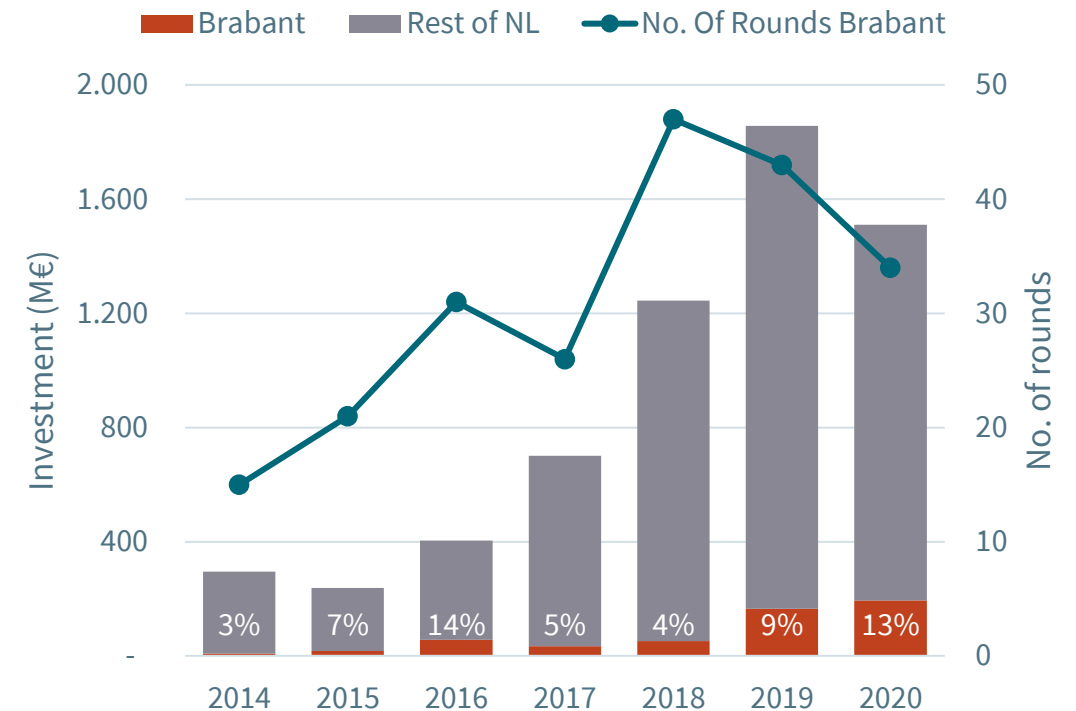
Company	Collaborations	Location
<b>PHILIPS CONSUMER LIFESTYLE BV</b>	30	Eindhoven
SIGNIFY NETHERLANDS BV	50	Eindhoven
<b>PHILIPS ELECTRONICS NEDERLAND BV</b>	150	Eindhoven
MEYER BURGER (NETHERLANDS) BV	14	Eindhoven
BRAINPORT INDUSTRIES COOPERATIE UA	8	Eindhoven
NXP SEMICONDUCTORS NETHERLANDS BV	71	Eindhoven
<b>PHILIPS MEDICAL SYSTEMS NEDERLAND BV</b>	97	Best
NEWAYS TECHNOLOGIES BV	28	Son en Breugel
<i>VDL INDUSTRIAL MODULES</i>	5	Helmond
COOLREC BV	4	Waalwijk
<i>VDL ENABLING TRANSPORT SOLUTIONS BV</i>	15	Valkenswaard
Enexis Netbeheer BV	13	's-Hertogenbosch
HELIOX BV	22	Best
SALVIA BIOELECTRONICS BV	29	Eindhoven
SIOUX CCM BV	17	Nuenen, Gerwen en Nederwetten



## Brabant captures an increasing share of investments in start-ups

- This analysis is based on ~2.200 funding rounds since 2010, of which ~1.600 have disclosed investment amounts, totalling 5,6 B€ of investments. Of this, 229 investment rounds take place in Brabant, for 192 (84%) of these rounds the amount of investment is known. These 192 rounds are invested in 114 unique start-ups. Average round size in 2020 is 6,1 M€ in Brabant, against 7,8 M€ nationally.
- The broad ecosystem analysis finds that the funding and financing of new start-ups in **Brabant has taken flight** and is now more comparable to the national average.
- Considering that 11% of Dutch start-ups is located in Brabant, the ecosystem has been underperforming in the amount of funding raised. 2019 is the year in which this trend is reversed, as **investment grows almost 300%** compared to 2018.
- The number of investment rounds in the region is growing. Despite the coronavirus crisis, 2020 is expected to be a record year.\*
- It is important to note that, although raising capital is important for high-growth scale-ups that face risk, the majority of start-ups grows without raising external funding. In Brabant, **78% of start-ups is bootstrapped or has not published funding information** (n = 412), compared to 75% nationally.

Share of investment and number of investment rounds



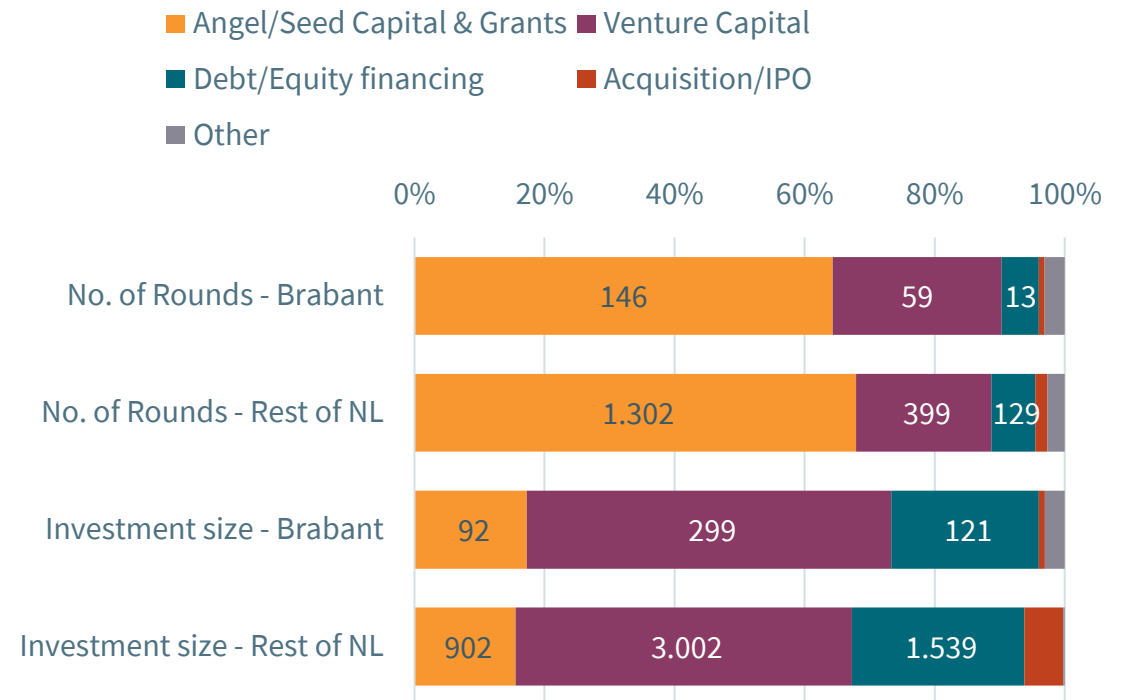


## Distribution for different growth stages comparable to national average

- Angel, seed & venture capital account for 85% of investment rounds and 65% of investment size in Brabant, which is comparable to the national distribution.
- The high volume investment rounds (>10M€) are shown below.

NAME	GROWTH STAGE	ROUND TYPE	YEAR	€ (M)
Floryn	late growth stage	Debt/Equity financing	2019	60,0
SMART Photonics	late growth stage	Venture Capital	2020	35,0
GTX medical	late growth stage	Venture Capital	2016	26,0
OTTO Motors	late growth stage	Venture Capital	2020	25,7
Salvia BioElectronics	early growth stage	Venture Capital	2020	21,0
PlantLab	early growth stage	Debt/Equity financing	2020	20,0
Citryll	seed stage	Venture Capital	2020	18,5
Citryll	seed stage	Venture Capital	2019	15,0
Lightyear	late growth stage	Debt/Equity financing	2019	14,4
PeelPioneers	early growth stage	Venture Capital	2020	10,0
Additive Industries	late growth stage	Venture Capital	2019	10,0
GTX medical	late growth stage	Debt/Equity financing	2016	10,0

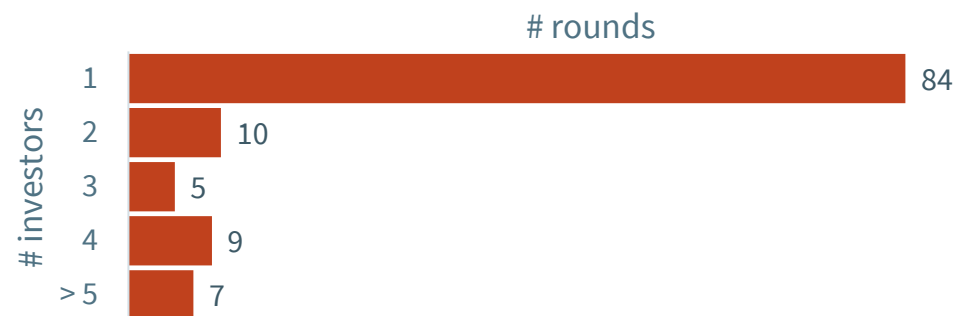
Type of investments (since 2010)






## Large share of government investors and attraction of outside capital

- Between 2010 and 2020, a total of **120 unique investors** have invested in **114 start-ups, through 254 rounds** (in which investors have been disclosed) in Brabant.
- 89% of investors have only one or two companies in Brabant in their portfolio. 80% of investors have less than five investments in Brabant start-ups. The majority of rounds is funded by one investor.
- Investors with three or more Brabant start-ups in their portfolio are listed in the table to the right. Note that only three have a headquarter in the region.
- Important to note is that the region relies heavily on (semi-public) government funding for start-ups. These are often grants and seed investments, so account for a small share in size of investments but a large share of rounds.



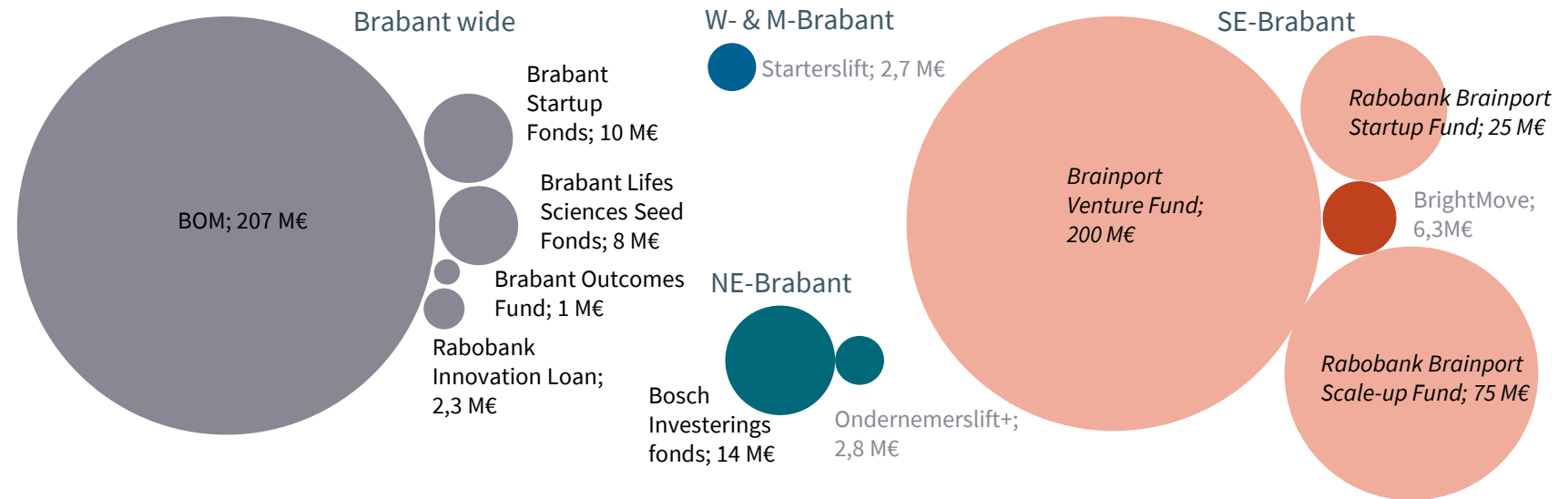
Investor*	Type	# of rounds	# of start-ups
<b>BOM Brabant Ventures</b>	Regional development	38	30
<b>European Innovation Council</b>	Government funding	31	25
<b>HighTechXL</b>	Accelerator	3	11
<b>Eurostars SME programme</b>	Government funding	11	9
<b>Rainmaking</b>	Venture capital	?	8
<b>EIT (includes EIT Health)</b>	Government funding	14	12
<b>Innovation Industries</b>	Venture Capital	8	7
<b>Startupbootcamp</b>	Accelerator	5	6
<b>RVO</b>	Government funding	3	6
<b>INKEF Capital</b>	Venture capital	4	3
<b>btov Partners</b>	Venture capital	4	3
<b>Horizon 2020 FTI</b>	Venture capital	3	3

 = Organisation headquartered in Brabant



## Strong ecosystem set up for early phase start-up funding

- There are a lot of opportunities for start-ups for financing up to 5 M€.
- Valorization funding of Bright Move, Ondernemerslift+ en Starterslift is limited to EUR 50k per proposition and funding above EUR 50k is financed by **Brabant Startup Fonds**. Brabant Startup Fonds has taken over the portfolios of Bright Move and Starterslift.
- Financing options for entrepreneurs concentrate around SE-Brabant, especially considering the **announced Brainport funds** with a volume of 300 M€\*. Although the Brainport region produces more start-ups, this runs the risk of missing opportunities in other regions for financing.



Fund	Year	Portfolio size	Ticket size min (€)	Ticket size max (€)	Focus
Brabant Outcomes Fund	2019	5	200.000	-	Impact
Brabant Startup Fonds	As of 2018	70**	50.000	350.000	Innovation
BOM	continuous	103	150.000	5.000.000	Growth
Brabant Lifes Sciences Seed Fonds	2009-2019	8	100.000	1.600.000	Innovation
Rabobank Innovation Loan	2020	17	25.000	150.000	Innovation
Bosch Investeringsfonds	continuous	7	150.000	1.500.000	Growth

\*Innovation Origins (2019), Rabobank Regio Eindhoven komt met fondsen voor start-ups en scale-ups. June 18th 2019. Retrieved at <https://innovationorigins.com/>

\*\*Including to BSF transferred portfolios of Bright Move and Starterslift

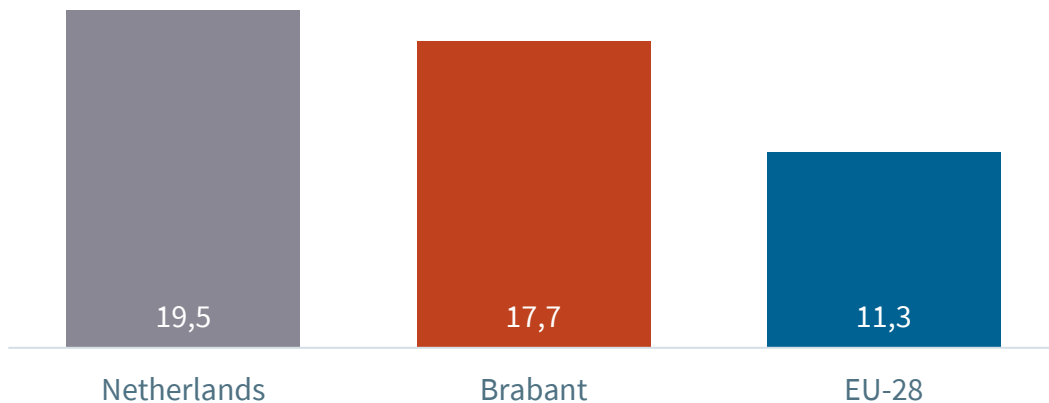




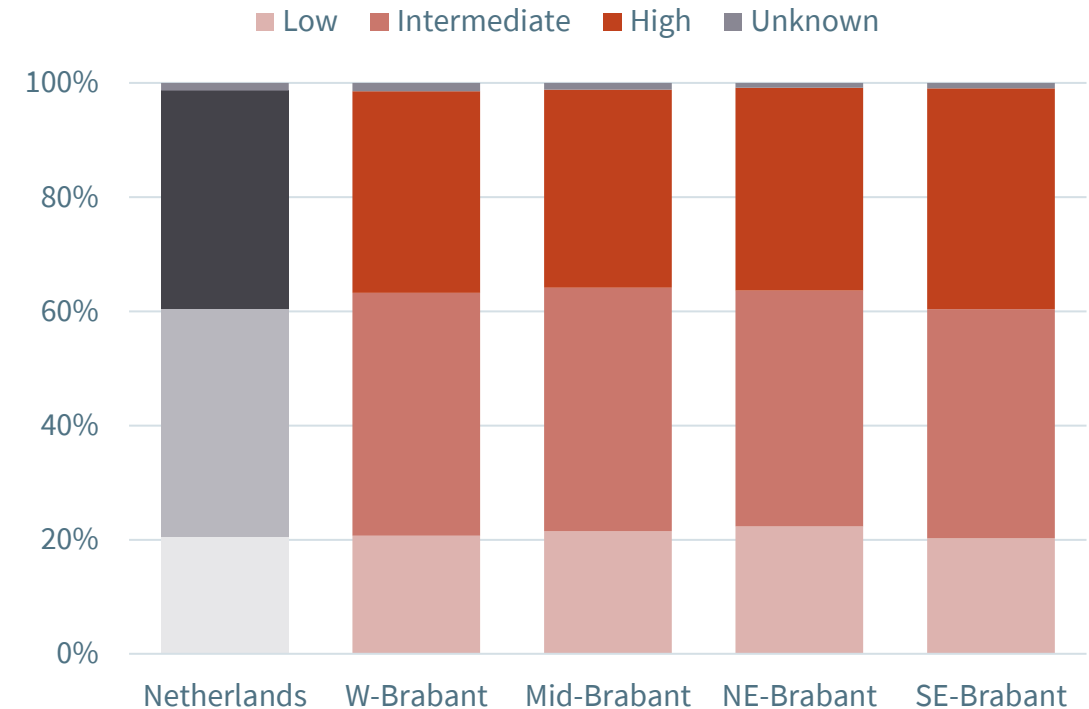
## Higher educated proportion of the labour force slightly below average

- Brabant has a **well-educated labour force**, which is concentrated in SE-Brabant. The other subregions have slightly lower shares of highly educated personnel available for the labour market. The deficit in these subregions is compensated by lowly and intermediately educated labour.
- In terms of education and training for active personnel (lifelong learning), the region falls behind slightly compared to the national average. The Netherlands is 8<sup>th</sup> in lifelong learning in the European Union, but still above average (11,3%).

Share of adults participating in lifelong learning (%)



Educational level of the available labour force

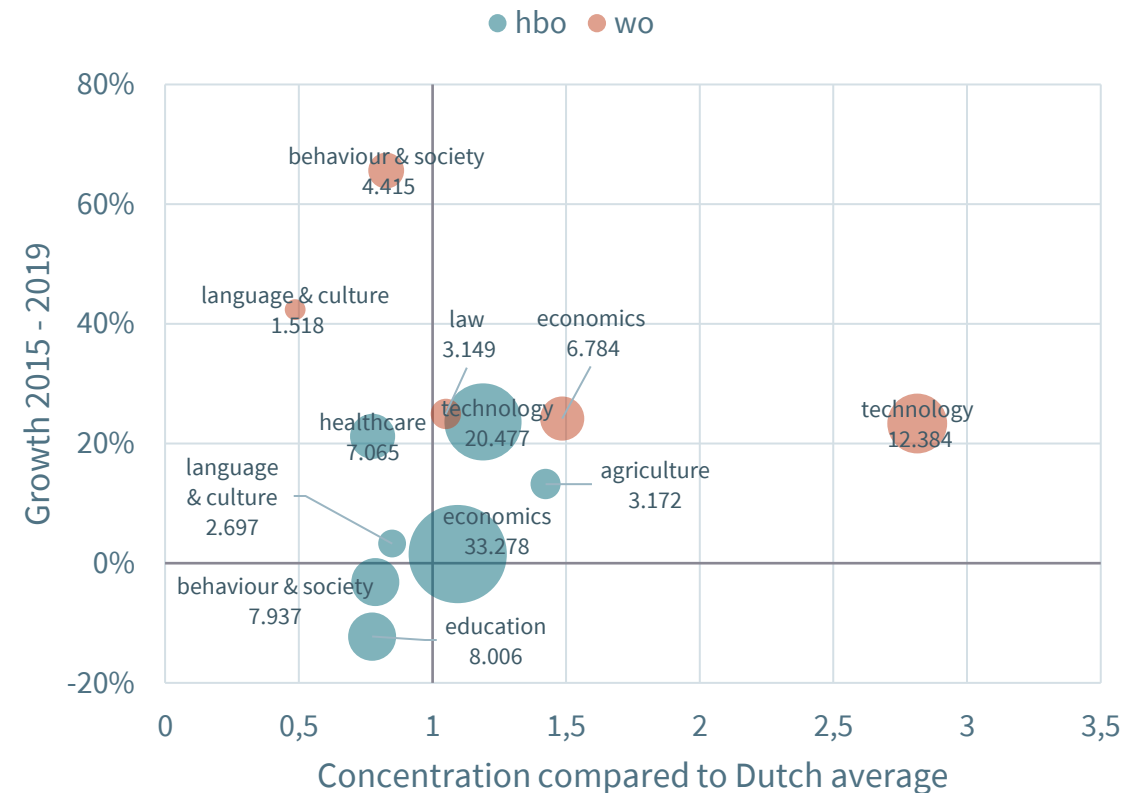




## High and growing concentration of new technological talent in Brabant

- Brabant has a wealth of high performing educational institutes: four universities of applied sciences (hbo: Fontys, Avans, Breda, HAS) and two top universities (wo: Tilburg University and the Eindhoven University of Technology (TU/e)). Together they educate **110.000+ students, ~83.000 hbo and ~30.000 wo**. This is 18% and 10% of the national student population respectively.
- **The fastest growing** (hbo) bachelor **programmes** between 2015 and 2019 in absolute number of students are ICT (34%), Nursing (22%) and Technical business management (31%). The fastest growing (wo) Master programmes are Computer Science & Engineering (143%), Communication & information sciences (58%) and Strategic Management (107%).\*
- The region has a **fast growing technological talent pool** in multiple technological fields, combined with a **large population of business professionals in training**.
- On the wo level, this **concentration of technology students is unique** to the Netherlands.
- However, the talent ecosystem is somewhat of a **monoculture**. 65% of students are either trained in technology or economics, leaving very little room for other directions of study. As innovation is a multidisciplinary effort, the opportunity for unexpected crossovers is somewhat reduced by such a focused education system.

Trend in talent - higher education





## Leading firms in R&D expenditure are located in Brabant

- The level of knowledge development is most often expressed in the prevalence of both public and private R&D funds in the region.
- Brabant has **multiple private organisations with large R&D budgets**. More specifically both ASML and Philips (of which Signify is a daughter-firm) are Dutch leaders in research and development expenditure. In total both firms spend more than **2,3B€ a year on R&D**, which is more than the next 10 ranked firms combined.
- In addition, there are several firms with substantial R&D budgets in Brabant, of which DAF, VDL, Prodrive and Vanderlande are all in the mobility/logistics industry.
- Most firms with large R&D budgets are located in SE-Brabant. West- Northeast and Middle-Brabant have significantly less prevalence in private R&D.

Ranking of Dutch companies by yearly R&D budgets; 2019

Rank <sup>1</sup>	Organisation	Ecosystem	Yearly R&D budget (€M)
1	ASML	SE-Brabant	1.359
2	Philips	SE-Brabant	733
3	KPN	Aggl. The Hague	447
4	Janssen pharmaceuticals	Aggl. Leiden	413
5	Signify	SE-Brabant	290
6	ING	Greater Amsterdam	286
7	Gemalto	Greater Amsterdam	266
8	Akzo Nobel	Aggl. Leiden	250
...			
13	DAF Trucks	SE-Brabant	165
14	VDL Groep	SE-Brabant	157
29	Vanderlande Industries	NE-Brabant	60
30	Prodrive Technologies	SE-Brabant	52
38	Marel Stork poultry processing	NE-Brabant	32
45	COSUN	W-Brabant	21
53	Neways	SE-Brabant	14

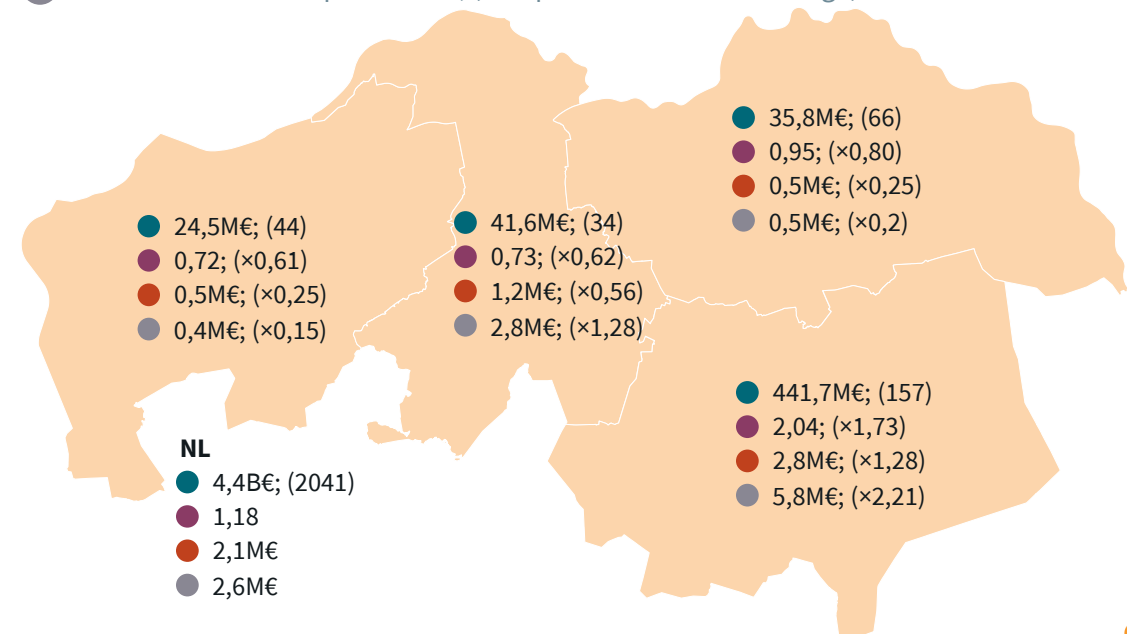


## Public knowledge development is mostly centered around (technical) universities

- Further Insight in knowledge development is provided by analysing activity of organisations (both public and private) in Horizon 2020 (H2020) projects. H2020 is a large-scale european research and innovation programme. Goal of programme is to remove barriers for innovation and make it easier for the public and private sectors to work together in delivering innovation.
- **SE-Brabant is one of the leading regions in The Netherlands when considering total H2020 contributions**, H2020 actor prevalence (number of organisations in H2020 projects per 1.000 firms) and H2020 contribution prevalence (H2020 contributions per 1.000 firms).
- Middle-Brabant also has an above average contribution prevalence. Other regions in Brabant have below average activity in H2020 projects and funding.

### Knowledge development in H2020 projects

- Total H2020 contributions<sup>1</sup>; (# of unique actors)
- H2020 actor prevalence; (compared to national average)
- Average H2020 contribution per unique actor; (compared to national average)
- H2020 contribution prevalence; (compared to national average)

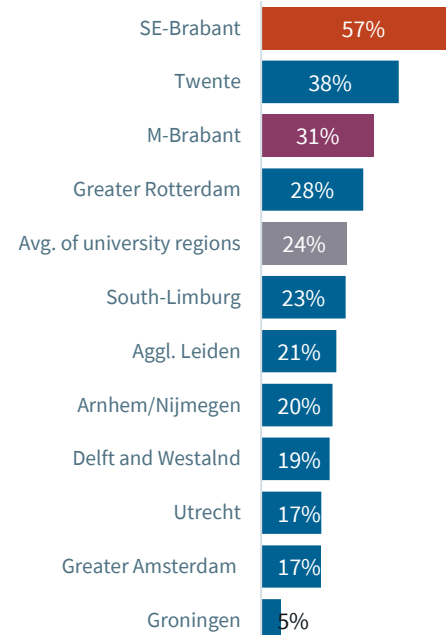




## SE-Brabant and M-Brabant leaders in public-private knowledge development

- Public-private collaboration in knowledge development is considered to be a main driver of innovation.
- Of all the received H2020 contributions respectively **57% and 31%** are allocated to private actors in SE-Brabant and M-Brabant, respectively. With the national average being 24%. This makes these regions leaders in public-private knowledge development.
- On individual firm level, received contributions vastly differ. Again, ASML and Philips are at the centre of private R&D and knowledge development.
- Especially NE-Brabant has no firms with relatively large (>2€M) H2020 contributions. However, most firms in the receiving the largest contributions are pharma/life science firms.

Percentage of H2020 funds allocated to private actors in Dutch university regions



Rank of private organisations with largest received H2020 funds (in €) per subregion

Subregion	Rank	Organisation	Amount (€)
W-Brabant	1	COSUN	5,4M€
	2	Process Design Center	4,3M€
	3	Micro Turbine Technology	3,2M€
	4	Fokker Elmo	1,1M€
	5	Bradford Engineering	1M€
	6	Grass Valley	0,7M€
	7	J.A.M De Rijk	0,5M€
	8	ARGUSI	0,3M€
	9	DTV Consultants	0,3M€
	10	REWIN	0,3M€
NE-Brabant	1	Intervet	1,7M€
	2	Enexis	1,5M€
	3	Hycult Biotechnology	1,4M€
	4	Linical	1,3M€
	5	Pamgene	1,1M€
	6	GEA Niro	1,1M€
	7	Mint Solutions	1,1M€
	8	Ancra Systems	0,9M€
	9	Innatoss Laboratories	0,8M€
	10	Noviocell	0,8M€
M-Brabant	1	FujiFilm	4,4M€
	2	Oppla	1,9M€
	3	CoolRec	1,1M€
	4	Tulipps	0,9M€
	5	TiasNimbass	0,8M€
	6	Resonance Design	0,6M€
	7	Smart Robotics	0,6M€
	8	Susmetro	0,4M€
	9	Thermaflex	0,3M€
	10	MicroLAN	0,2M€
SE-Brabant	1	ASML	32,1M€
	2	Philips Electronics	28,4M€
	3	Philips Medical	15,8M€
	4	NXP	8,9M€
	5	Signify	7,5M€
	6	FEI Electron Optics	7,5M€
	7	Smart Photonics	6,5M€
	8	Philips Consumer Lifestyle	5,9M€
	9	VDL	5,8M€
	10	DAF	4,8M€



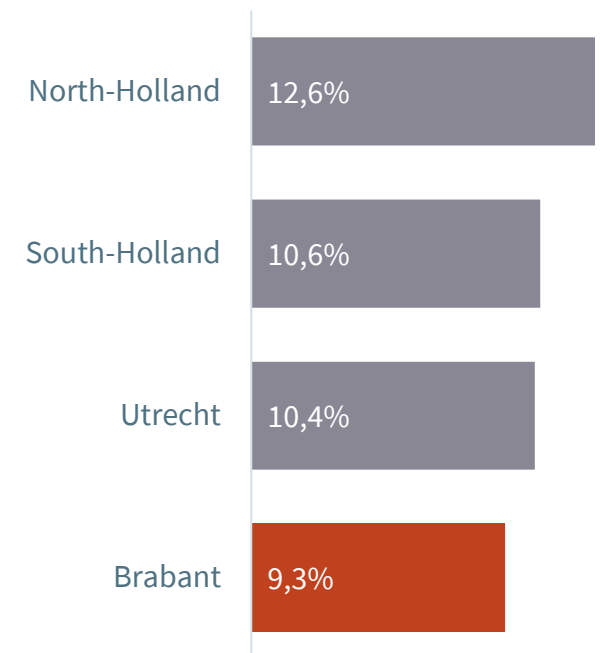


## Brabant has sufficient knowledge service infrastructure available

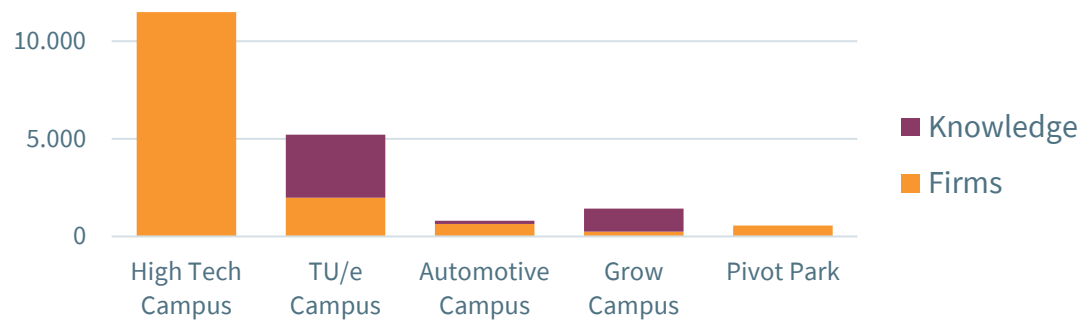
- Services comprise all activities that smoothen entrepreneurial activity and start-up growth. This requires service providers such as intellectual property lawyers, software suppliers, incubator programmes and other training facilities.
- An indirect measure is the share of employees in knowledge intensive services, for which Brabant is around the national average (right).
- Services for knowledge driven start-ups often concentrate on campuses, providing scientific knowledge, innovation support and facilities. Brabant has several campuses, business parks and field labs in the region, concentrated in Brainport.

Parks and field labs	
Philips Healthcare Campus	Best, SE-Brabant
Science Park Ekkersrijt	Son, SE-Brabant
Aviolanda	Woensdrecht, W-Brabant
Food Tech Brainport	Helmond, SE-Brabant
Health Technology Park	Veldhoven, SE-Brabant
SPARK Campus	Den Bosch, NE-Brabant
JADS	Den Bosch, NE-Brabant
Nieuw Prinsenland	Dinteloord, W-Brabant
Brainport Industries Campus	Eindhoven, SE-Brabant
Green Chemistry Campus	Bergen op Zoom, W-Brabant

% of employees in knowledge intensive market services\*



Employees on campuses\*\*



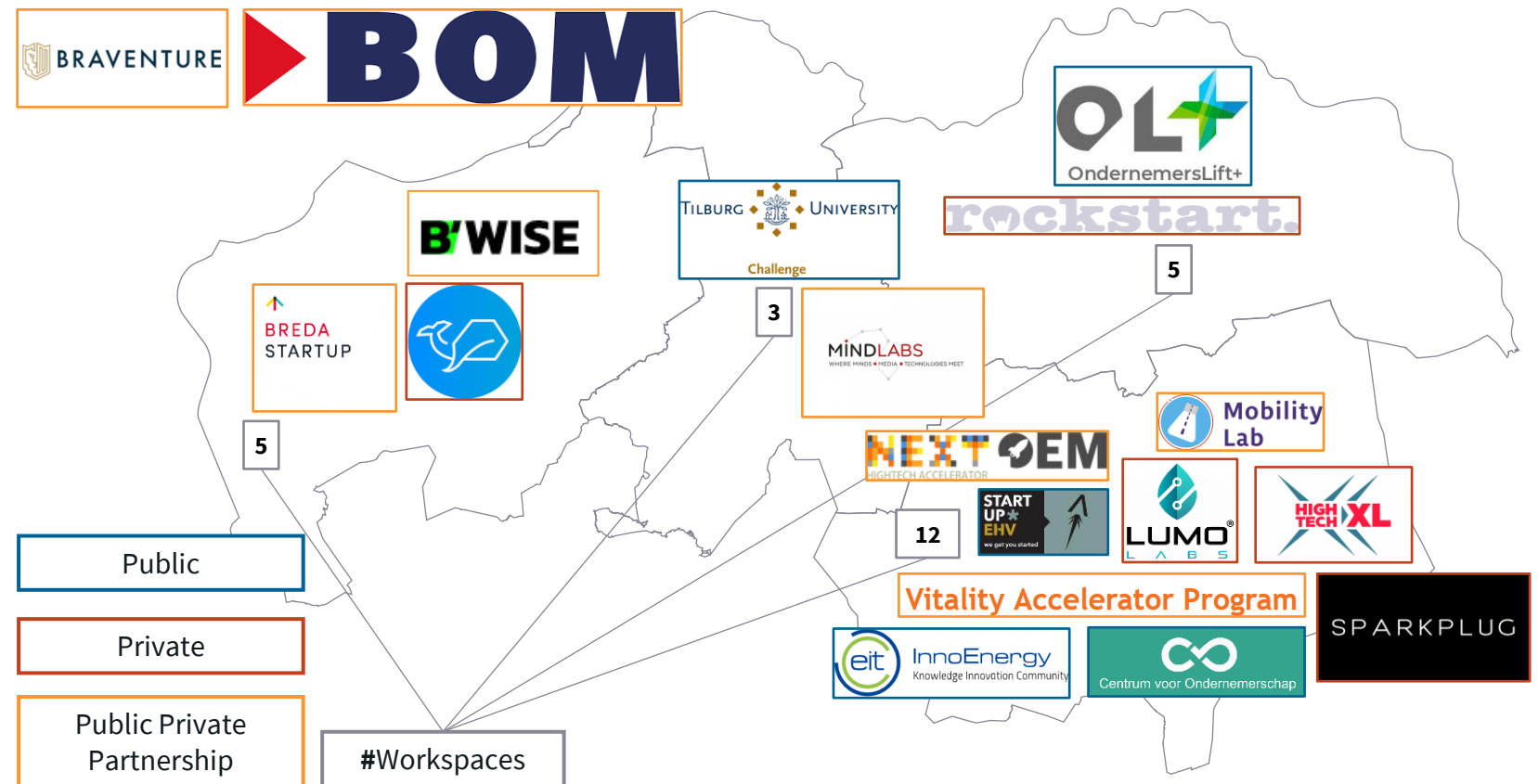
\* Eurostat (2019)

\*\* Buck Consultants International (2018). Inventarisatie en meerwaarde van campussen in Nederland. Also listed are the Brainport Industries Campus and the Green Chemistry Campus, but no accurate employee data is available.



## Start-up support concentrated in Eindhoven

- There is an abundance of start-up specific services available throughout Brabant.\*
- There are **at least 16 organisations for start-up support**, providing 20+ programs, incubators and accelerators in Brabant, mainly focused on customer discovery/validation and investor readiness.
- There are multiple start-up centric co-working spaces in Brabant, providing offices and scientific facilities.
- The majority of these facilities **cluster around Eindhoven**.
- For deep tech start-ups, there are several university and research centre labs in Eindhoven that provide scientific research facilities and support: Magnum PSI, Solliance and the Nanolab@TU/e.





# 5. Benchmarks

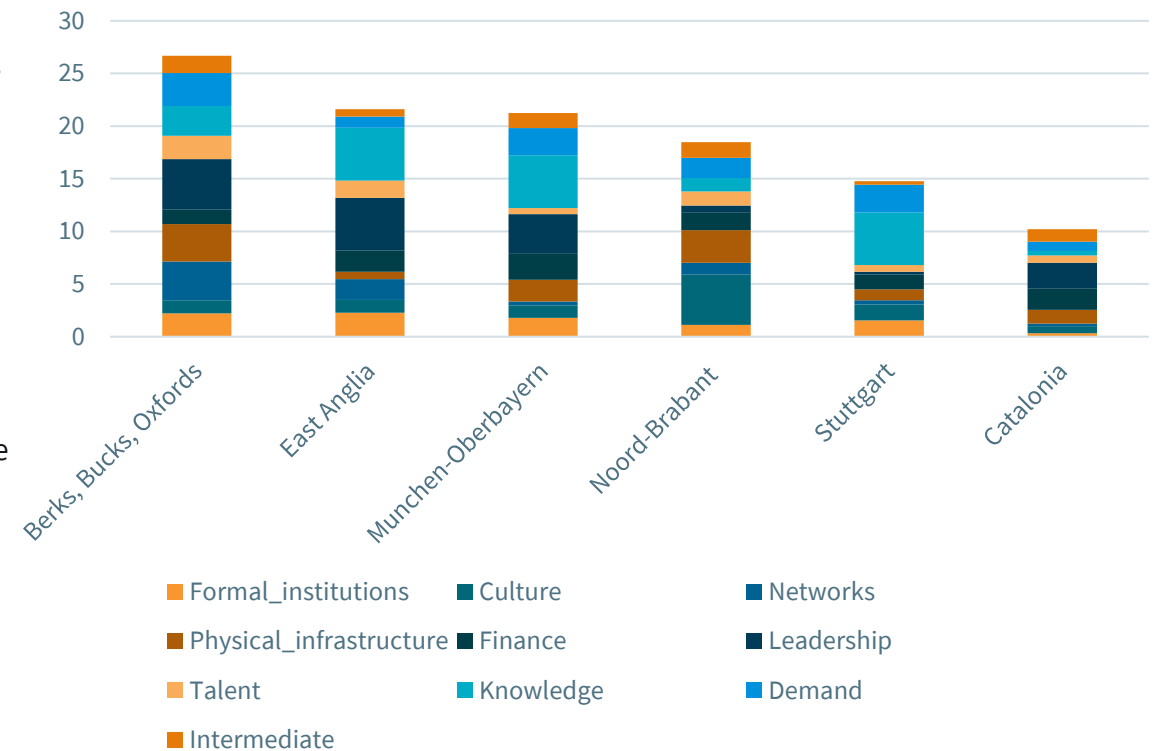


# International Benchmark

## München region makes a good benchmarking region for Brabant

- The Ecosystem of Brabant can be internationally compared to other regions. Regions such as München, Stuttgart, East Anglia and Catalonia are comparable in size and economic structure.
- Of all European 'NUTS-2' (i.e. province level) regions Brabant is ranked **23/273**.
- Hence, the Brabant is from a European perspective a relatively strong region but is not considered one of the top ecosystems in Europe.
- Cambridge-East Anglia & Oxfordshire, Berks, Bucks are highly scientific regions of which the ecosystems score high on Knowledge development and Leadership. Also, the levels of Talent are significantly higher in these top-performing ecosystems.
- Stuttgart has the presence of large corporate anchors such as BMW and Mercedes and is thus comparable to Brabant with the presence of Philips and ASML. However, Stuttgart scores lower on almost all ecosystem element except Knowledge.
- However, **München has to most similarities to Brabant**: there is a large corporate anchor in the region (Siemens), together with the presence of a relatively large University of Technology (TU München).

Entrepreneurial Ecosystem Index scores of similar European regions



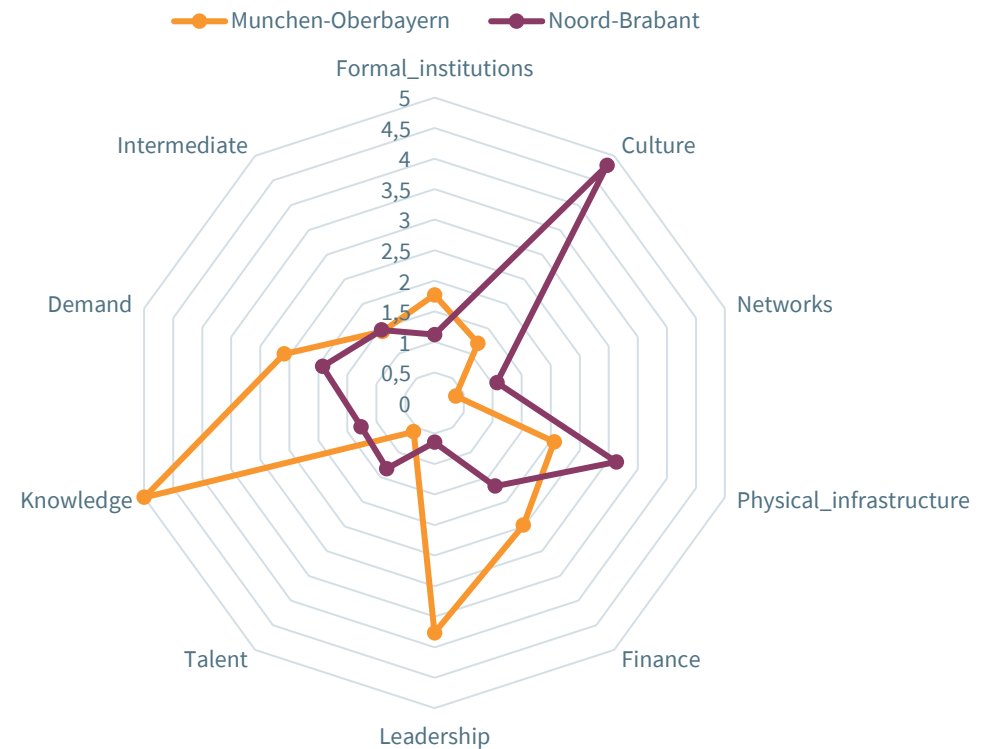


# International Benchmark

## Internationally, Brabant lags in knowledge development and leadership

- Using a European comparison makes differences in strengths and weaknesses more prominent.
- When scores relative to European averages are used and compared to München-Oberbayern the following conclusion can be drawn:
  - Brabant benefits from being part of a high-quality Dutch entrepreneurship **culture** and benefits the good infrastructure and high accessibility present in the Netherlands.
  - Brabant reflects Dutch weakness in **knowledge** investments. While being the region with the highest private R&D investments in The Netherlands and sizable public R&D investments, it lags significantly compared to top ecosystems in Europe. More specifically: the R&D intensity (R&D expenditures as percentage of R&D) in Brabant ranges between 2-3%, while regions such as München, Stuttgart or East-Anglia the R&D intensity is more than double.<sup>1</sup>
  - Brabant is weak in **leadership** (in knowledge networks).
  - **Talent** is slightly above average from a European perspective and slightly higher than München-Oberbayern. However, when compared to leading European ecosystems Brabant scores significantly lower.

Benchmark of ecosystem elements for Noord-Brabant and München-Oberbayern



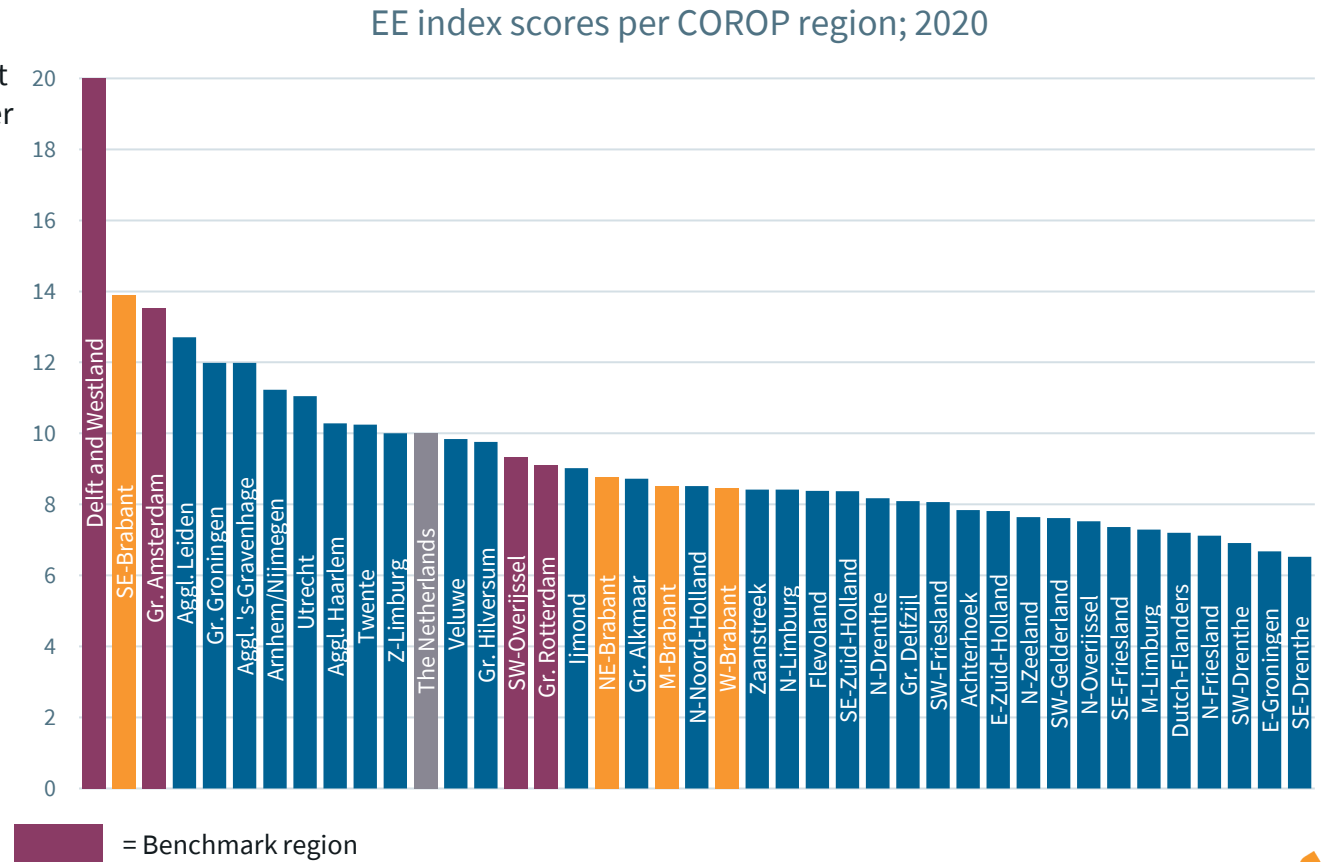




# National Benchmarks

## Each Brabant region has its own benchmark regions

- Brabant's subregions have different characteristics and therefore should be benchmarked to different regions in The Netherlands.
- As SE-Brabant is one of the strongest ecosystems in The Netherlands it is benchmarked to leading ecosystems Delft and Westland and Greater Amsterdam.
- M-Brabant, as one of the weaker regions with a (non-technical) university, is compared to Greater Rotterdam.
- W-Brabant and NE-Brabant are benchmarked to one of the stronger non-urban agglomeration ecosystems without a university in The Netherlands: SW-Overijssel.

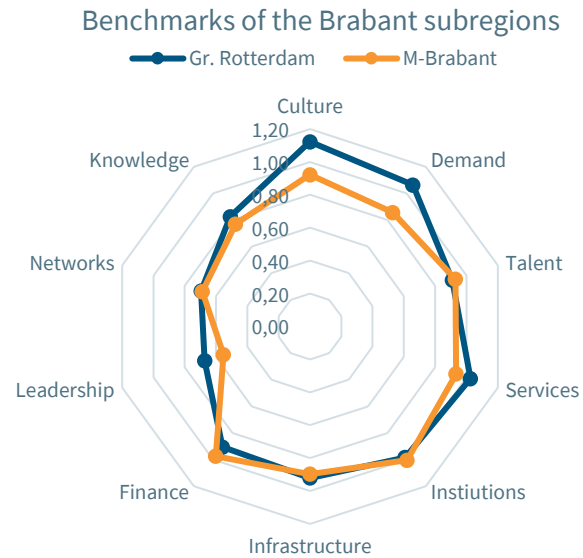
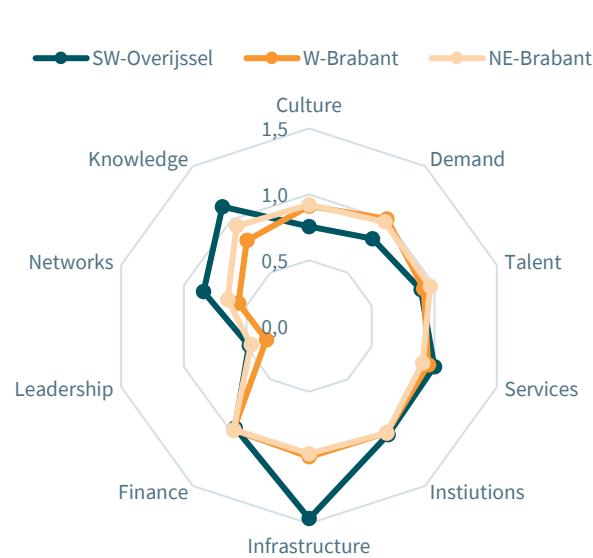




# National Benchmarks

## Strength and weaknesses of Brabant regions differs when compared to peers

- Compared to SW-Overijssel W- and NE-Brabant have better entrepreneurship culture and higher potential demand. The development of Knowledge, Networks and Infrastructure are better in SW-Overijssel compared to the Brabant regions.
- Compared to Rotterdam, M-Brabant is less developed in the level of entrepreneurship culture, potential demand, leadership of the ecosystem and the presence of intermediary services.
- Delft and Westland and Greater Amsterdam both excel in different aspects of the ecosystem: where the Delft region is unmatched in the levels of leadership and network development of the ecosystem, the stronger elements of Amsterdam are in the entrepreneurship culture, potential demand and talent. In its structure, SE-Brabant seems more comparable to the Delft region (as it has higher levels of networks and leadership) but has several points of improvements compared to Amsterdam.

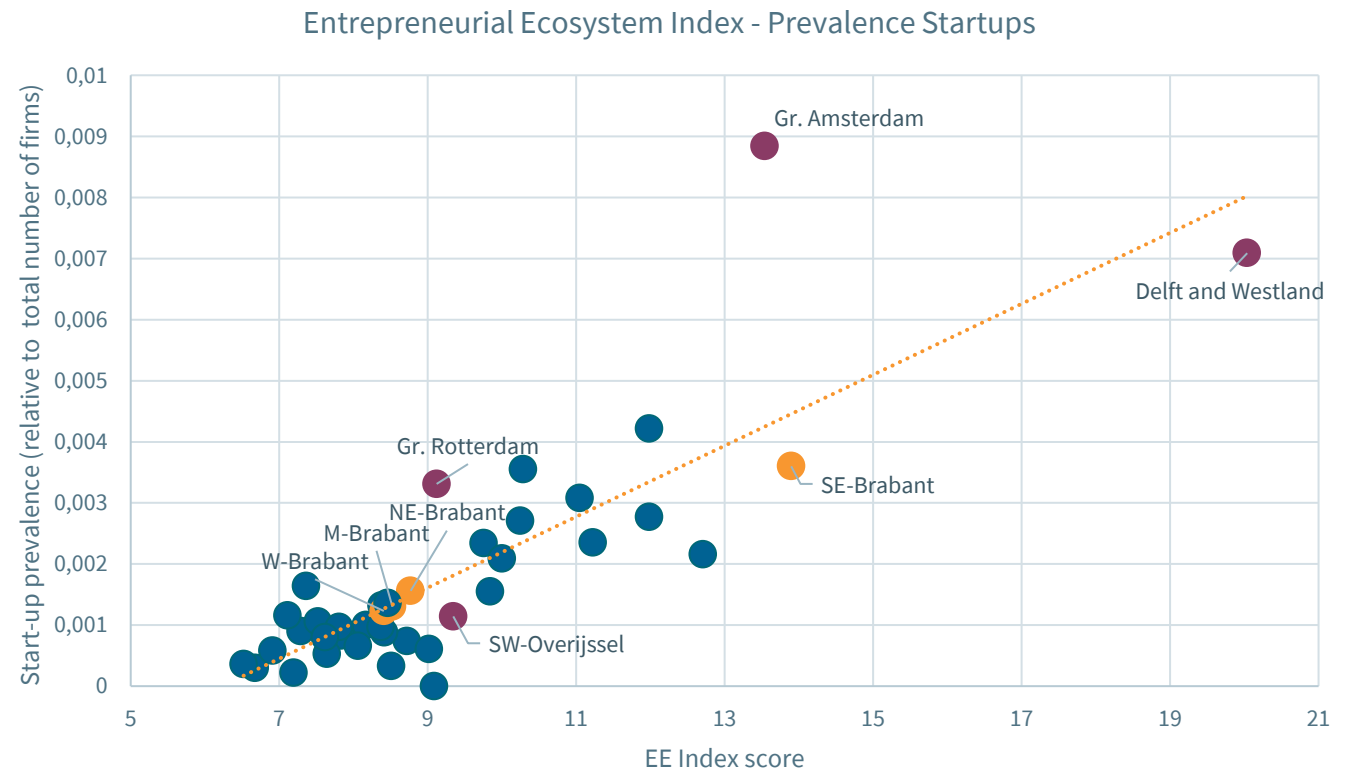




# National Benchmarks

## Most Brabant regions have above average outputs, SE-Brabant underperforms

- A stronger ecosystem is positively correlated to outputs of the ecosystem. When plotting the Entrepreneurial Ecosystem Index score to startup prevalence for all dutch regions a positive relationship can be observed.
- SE-Brabant has, relative to its ecosystem strength, relatively low start-up outputs and is significantly outperformed by both Greater Amsterdam and Delft and Westland.







# 6. Monitoring



# Monitoring

## Charting opportunities for improvement through monitoring

- This report is based on the Entrepreneurial Ecosystem index framework, which uses standardised variables to enable comparison between regions on the quality of the ecosystem. Analysis of these elements has been deepened with supplementary indicators to provide more insight.
- **This method provides an objective base but does not yet give a conclusive overview of the ecosystem and its outputs.**
- To closely monitor progress in the Brabant ecosystems and to measure the effect of new interventions, we propose a two sets of indicators:
  1. **A set of indicators that makes ecosystem and its outputs comparable to other regions.**
  2. **A set of additional indicators that may help deepen understanding and chart progress for the start-up ecosystem.**
- The first set of indicators is used in this report (see page 23 and appendices).
- The second set of indicators can be constructed given the monitoring goals. Of crucial importance in measuring ecosystems is a **central goal**, which enables the Brabant ecosystems to work towards a common ground. This will also prevent competition amongst different regions for the same resources and results.
- Rather than explicate this goal into measurable targets (x scaleups of size y), **common ground should be found in events and results** that regions agree on are good for the entire ecosystem. This leaves room for the use of regional strengths and avoids Goodhart's Law.\*

Proposed additional indicators for monitoring the Brabant Ecosystem

Element	Indicator	Method/Details
Leadership & Networks	Top stakeholders per subregion.	Name generator: ask a sample of entrepreneurs and feeders the top actors
Services	Incubator networks, focus areas and quality.	Entrepreneur survey, Desk research into start-ups and incubator focus and quality
Finance	Required financing for entrepreneurs, available financing methods.	Entrepreneur survey. Desk research into available and used start-up funds.
Talent	Embeddedness of entrepreneurial skills in education.	Analysis of curricula and/or surveys among students and/or lecturers.
Outputs: Fast growing companies	Gazelles	Number and industry of fast-growing companies
Outputs: Social entrepreneurship	Social enterprises	Number of social enterprises (as an ecosystem output)
...	<i>To be determined in line with ecosystem goals</i>	

*"Any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes."*, often popularised as: *"when a measure becomes a target, it ceases to be a good measure"*



# Appendix





# Method: Entrepreneurial Ecosystem Index

## Description of elements and empirical indicators for COROP-analysis

Elements	Description	Emperical indicators	Source(s)
<b>Formal institutions</b>	Quality and efficiency of governance	Four components: corruption, law, effectiveness and accountability, in normalised scores on province level.	Quality of Government Survey 2019
<b>Culture</b>	The degree to which entrepreneurship is valued in a region	Number of new firms per 1.000 inhabitants.	Centraal Bureau voor de Statistiek (CBS) 2019
<b>Infrastructure</b>	Physical infrastructure	Three components: distance to main road, distance to train station and accessibility to passenger flights (within a 90-minute drive).	Regional Competitiveness Index (RCI) 2019 + CBS 2019
<b>Demand</b>	Potential market demand	GRP per capita.	CBS 2019
<b>Networks</b>	The connectedness of businesses for new value creation	Number of connected Dutch firms per 1.000 firms in innovative projects (volginnovatie, H2020), average over 3 years.	Rijksdienst voor Ondernemend Nederland (RVO) 2016 – 2018
<b>Leadership</b>	The presence of actors taking a leadership role in the ecosystem	The number of coordinators on H2020 innovation projects per 1000 firms, average over 3 years.	RVO 2018 + CORDIS 2020
<b>Talent</b>	The prevalence of individuals with high levels of human capital	Percentage of population that has finished higher education	CBS 2019
<b>Finance</b>	The availability of capital for new firms	Intensity (average investment per firm) and prevalence (number of firms that receive investments per 1.000 firms) of investments on province level, average over 3 years.	Nederlandse Vereniging van Participatie-maatschappijen 2016 - 2018
<b>Knowledge</b>	Investments in new knowledge	Intensity (average investment per firm) and prevalence (number of firms that invest per 1.000 firms) of wage and capital investments for R&D.	RVO 2018*
<b>Intermediaries</b>	The presence of intermediary services	Percentage of firms in intermediary services	CBS 2019

\*For investments in private R&D data from 2017 is used