

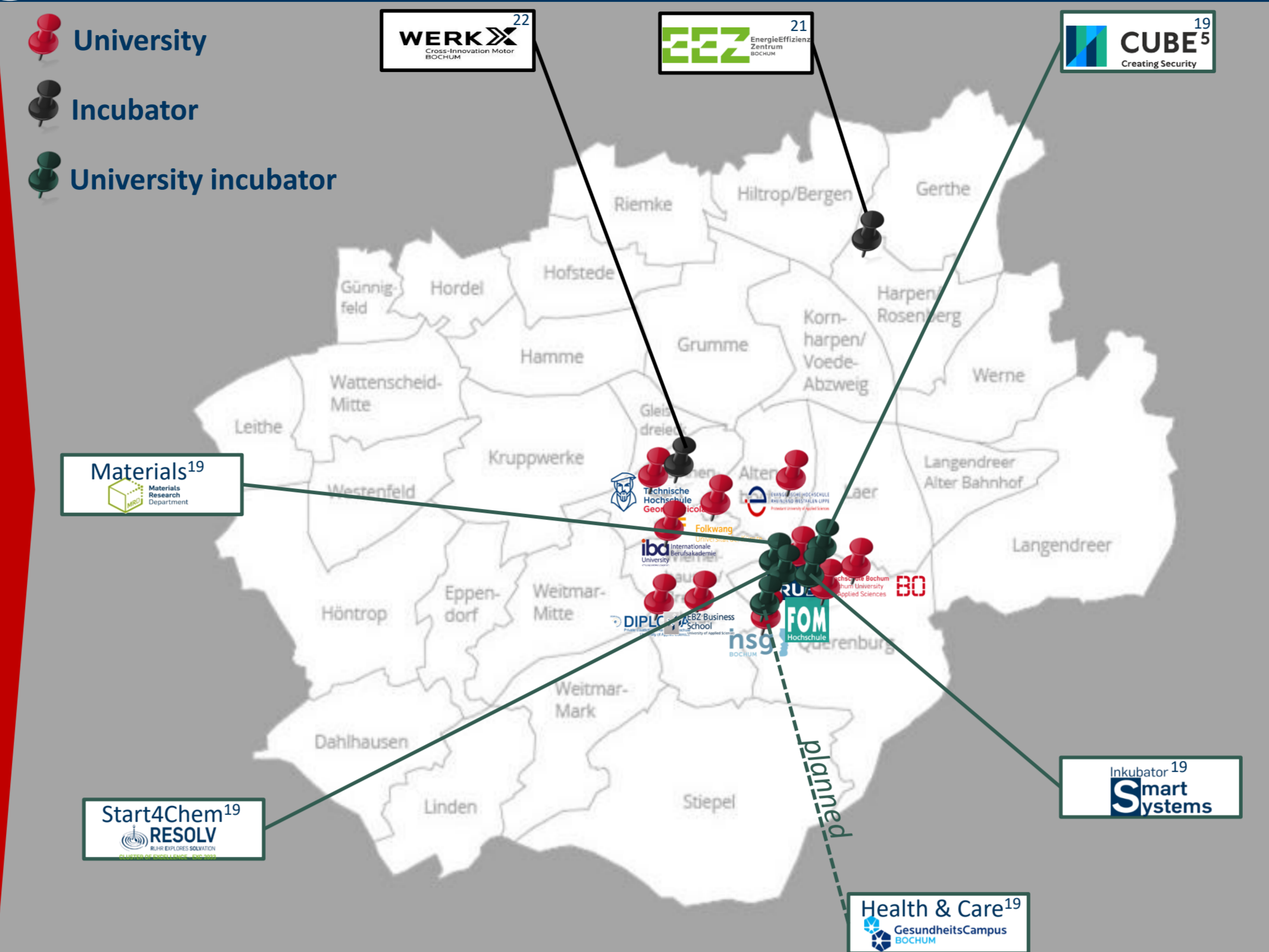
Research Question: How do support services such as incubators contribute to the overall entrepreneurial ecosystem in the Bochum?

Region

Region – general information
 City Bochum - in the centre of the Ruhr Area - North Rhine-Westphalia¹
 Population 370.797 (2020)¹
 Population density (per km²) 2.551 (2020)¹
 Total employees subject to social insurance contributions 132.250 (2020)¹
 Unemployment rate 8,5% (2019)²
 GDP 11.914 (2017)²
 Economic Structure Manufacturing 16.9%; trade, hospitality, transport 22.6%; public and private service providers 22.2%; other service providers and "not specified" 38.2% (2018)³

Innovative Performance
 Employees in Fields of Innovation 44.033 (2020)¹
 Number of planned start-up projects from 2018 to 2020 98¹
 Share and start-up-activity Below German average³
 Technology patent registration at the EPA Below German average⁴
 Private sector R&D expenditure per capita 1.98% - below German average (3%)³

Universities in Bochum
 Number of universities 10 (2020)⁵ – 4 public⁵, 5 private⁵ and 1 church sponsor⁵
 Total number of students ~60.000^{1,5}
 Total of graduates ~7.730 (2018)⁵
 Total university staff 7.947 (2018)⁵
 Number of habilitations 25 (2018)⁵



Methodological approach

Approach
 Primary source Qualitative research^{6,7}
 Type Semi-structured expert interviews^{6,7}
 Secondary sources Statistic bureaus^{2,5}, databases⁴
 Theories for assessing the research question Analysing the descriptive status quo using Stam's (2015) Entrepreneurial Ecosystem⁸

Interview partner
 Selection criteria Aiming to interview an incubator whose focus is to support innovative academic spin-offs, contributing to the development of Bochum

CUBE⁵
 Creating Security
 Foundation August 2018⁹
 Sponsor Public⁹
 Industry focus IT-security⁹
 Average duration of support 1 ½ years⁹
 Start-up Stage Early stages - before founding phase and idea generation⁹
 Acceptance criteria Commitment to Bochum⁹
 Offer Individual/group coaching, recruiting, networking, business model consulting⁹

Theoretical framework

The Entrepreneurial Ecosystem⁸
 Characteristic Consisting of several interdependent actors & factors enabling productive entrepreneurship⁸
 Entrepreneurship process of exploring, evaluating and exploiting opportunities⁸
 → Creating new goods, services and value creation by individuals⁸
 → Important source of innovation, productivity growth and employment⁸

Outcomes Referring to value being added (e.g. productivity, income, employment & well-being)⁸

Outputs Referring to entrepreneurial activity (e.g. identifying and exploiting new products, markets and processes and funding of high-growth/innovative start-ups)⁸

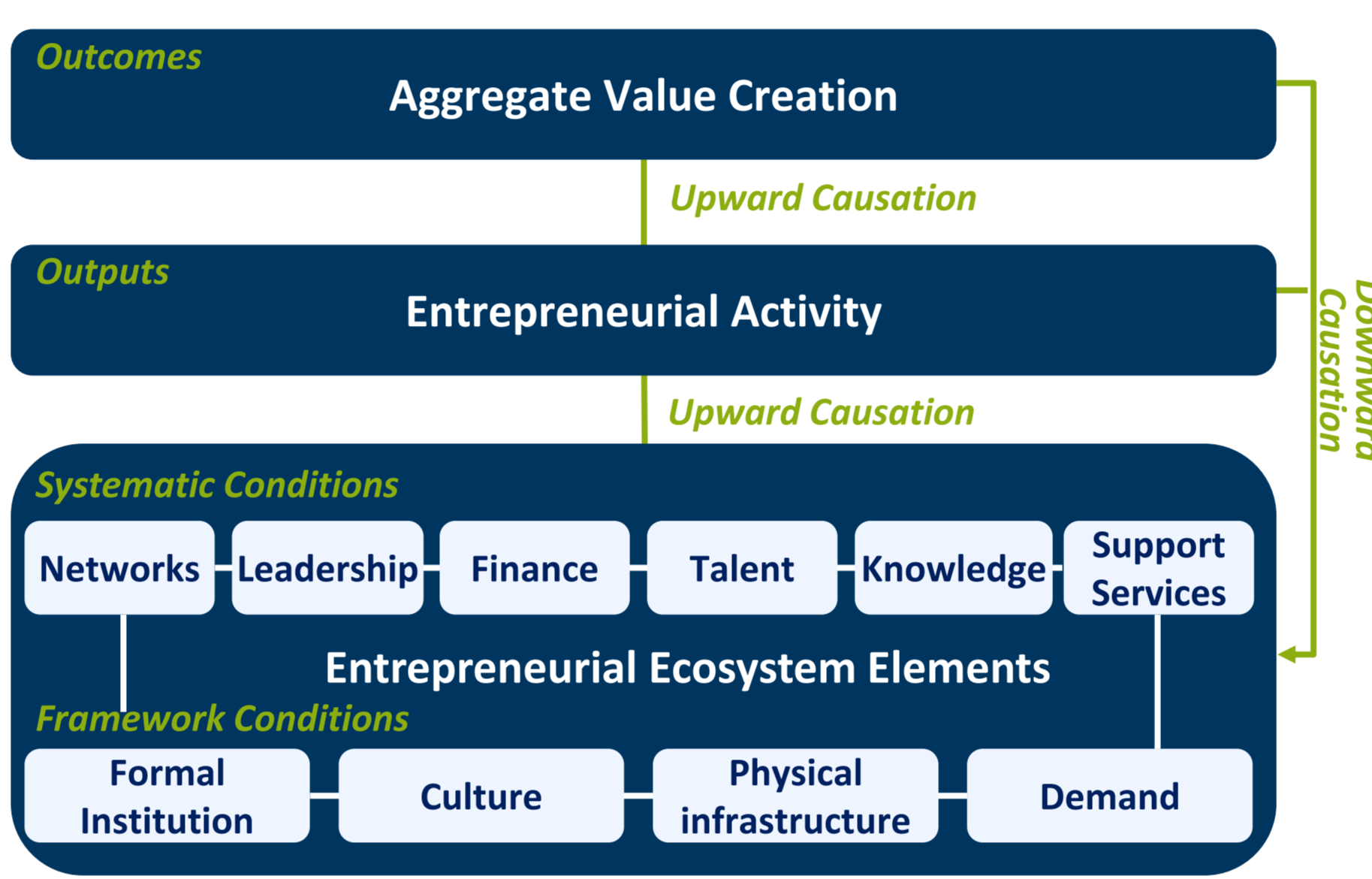
Systematic conditions Interacting of elements determine success of the entrepreneurial ecosystem⁸

Framework conditions Forming the fundamental cause of value creation in an entrepreneurial ecosystem⁸

Upward causalities Influencing of new value creation by intermediate causes⁸

Downward causalities Flowing back of outcomes and outputs into system conditions⁸

Intra-layer causalities Interacting of various elements within the ecosystem and different outputs and outcomes⁸



Academic spin-offs

Relevance of academic spin-offs¹⁰
 firms whose products and services develop out of technology-based ideas or scientific technical know-how generated in a university setting by a member of faculty¹¹

Attracting considerable attention because of their potential to
 (1) enhancing local economic development^{12,13}
 (2) assisting universities in their major mission of teaching and research^{12,13}
 (3) generating high-performance firms^{12,13}

Examples for academic spin-offs at the Ruhr-University Bochum¹⁵

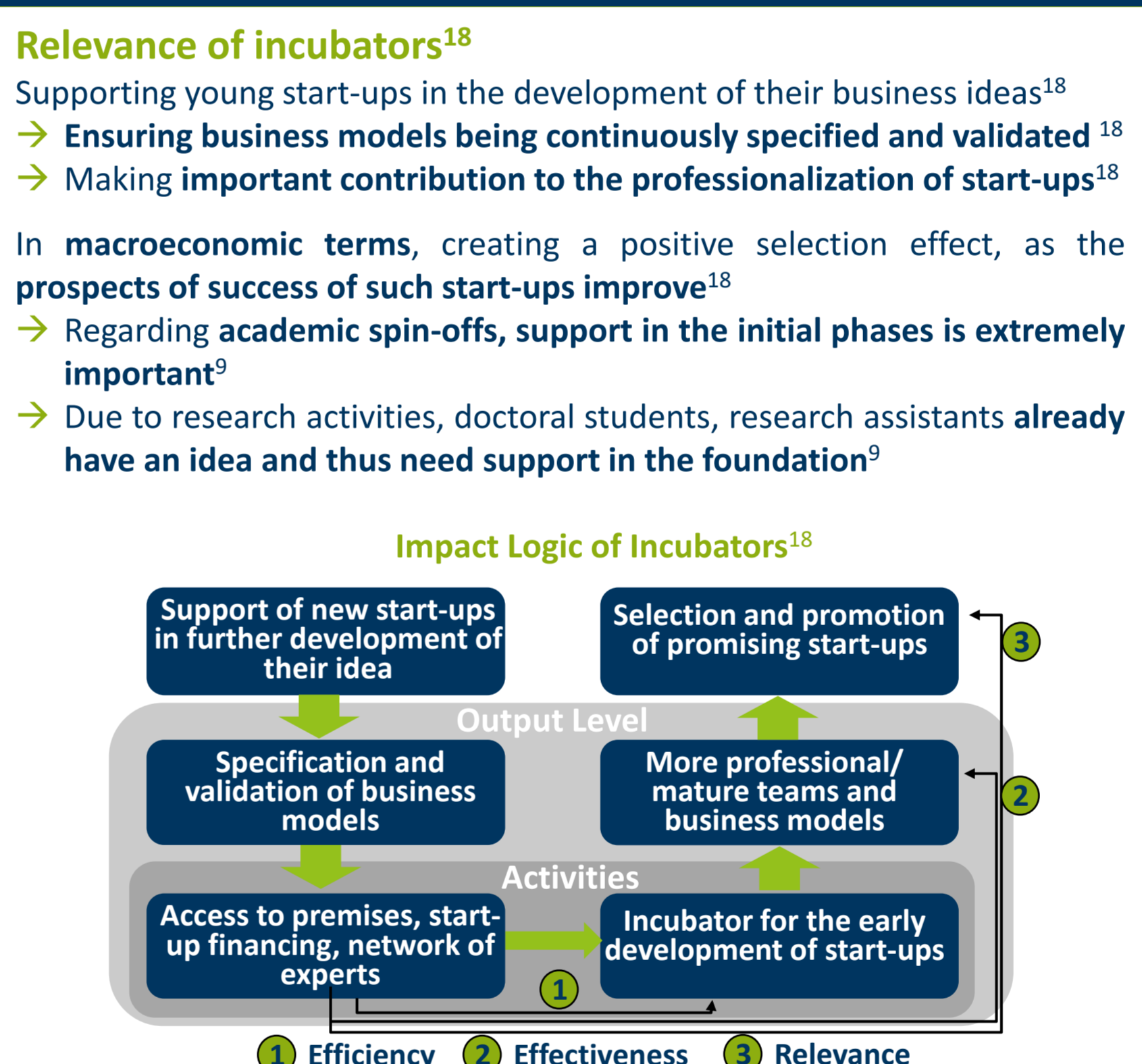
EMSEC Chair spin-offs
 escript
 PHYSEC
 Former EXIST research transfer scholarship holders

protagen
 FREE-D PRINTING
 EXIST start-up scholarship holders

Support services

Differences between incubators and accelerators
 Both representing an important instrument of start-up support, contributing to the further development of a region^{16,18}

	Accelerator	Incubator	Private incubator
Duration	Cohort based, 3-6 months ^{16,18}	Ongoing recruitment, 1-5 years ^{16,18}	1-5 years ¹⁸
Investment	Invest capital, take equity ^{16,18}	Rent, non-profit ^{16,18}	Intrapreneurship ¹⁸
Start-up stage	Early or late ^{16,18}	Early ^{16,18,19}	Late (reducing own risk) ^{17,18}
Entry criteria	High ^{16,18}	Low to medium ^{16,18,19}	Medium ¹⁷
Benefit for start-ups	Mostly private → profiting of knowledge transfer and networking of companies ^{16,18}	Interested in development of the region rather own profit, located near the Ministry's funding scenes ^{16,18,19}	Providing distribution channels, technical advertising/marketing support ^{17,18}



- Elements directly or indirectly influenced by incubators**
- Networks**
 connectedness of businesses for new value creation⁸
 → Evaluating networks of incubators
 - Talent**
 Individuals with high levels of human capital⁸
 → Number of talents/academic spin
 - Knowledge**
 Theoretical or practical understanding and know-how⁸
 → Evaluating knowledge contribution and transfer
 - Support Service**
 Services that are provided to support others⁸
 → Evaluating availability & accessibility
 - Culture**
 Entrepreneurship culture engagement⁸
 → Evaluating offer for promotion of start-up culture
 - Formal Institutions**
 Contribution and support from the government⁸
 → Evaluating offer of public support

Key findings and challenges

Key Findings – incubators offer good conditions for entrepreneurial activities and therefore lead to value creation by supporting start-ups and academic spin-offs in the region of Bochum

Networks
 → Strong networks within the universities⁹, e.g. Worldfactory, corresponding faculties and institutions : e.g. Horst Görtz Institut, WIWI faculty⁹
 → Cube 5 part of the "Start-up-Secure" network with incubators from Darmstadt, Karlsruhe and Saarbrücken⁹, cooperating with business angels and founding alliance (on event level)⁹
 → Contributing to UniverCity network as core asset for further regional development²⁰, numerous inter-communal connectors: e.g. ruhr:HUB, UA Ruhr, Economy Ruhr Metropolis MR, Ruhr Initiative Circle

Talent
 → High potential, many top researchers/academic talents, ~60,000 students¹, ~ 8000 scientific staff¹, however brain drain^{9,20}, migration of MINT graduates^{9,20}
 → Leading location for IT-security^{9,15}, Germany's first state university for health care professions⁵
 → Registration of 24 new academic spin-offs per year- expecting to rise to 36 per year¹⁹, numerous EXIST start-up scholars¹⁵ - e.g. PHYSEC received the "Gründerpreis NRW 2019"¹⁵

Knowledge
 → Incubators: distinguishing themselves through industry focus^{9,19}, e.g. Cube5's focus on IT-Security^{9,19} - Strengths: determining of market fit & usability testing⁹, Start4Chem's focus on chemistry start-ups¹⁹
 → Establishment of new transfer teaching projects and formats¹⁹, e.g. TranSOLV, inSTUDIES, certificate course "Chief Innovation Manager"¹⁹

Support Services
 → Consultation free of charge⁹, providing information on the latest funding opportunities⁹, individual/group coaching⁹, recruiting⁹, networking⁹, business model consulting⁹, market fit & usability testing⁹
 → Existing of information asymmetries⁹: lack of knowledge about the functional profile⁹, existing fear of "exploitation" by support services⁹

Culture
 → No founding spirit predominating in Bochum⁹, approx. 3.3% of all founders from NRW with an academic background originate from the RUB vs. RWTH Aachen 10.2%¹⁴
 → Culture fear of failing⁹, mentality of preferring employee status⁹

Formal Institutions
 → Worldfactory: one of the selected 6 Excellence Start-up Centers in Germany, working closely with incubators, not driven by economic interests, but rather contributing to regional development
 → Start-up consulting through: IHK Bochum, Bochumer Wirtschaftsförderung, Bochum employment office, EXIST start-up scholarship⁹

Key challenges (directly or indirectly influencing incubators)

Region Lack of attractiveness of Bochum compared to Munich/Berlin⁹, lack of entrepreneurial mindset/culture⁹

Academics Brain drain⁹, lack of interest/ insufficient incentives in founding a start-up⁹, attractiveness of the industry (salaries)⁹, bringing together interdisciplinary academics⁹, lack of economists in engineering intensive start-ups⁹

Start-ups Difficulties in finding suitable personnel⁹, number of spin-offs too low for cluster formation⁹, lack of entrepreneurial role models for internal and external branding⁹

Incubator Lack of experience in internationalization¹⁸, lack of innovative capability¹⁸, limited and outdated functional profile¹⁸, dependency on founding of academic spin-offs^{9,18}, dependency on public funding¹⁷, dependency on (voluntary) mentors and coaches^{9,17}, availability of only 1-3 permanent employees⁹

Other support services Greater attractiveness of other support services^{17,18} better competence profiles of other (private) support services^{17,18}, possessing better networks¹⁷

Recommendations

- Recommendations**
- Developing a network portal to bring engineers and economists together⁹
 - Strengthening the entrepreneurial spirit⁹, e.g. through active promotion of the functional profile/capabilities of incubators¹⁸
 - Adapting the competencies of incubators according to the needs of the corresponding academic spin-offs¹⁸
 - Increasing employment of interdisciplinary support services permanent staffs⁹
 - Developing a cluster to retain academic staff⁹, preventing brain drain⁹, not resting on MARK51 campus⁹
 - Intensified promotion/branding of success stories⁹ like PHYSEC, FREE-D Printing
 - Strengthening the cooperation between all support services in Bochum⁹

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