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Master Thesis

The Impact of Resource Base on Performance: Success Factors of Swiss Energy and Environmental Startups

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Management Summary

While few startups disproportionately contribute to innovative economic developments, most startups remain small or fail, even with substantial funding. Thus, precise support instruments are required for startups that are promising to achieve environmental objectives. The identification of success factors offers valuable insights for practice, research and policy making to enhance the low success rate.

Drawing on the RBV, the effects of various resources and capabilities on the performance of Swiss energy and environmental startups are explored within a framework comprised by *Financial Resources*, *Networks & Partnerships*, and *Team Capabilities & Knowledge*. Besides the relative importance of elements of the resource base, moderating effects of *Type of Main Offer*, *Technology Intensity* and *Phase in the Life Cycle* are examined. A longitudinal secondary research design is used, drawing on a novel dataset of 108 startups, consisting of self-reported data from the Innovation Monitor surveys from 2018 to 2022, enriched by hand-collected data from desk research. A quantitative analysis is conducted by a series of moderated multiple linear regressions. Semi-structured interviews with seven founders are conducted to deepen the insights with a qualitative content analysis.

Industry Partnerships were found to be a crucial success factor, particularly for high-tech startups, followed by founders' experiences and an early *Product-Market-Fit*. While *Managerial & Leadership Experience* showed negative effects, *Entrepreneurial* and *Industry Experience* are less positive than prior research suggests. *Technology* and *Industry Experience* are valuable in the beginning but showed negative effects in the growth phase, while the opposite was observed for *Marketing & Sales Experience*. Whereas the *Total Capital Raised* was neutral, fundings from *Corporate VCs* and *BAs* were more effective than those of *Independent VCs* due to additional non-financial benefits. While the *Phase in the Life Cycle* showed the highest moderation potential, fewer moderations were identified for *Technology Intensity* and *Main Offer*. High relevance is awarded to *External Factors*, whereby Switzerland is considered as a conducive location. Drawbacks of a high salary level and small market can be resolved by *International Activities* which showed a positive effect.

Derived from the findings, startups should aim for a fast product-market-fit, focus on key competencies, and adapt the team capabilities to the current phase. Building strong partnerships is paramount, ideally within an international business model. When looking for investors, non-financial values should be considered. Policy makers are encouraged to promote networking events and to be open for adjustment of regulations to foster innovative business models. Future research could use holistic frameworks to examine relationships between resources or study different identified effects and moderations in detail. Focused qualitative studies could investigate the causalities of the effects. For the Innovation Monitor it is suggested to conduct uniform surveys with mainly metric scales, and to continue the networking events which are considered valuable.

Key Words: resource-based view (RBV), startup performance, startup success, success factors, predictors of performance, predictors of success

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List of Abbreviations

BA	business angel
e.g.	for example
et al.	and others
NTBF	new technology-based firm
NTV	new technology venture
p.	page
pp.	pages
RBV	resource-based view
US	United States of America
VC	venture capitalist

1 Introduction

Recent research suggests that the startup scene disproportionally contributes to job creation, innovation and productivity growth (Breschi et al., 2018, p. 10). Furthermore, it plays a vital role in the transition to clean energy production and an environmentally sustainable economy, as it acts as a room for experimentation and incubation of innovative solutions, paving the way for the most promising solutions to be pushed into the mainstream by established companies or by startups themselves. The Swiss Environment and Energy Innovation Monitor (website: https://www.innovation-monitor.ch) was developed to address the need for more visibility of Swiss energy and environmental startups, and improve accessibility for collaboration opportunities between startups, established companies and research institutions. Over 100 startups have participated at least to two Innovation Monitor surveys out of four in the last years. In combination with the yearly updated database of the Innovation Monitor, they constitute the data basis for this work. With an explorative research design based on the framework of the resource-based view (RBV), the objective of this thesis is to identify predictors of performance across different types and phases of startups in the energy and environmental sector in Switzerland.

Problem & Motivation: While only a small number of startups and successful breakthrough innovations generate the disproportionate contribution to innovative economic developments, the majority of startups end up as small substance businesses (Breschi et al., 2018, p. 9; Picken, 2017, p. 588). Regardless of the potential of the original idea, only about half of the startups survive more than five years, even when they received substantial venture capital investments (Picken, 2017, p. 588). Thus, it is no longer a question of promoting entrepreneurship per se, but of creating precise instruments to support specific startups that are valuable to achieve national and global economic and environmental objectives (Skala, 2019, p. 4). Being able to trace the performance of startups in the energy and environmental sector back to certain success factors and quantify their performance more reliably would offer valuable insights for various actors in practice, research, and policy making to enhance this improvable success rate. It could aid the startups identifying potential deficiencies to purposefully build and acquire resources and capabilities, which are conducive for success. Understanding predictors of startup success helps policy makers and administrators to provide a better suitable

framework of regulations and support mechanisms to improve the performance of startups (Rompho, 2018, p. 33) and facilitate the energy transition more deliberately. For research this work could contribute to identify the suitability and potential limitations of the RBV as a research framework for explaining superior startup performance. Furthermore, this work examines the applicability of existing research findings to the context of energy and environmental startups.

Research Gaps and derived Research Questions: The RBV postulates that companies represent heterogeneous bundles of resources and capabilities (Barney, 1991, pp. 105–106; Coleman et al., 2013, p. 2; Wiklund & Shepherd, 2011, p. 929). In the context of startups, the entrepreneurs' tasks are to acquire, develop and assemble those resources and capabilities to adapt to a changing environment and to develop and sustain a competitive advantage which can lead to superior performance (Coleman et al., 2013, pp. 3–4; Lonial & Carter, 2015, pp. 94–96). Considering the linkage of startup performance and resource base, it would be valuable to identify the resources and capabilities which have the strongest impact on performance and discover the underlying mechanisms. The literature provides some research on success factors of startups in the light of the RBV in different contexts, but the energy and environmental sector is not yet widely addressed, particularly not in Switzerland. Correspondingly, the first research question is: *1.) Drawing on the resource-based view theory - what are the effects of different resources and capabilities on the performance of Swiss startups in the energy and environmental sector?* The startups included in the sample represent various types of businesses with different types of main offerings and different technology intensity, in different phases of the life cycle. While some previous studies identified success factors of startups in several specific contexts, there is only few theoretical and almost no empirical research on moderating effects of such characteristics. Accordingly, the second research question is: *2.) How do the Type of main Offer, the underlying Technology Intensity and the Phase in the Life Cycle affect the importance of certain resources or capabilities of startups for achieving superior performance?*

Delimitation of the Topic: This work examines the context of startups in the Swiss energy and environmental sector, observing only those startups which have participated in Innovation Monitor surveys during recent years. With the RBV as the underlying theoretical framework, the focus is clearly set on the internal perspective. Examined types

of resources and capabilities are *Financial Resources*, *Networks & Partnerships* and *Team Capabilities & Knowledge*. The external perspective is deliberately omitted in the quantitative part of this study. In the qualitative part, however, induced by the freedom of the interview partners answers, the view is opened somewhat to the outside, also giving room for external factors. While the focus is still on the internal perspective, the less restricted view of the quantitative part could allow to draw conclusions regarding the explanatory power of the quantitative research model respectively the RBV in the context of energy and environmental startups.

Methodology: The sample for this secondary research consisted of 108 Swiss energy and environmental startups and was compiled from existing data collected with the Innovation Monitor surveys between 2018 and 2021. The data was complemented by information from the Innovation Monitor database and some hand-collected data from desk research to fill missing data points. Based on the theoretical framework of the RBV, a suitable quantitative research model for answering the research questions was developed within the limitations of the secondary data. Two prior interviews with venture capital companies have been conducted to gather insights regarding relevant indicators for the performance assessment from a practical point of view. Thereafter, a mainly quantitative analysis was conducted with SPSS. The prevailing statistical method was a multiple linear regression analysis, which was applied to the whole sample and to sub-groups of the sample according to the categorical moderator variables addressed by research question 2. To test for moderating effects, a series of moderated multiple linear regression analyses was conduct with SPSS PROCESS. Afterwards, a qualitative deep dive by means of semi-structured interviews with founders of seven startups included in the sample was conducted to evaluate whether the same predictors of performance are stated as the prior statistical analysis would suggest. For the analyzation of the interviews a qualitative content analysis was used.

Structure: In the theoretical background, first, the concept of a startup is defined and the theory of the RBV is elaborated. Based on a derived simplified framework, potential performance predictors are identified and associated prior research is analyzed. After the identification and elaboration of performance indicators, the complete conceptual model is illustrated. Following an explanation of the methodology, the results of the quantitative and the qualitative analyses are presented. During the discussion, quantitative and

qualitative results are synthesized and implications and recommendations for startups, research and policy making are derived. Topic specific limitations and possibilities for further research are also outlined during the discussion. The work is completed by a conclusion, which critically appreciates the contributions of this work in consideration of general limitations and prior research. Finally, suggestions for the future work of the Innovation Monitor are presented.

Swiss Environment & Energy Innovation Monitor: The Innovation Monitor is a website and continuously updated database, which collects and publishes information on innovative startups, projects and companies in the Swiss energy and environmental sector since 2014. While the focus is on active startups and projects which may become startups, the scope will be expanded to innovative SMEs and innovation projects in larger companies in the future. Every year a survey is conducted to request information on the progress of the startups and explore how the startups can be supported and which factors are relevant for their success. The target of the Innovation Monitor is to improve visibility and accessibility of these startups to various actors in the startup ecosystem. By targeted actions and events such as the yearly *Energy Startup Day*, startups are supported and connected to established companies, public institutions, investors, or universities to foster collaborations and investments. The project is managed by a team of researchers from the ZHAW School of Management and Law under the lead of Christina Marchand and experts from the startup development company *eqlosion*, and is supported by the SFOE (Swiss Federal Office of Energy) and *Innosuisse*. The description was summarized from Innovation Monitor (2018) and ZHAW (2021).

2 Theoretical Background

This section provides a literature review of the relevant concepts and theories for this thesis. It starts with a brief description of the role of startups in fighting the climate change and compiles a definition for the term *Startup* and synonymously used terms in academic literature. Afterwards, a presentation of the resource-based view (RBV) is provided, which constitutes the main theoretical foundation of this work. Additionally, some simplifications to the RBV are explained, to make the model compatible with the data basis. Potential predictors of startup performance are identified in the literature and consolidated to those which can be represented by the available data, constituting the independent variables of the conceptual model. Additionally, more specific research questions are proposed. A discussion of challenges during performance assessment in the context of startups leads to further examination of the *Phase in the Life Cycle*, the *Type of Main Offer* and the *Technology Intensity*. A description of the startup life cycle is given, also explaining the criticality of the phase for performance measurement and discussing difficulties in the assessment of a startup's phase in the life cycle. Afterwards, three corresponding moderator variables and an associated research question are introduced, completing the research model for this thesis, which is shown at the end of this chapter.

2.1 Definition of Startups and their Role in fighting Climate Change

In modern global economy, startups are considered increasingly important for economic prosperity on regional, national and industrial level by the commercialization of break-through innovations and the creation of jobs (Petrů et al., 2019, p. 2; Tripathi et al., 2019, pp. 56–57). Related to climate change, entrepreneurship emerged as an important enabler of sustainable products and processes, thus innovative startups are seen as the answer to many social and environmental problems (Bocken, 2015, p. 647). According to Skala's (2019, pp. 4–6) literature review, most of the disproportionally high job creation and economic output can be traced back to few startups with break-through innovations, while the majority of newly founded companies remain small substance businesses for self-employment. The scholar concludes, however, that the entirety of startups significantly contributes to economic development and society, which justifies the increasing venture capital investments. Nevertheless, to discover success factors of potentially promising startups in the face of such problems, the concept *Startup* is defined for this work and delimited from small firms without distinct innovative or growth-oriented intentions.

Paradoxically, despite long-term interest in startups, a precise and generally agreed definition of the concept has remained elusive and is still a topic of debate (Breschi et al., 2018, pp. 9–10; Santisteban et al., 2021, pp. 399–400). Cunha et al. (2013, p. 5) concluded that there is little cross-referencing in literature, which indicates that none of the definitions proposed by preceding literature succeeded and was commonly accepted by other scholars. Despite this lack of consensus, the definitions evolved over the last decades, resulting in increasingly complex but varying criteria, including different time horizons, firm dimensions, prerequisites such as focus on innovation, development or use of new technology, scalability, high growth, or economic circumstances such as high uncertainty or lack of financial resources. Consistent with this lack of conceptual clarity, the literature provides other common nomenclature used for the same or similar type of companies: *New Technology-Based Firm (NTBF)* and *New Technology Venture (NTV)*. These terms imply potential for confusion because it is not obvious whether "new" refers to the technology or the firm (Candi & Saemundsson, 2011, p. 543). However, for this study "new" refers to the company, although most companies in the sample develop or apply an innovative technology. Fewer studies also use the more generic terms *New Venture*, *New Firm* or *Entrepreneurial Venture*, thereby not explicitly mentioning the aspect of technology. Also for NTBFs, NTVs and the more generic terms, a precise definition remains elusive and the terms' application differs among authors (Cunha et al., 2013, p. 3; Santisteban et al., 2021, p. 399; Song et al., 2008, p. 9). Though, García et al. (2015, p. 118) underline the difficulty of formulating clear and distinctive characteristics for the heterogeneous bundle this type of companies represent. Table 1 provides a non-exhaustive list of definitions for *Startup* and other synonymously used terms encountered during the literature review, which represent the variety of definitions among authors.

García et al. (2015), Cunha et al. (2013), Santisteban et al. (2021) and Song et al. (2008) identified a set of criteria for a generally applicable definition of the concepts *Startup*, *NTBF* and *NTV*. There is large correspondence between the criteria identified by the authors: *newness of the firm*, *small size*, *innovativeness*, *independent firm property*, *scalability of the business model* and *technology intensity*. Nonetheless, the use of distinct definitions continues, as many scholars adjust the concept to some degree to fit the target of their studies (Cunha et al., 2013, pp. 3, 4) or apply the most generic definition available to establish criteria applicable to the previously collected data (García et al., 2015, p. 118).

Table 1: Definitions of Startup and synonymously used Terms

Source	Term	Definition
Blank & Dorf (2012, p. 16)	Startup	A temporary organization in search of a scalable, repeatable and profitable business model.
Ripsas et al. (2016, p. 4)	Startup	A young company, less than 10 years old, with an innovative business model and/or innovative technologies, and that demonstrates significant growth in the number of employees and/or in turnover.
Chen et al. (2019, p. 46)	Startup/NTBF	Organizations that create new products and/or services in an environment of high uncertainty.
Zajko (2017, p. 62)	Startup	A firm in the initial phase in the life cycle of a company. If it survives the first 2 to 3 years and internal and external conditions are favorable, it should continue with the growth phase.
Überbacher (2014, p. 668), Zimmerman & Zeitz (2002, p. 414)	New Venture	Nascent organizational entities in their first years of existence, whether initiated by an established organization or independent from an established organization.
Ng et al. (2018, p. 4774)	NTV	Emerging business entities during their early development and growth with exploitation of technologies and transforming such technologies into new products or services for rapid business growth and development.
Song et al. (2008, p. 9)	NTV	Companies which can be described with the terms new, adolescent, young, emergent, high technology, technology-intensive, and technology-based, with a maximum age of 6 to 15 years.
Candi & Saemundsson (2011, p. 543)	NTBF	New business entities that develop new offerings based on the knowledge and skills embodied in engineering and the natural sciences.
Coeurderoy & Murray (2008, p. 13)	Startup/NTBF	New and independent high-tech firms formed within the last 10 years.
Maine et al. (2010, p. 127)	NTBF	Young and initially small firms operating in research and development (R&D) intensive sectors.
Cunha et al. (2013, pp. 9–18), Sońta-Drączkowska & Mrożewski (2020, p. 295)	NTBF	Companies with three distinctive characteristics: (1) youth, exists less than 10-25 years; (2) exploitation of an invention or technological innovation; (3) independence, an entrepreneur owns the majority stake and the venture is independent of capital groups.
García et al. (2015, p. 118)	NTBF	All independent companies that incorporate some kind of invention, technological advance or noteworthy technological innovation to their processes and/or products within less than 42 months since their creation.

Likewise, a slight adjustment of the definition to the sample is done to coincide with the startups the Innovation Monitor lists in its database. Thus, the definition of startups for this thesis is: *New firms with an age of less than 15 years and a size of less than 50 employees, working on or with innovative products, services, technologies, or business models with the potential of high scalability or significant growth.*

Reasoned by the conceptual imprecisions highlighted above, to cover as much of the relevant research as possible, the literature research of the other topics of the theoretical background was based on all the following keywords in combination with the respective keywords of the topic of interest: *startup*, *start-up*, *new firm*, *new venture*, *entrepreneurial venture*, *new technology-based firm*, *NTBF*, *new technology venture*, and *NTV*.

2.2 Resource-Based View Theory in the context of Startups

Although the field of entrepreneurship research matures (Combs et al., 2021, p. 348), scholars pursue to leverage theoretical frameworks of more established areas of organizational research to explore the context of startups (Crook et al., 2010, p. 11; Kellermanns et al., 2016, p. 26). The resourced-based view (RBV) is one of the leading theories in the organizational sciences and many scholars in the field of entrepreneurship used this theory as a basis to discover determinants of startup performance (Kellermanns et al., 2016, p. 26). While meta-analyses show that the RBV still continues to become more popular and influential in entrepreneurship research (Kellermanns et al., 2016, pp. 26–27), Combs et al. (2021, p. 348) recently suggested that research will develop its own theoretical frameworks in the future as the field further continues to mature. Kellermanns et al. (2016, p. 27) also emphasize on distinct differences between strategic management and entrepreneurship, because the importance of resources may vary significantly between established companies and young, small but rapidly growing startups. Hence, a major part of the RBV literature likely focuses on resources which are primarily important to established companies. To address this objection, this work solely draws on publications which used the RBV in the context of startups or ventures. Keeping this in mind, the RBV provides the theoretical foundation for the conceptual model of this thesis.

The RBV suggests that resources and capabilities can either be tangible (e.g. financial capital, manufacturing equipment etc.) or intangible (e.g. entrepreneur's abilities, human capital, innovation capabilities, flexibility, culture etc.) and must be valuable, rare, and difficult to be imitated or substituted to be a viable basis for developing a competitive advantage (Barney, 1991, pp. 105–106; Wiklund & Shepherd, 2011, p. 929). The entrepreneur's task is to acquire, develop and assemble these internal resources and capabilities to adapt to a changing competitive environment (Coleman et al., 2013, pp. 3–4; Lonial & Carter, 2015, pp. 94–96). However, as depicted in Figure 1, the RBV suggests that internal resources and capabilities may only be the basis of superior company performance when a competitive advantage is developed and sustained over a certain period of time (Coleman et al., 2013, pp. 3–4; Lonial & Carter, 2015, pp. 94–96). Thus, to seriously analyze a cause-and-effect relationship, measurement of resources and capabilities and measurement of performance must occur at different points in time.

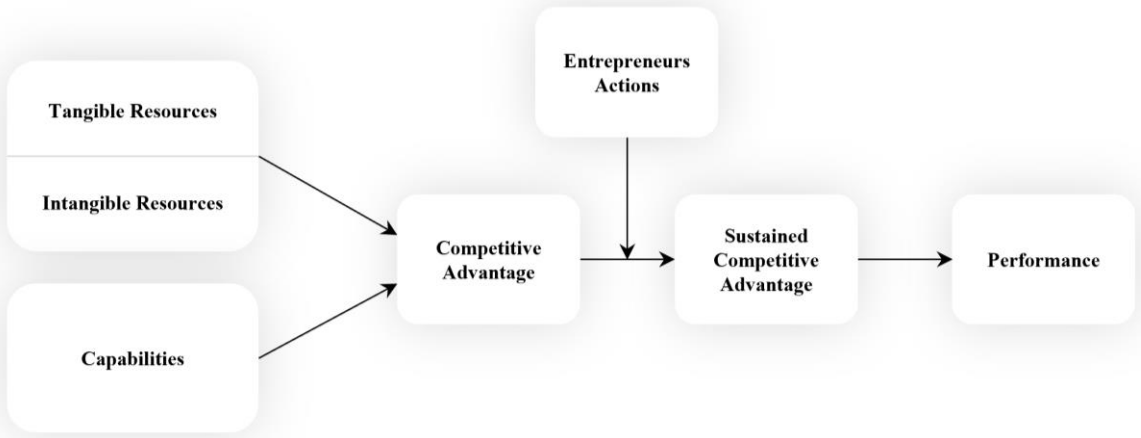

Figure 1: RBV on Startup Performance based on Coleman et al. (2013, pp. 3–4) and Lonial & Carter (2015, pp. 94–96)

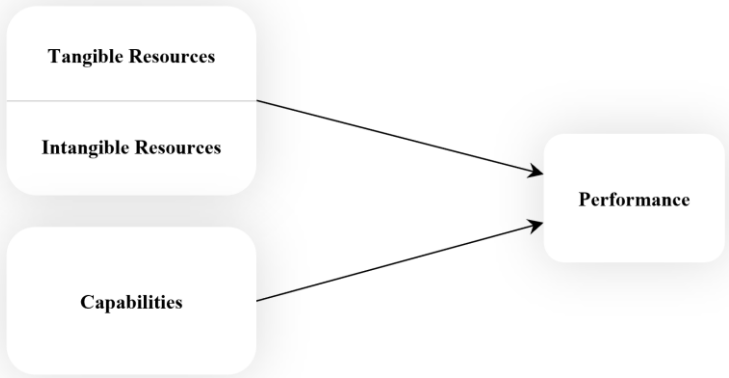

Figure 2: Simplified Conceptual Model (own representation)

Due to the secondary research approach, the availability of existing data constrains the freedom of design of the research model. Because no data is available which allows to determine the existence of a competitive advantage or represent the entrepreneurs' actions, the conceptual model must be slightly adapted. Supposing that the entrepreneurs' skills constitute a major part of the startups' capabilities, for the context of this work it is assumed that the entrepreneurs' actions are closely linked to the capabilities. Hence, a simplified conceptual model as depicted in Figure 2 is used, constituting the endpoints of the RBV, with the resources and capabilities as the independent variables and the startups' performance as the dependent variable. Naturally, these adaptions limit the suitability to explain underlying mechanisms between the endpoints, however, with a qualitative deep dive eventually some explanatory power can be restored in this regard.

2.3 Potential Predictors of Performance for Startups

This chapter identifies and analyzes resources and capabilities which could be predictors of startup performance, constituting the independent variables in the research model as indicated in Figure 2. The identified independent variables are grouped according to similar areas of affiliation and for each group corresponding specific research questions are formulated.

To identify all relevant resources and capabilities which are potentially beneficial for the performance of a startup, literature research was conducted with the keywords *success factors*, *critical success factors*, *CSF*, *predictors of performance*, *resource base*, and *human capital*, each combined with the keyword *startup* or synonymously used terms mentioned at the end of chapter 2.1. Prior research proved especially valuable in the form of three publications, which provided a foundation for the analysis of further literature: A comprehensive statistical cross-country portrait of innovative startups listed in the Crunchbase database (www.crunchbase.com) undertaken on behalf of the OECD by Breschi et al. (2018), a systematic literature research conducted by Santisteban & Mauricio (2017), and a meta-analysis from Song et al. (2008). Depending on the framework scholars used for their studies, the view is not always focused on the startup but sometimes extended to the bigger surrounding system constituted by an external economic and cultural environment (e.g. Miettinen & Littunen (2013)). Hence, the scope of the identified success factors varies with the underlying theory or research model. Correspondingly, systematic literature reviews or meta-analyses often not only depict success factors which can be categorized as resources or capabilities, but also external factors related to the market or to the macro-economic, regulatory, social, or cultural environment. Also within the framework of the RBV, researchers do not completely coincide about what the term resources really addresses. Kellermanns et al. (2016, p. 29) claims that virtually anything associated with a company can be a resource, which would make the concept essentially meaningless to describe organizational advantage. Perhaps for the reason of this conceptual imprecision, the literature offers a nuanced spectrum of conceptualizations. Table 2 provides a list of potential success factors identified in the literature. However, to delimitate the concept, for this work only predictors which can be clearly categorized as tangible or intangible resources, or capabilities are considered, whereas firm characteristics are deliberately excluded.

Table 2: Potential Predictors of Performance synthesized primarily from Breschi et al. (2018), Song et al. (2008), and Santisteban & Mauricio (2017)

	Resources & Capabilities	Description	Source
Financial Resources	**Total Capital Raised**	total capital raised by the startup regardless of origin and type of investment	(Bertoni et al., 2011, p. 1039; Bocken, 2015, p. 647; Burer & Wüstenhagen, 2008; Colombo & Grilli, 2010, p. 624; Huhtala, 2003; Santisteban & Mauricio, 2017, p. 18)
	Early Turnover	the amount of turnover a startup generates which can be used as a financial resource again	(A. Langguth, personal communication, April 6, 2022; E. Schepers, personal communication, April 22, 2022)
	Sources of Financial Resources		
	Initial Financial Capital	capital from founder(s), friends, family & fools, or from a seed funding to cover the initial costs of founding a business	(Bocken, 2015; Coleman et al., 2013, p. 7; Santisteban & Mauricio, 2017, p. 15)
	Capital of Founders	the amount of capital brought by the founders themselves	(Coleman et al., 2013, p. 7; Miettinen & Littunen, 2013, p. 453)
	Financial Support from Governmental Institutions	financial support from government without exchange of equity stakes (e.g. subsidies or guarantees)	(Bocken, 2015, p. 654; Grilli & Murtinu, 2014, p. 1525; Luukkonen et al., 2013, pp. 160–161; Pugliese et al., 2016, p. 1641)
	Non-Governmental Financial Support	e.g. sponsorship from other companies without exchange of equity stakes	(Santisteban & Mauricio, 2017, p. 11)
	Independent Venture Capitalists	financial capital raised in exchange of equity stakes (e.g. from venture capitalist or business angel)	(Chemmanur et al., 2011; Grilli & Murtinu, 2014, p. 1525; Kaplan & Strömberg, 2002; Luukkonen et al., 2013, pp. 160–161; Mazzucato, 2011, p. 23; Pugliese et al., 2016, p. 1641)
	Corporate Venture Capitalists	e.g. corporate venture capital in exchange for equity stakes	(Bocken, 2015, p. 654)
Networks & Partnerships	**Support by Mentoring Institutions**	support by organizations providing mainly non-financial support such as training, consulting, and networks (e.g. Hubs, Incubators, Accelerators, Coachings)	(Mason & Brown, 2014, pp. 20–21; Murray, 2019, p. 4)
	International Activities	early international activities of the firm such as foreign sales or production, or foreign developers	(M. Baum et al., 2011, p. 324; J. Chen et al., 2021, p. 430; Lu & Beamish, 2001, p. 578; van Zantvoort, n.d., p. 15)
	Supply Chain Integration	cooperation across different levels of the value chain (e.g., suppliers, distribution channels, agents, or customers)	(Dutta & Hora, 2017; van Zantvoort, n.d., p. 15)
	Industry & Research Partnerships		
	Industry Spin-Off	when the startup is a spin-off from an established firm in the same industry	(Clarysse et al., 2011; Czarnitzki et al., 2014, pp. 310–311; Pugliese et al., 2016, p. 1641; Wennberg et al., 2011, p. 1128)
	University Spin-Off	when the startup is a spin-off from a university	(Pugliese et al., 2016, p. 1641)(Clarysse et al., 2011; Czarnitzki et al., 2014, pp. 310–311; Mathisen & Rasmussen, 2019, pp. 1891–1892; Pugliese et al., 2016, p. 1641; Visintin & Pittino, 2014, p. 31)

	Industry Partnership	cooperative arrangements with established companies for the purpose of R&D or other knowledge transfer	(Frølund et al., 2018, p. 74; Harlé & Soussan, 2017, p. 2; Kim, 2012, p. 116; Kohler, 2016, p. 348; Lu & Beamish, 2001, p. 577)
	University Partnership	the firm's use of cooperative arrangements with universities	(Frølund et al., 2018, p. 74; Kim, 2012, p. 116; Lee et al., 2001, p. 621)
Team Capabilities & Knowledge	**Firm Size**	number of early employees	(A. Langguth, personal communication, April 6, 2022; Song et al., 2008, p. 12)
	Market Readiness	maturity level of the product, service or technology such that introduction to the market is possible	(In & Monk, 2020, pp. 34–42; A. Langguth, personal communication, April 6, 2022; E. Schepers, personal communication, April 22, 2022)
	Intellectual Property Protection	availability of firm's patents protecting product or process technology	(Breschi et al., 2018, pp. 30, 35; Farre-Mensa et al., 2020, pp. 676–678; Song et al., 2008, p. 13)
	Size of Founding Team	number of founder(s)	(Breschi et al., 2018, p. 30; Colombo & Grilli, 2010, p. 621; Ganotakis, 2012, p. 511)
	Education Level of Founders	highest academic degree of the founder(s)	(Breschi et al., 2018, pp. 16, 35; Coleman et al., 2013, p. 5; Ganotakis, 2012, p. 510; Miettinen & Littunen, 2013, p. 455; West & Noel, 2009)
	Prior Experiences of the Founding Team		
	Entrepreneurial Experience	experience of the firm's management team in startup companies/situations	(Breschi et al., 2018, p. 10; Coleman et al., 2013, p. 4; West & Noel, 2009, p. 6; J. Zhang, 2011, pp. 187, 203–204)
	Industry Experience	experience of the firm's management team in related industries and markets	(Baptista et al., 2007, p. 29; Coleman et al., 2013, p. 4; Colombo & Grilli, 2010, pp. 614, 619; Ganotakis, 2012, p. 510; Pugliese et al., 2016, p. 1640; West & Noel, 2009, p. 6)
	Commercial (Marketing & Sales) Experience	experience of the firm's management team in marketing & sales	(Baptista et al., 2007, p. 29; Colombo & Grilli, 2010, pp. 614, 619, 621; Ganotakis, 2012, p. 510)
	R&D / Technology Experience	experience of the firm's management team in R&D or technology	(Colombo & Grilli, 2010, p. 619; Ganotakis, 2012, pp. 510–511)
	Leadership & Managerial Experience	experience of the firm's management team in leading teams or organizations	(Baptista et al., 2007, p. 29; Colombo & Grilli, 2010, pp. 614, 619, 621; Ganotakis, 2012, p. 510)
	Social Skills	the ability of the entrepreneurial team to communicate and negotiate with other people or companies	(Santisteban & Mauricio, 2017, p. 12)
	Dynamic Capabilities	the abilities of the entrepreneurial team to solve and adapt to problems in a dynamic uncertain environment	(Santisteban et al., 2021, p. 406)
	Professional Diversity	a more diverse team is assumed to bring more value to the startup than founders with similar backgrounds	(Colombo & Grilli, 2010, p. 619; Ganotakis, 2012, p. 511; Miettinen & Littunen, 2013, p. 454)
	Production & Lab Facilities	ownership of or access to facilities for development and production of the firm's products	(A. Langguth, personal communication, April 6, 2022; E. Schepers, personal communication, April 22, 2022)

As outlined earlier, the nature of secondary research limits the freedom of choice in the selection of variables for the research model. Thus, a detailed analysis and description is only provided for the resources and capabilities of Table 2 which are written in bold. These variables can be legitimately represented by the available data and are incorporated into the research model as independent variables. In order to get a better overview of the independent variables, a structuring is carried out by grouping the corresponding variables into topics. The first two topics *Financial Resources* and *Team Capabilities & Knowledge* are chosen based on the groupings as shown by Breschi et al. (2018, pp. 10, 29). In the interviews with representatives of two venture capitalists for the validation of the research model from a practical perspective, both interview partners emphasized the importance of the founding teams' networks and partnerships. Hence the third topic *Network & Partnerships* was added. The assignment of the identified resources and capabilities to these topics primarily based on the categorization of Breschi et al. (2018, pp. 10, 29) and the meta-analysis from Kellermanns et al. (2016, pp. 38–39).

2.3.1 Financial Resources

The academic literature is consent that financial resources are one of the most important resources of a startup and constitute a key requirement for its future performance (Santisteban & Mauricio, 2017, p. 18) and sustainable growth (Colombo & Grilli, 2010, p. 624). Because startups have no long history of transactions with financial institutions, they are seen as particularly risky. Therefore, compared to established firms, startups usually have to pay a premium for external capital in the form of higher interest rates from banks or higher prices and tighter credit terms from suppliers (Lee et al., 2001, p. 619). Overall, startups with insufficient financial resources have a decisive disadvantage in the early years compared to startups that have good financial resources during their development phase, which benefit of many advantages and can therefore perform better. It must be noted though, that the RBV literature does not directly consider financial resources as a sustainable competitive advantage, because this type of resource is neither rare nor imitable. However, it can be an indirect source of sustainable competitive advantage, when a startup can use more financial resources in the development phase than its competitors, thereby building a valuable set of tangible and intangible strategic assets (Lee et al., 2001, p. 619). To provide these financial resources, venture capital is reputed as the best tailored financing mode for startups by literature and policymakers (Grilli &

Murtinu, 2014, p. 1524). For this reason, among others, the *Total Capital Raised* by a startup, as underlined by empirical evidence and recognized by academics (e.g. Bertoni et al. (2011), Colombo & Grilli (2010, p. 624)), has a significant positive impact on startups' survival, superior performance and sustainable growth of employment and sales (Bertoni et al., 2011, p. 1039; Bocken, 2015, p. 647; Santisteban & Mauricio, 2017, p. 18). Other scholars specifically emphasize the importance of venture capital for the success of sustainable businesses, which aim for positive contributions to the environment and society, besides generating profit (Burer & Wüstenhagen, 2008; Huhtala, 2003).

Besides the total amount of the financial resources, fewer studies also highlight the importance of the *Source of the Financial Resources*. Providers of financial capital for startups differ in several dimensions, including investment policies (expected return, time horizon, risk tolerance), screening methods, governance mechanisms, competencies and networks, and non-financial objectives (Grilli & Murtinu, 2014, p. 1524). Relatively little is known about how the organizational structure of the venture capital owner affects the success of entrepreneurial firms, which is one of the most controversial dimensions of the differences between capital providers (Da Rin et al., 2011, p. 49). Da Rin et al. (2011, p. 49) also identified that, compared to the United States, in Europe the heterogeneity of venture capital providers is higher, ranging from US-style independent venture capitalists, bank-affiliated branches, corporate VC subsidiaries of companies outside the financial industry to governmental institutions.

Studies conclude that different types of financiers also have a different impact on startups and different underlying objectives. *Independent Venture Capitalists* in a first priority push the growth of their portfolio startups to ideally achieve one of two exit strategies – an initial public offering (IPO) or an acquisition – to achieve a maximum financial return of invest in minimum time (Chemmanur et al., 2011). Mazzucato (2011, p. 23) concludes that *Independent Venture Capitalists* prefer companies with innovative business ideas which are already quite far developed, whereas they often refrain from investing in startups with a very high technology intensity, due to the higher associated risk. *Governmental Institutions* also target growth of the supported startups, but usually have less short investment horizons, show less risk aversity and also value social and environmental benefits of startups (Grilli & Murtinu, 2014, p. 1525), which for example manifests in technology funds investing in particularly R&D-intensive startups. Bocken

(2015, p. 654) and Pugliese et al. (2016, p. 1641) also emphasize the importance of *Governmental Institutions* to unleash the creative destructive potential of sustainability startups by adequate funding and the creation of a conducive environment by legislation. Bocken (2015, p. 654) also adds the role of *Corporate Venture Capitalists*, meaning companies outside the financial industry, which provide capital for startups pursuing innovative activities in the same industry as the capital provider. Besides financial returns, industrial companies often intend to foster innovation by integrating the supported startup into their own company if the idea of the startup proved to be successful.

Another important difference between these three types of capital providers are the activities each type pursues to add value to their portfolio startups and help them reach their goals. Grilli & Murtinu (2014, p. 1525) suggest that *Governmental Institutions* are less likely to reach the quality of consulting services that specialized *Independent Venture Capitalists* can provide to their portfolio startups in enhancing development of business ideas, managerial professionalization or building of sales and supply networks. A study of Luukkonen et al. (2013, pp. 160–161) confirms this suggestion by an empirical comparison of the level and composition of value-added activities by different types of venture capital providers, as perceived by the startups. Usually, *Independent Venture Capitalists* use specific financial instruments and contractual agreements, such as staged funding or decision rights, to actively monitor their portfolio startups and create incentives for growth (Kaplan & Strömberg, 2002). *Corporate Venture Capitalists* provide support with their knowledge, networks and own resources, in the form of consulting, R&D, manufacturing partnerships or sales and supply networks (Bocken, 2015, p. 654). Conversely, *Governmental Institutions* usually impose less strict contractual agreements, have less strategical decision power and monitor their startups not as closely (Grilli & Murtinu, 2014, p. 1525). Another difference is the type of funding: While *Governmental Institutions* mostly offer non-equity fundings in the form of loans or sometimes even grants, *Independent Venture Capitalists* and *Corporate Venture Capitalists* mostly invest in the form of equity investments and demand a part of the startups' shares. Regarding effectivity, the research results are fragmented, as several studies could not identify a significant effect of *Governmental Support* on startup performance, which could be due to sub-optimal investment decision when viewed from a purely financial perspective (Grilli & Murtinu, 2014, p. 1525; Lee et al., 2001, p. 622).

During the validation interviews with independent venture capitalists as described in chapter 2.6.1 Langguth (personal communication, April 6, 2022) and Schepers (personal communication, April 22, 2022) both emphasized the importance of *Early Turnover* as a predictor of future startup success. According to them, the existence and the amount of *Early Turnover* impact the startup in two ways: First, albeit usually not too high, turnover constitutes a source of financial capital, thereby reducing the time pressure of closing fundings. Second, *Early Turnover* demonstrates traction and an established product-market-fit to potential investors, which increases the likelihood of obtaining further fundings for nurturing growth.

Based on the preceding, the following additional research question is proposed, which specifically addresses the sources of a startup's financial resources:

1.a) Which impact does the source of the financial resources have on the performance of startups in the energy and environmental sector?

2.3.2 Networks & Partnerships

Companies take significant advantage of external networks, as those relationships constitute critical resources, can be a source of competitive advantage and further lead to superior performance, as suggested by the resource-based view theory (Barney, 1991). This also applies to startups, as business networks and personal networks of the founding team or relationships on an organizational level significantly influence the chances of surviving and achieving high growth (Pugliese et al., 2016, p. 1641; Zhao & Jung, 2017, p. 554). The causality behind this positive influence is that socially embedded ties allow startups to acquire resources cheaper than on the market or to obtain resources which cannot simply be bought on the market such as a good reputation, customer contacts or established sales channels (Witt, 2004, p. 391). Semrau & Werner (2014, p. 501) found that an increasing size of a startup's network and an increasing quality of those relationships, led to better access to financial resources, knowledge and information, and further business contacts. Especially technology-intensive startups, which constitute a considerable part of the total number of startups in the energy and environmental sector, are often led by teams consisting mainly or only of engineers. However, in order to lead a new technology from invention to commercial application, major challenges and uncertainties have to be overcome, which require not only technological excellence but

also critical resources and capabilities such as market knowledge, external financing, production facilities and other operational knowledge (Dutta & Hora, 2017, p. 218). Often technology startups face a scarcity of these critical assets, so it is not surprising that they generally tend to rely on external partnerships to secure these resources and capabilities to gain a competitive advantage (Dutta & Hora, 2017, p. 218). According to Lee et al. (2001, p. 620), such partnership-based linkages are a significant predictor of startup performance and can be comprised of four types of external actors: other companies in the industry, universities or research institutions, venture capitalists, and venture associations (organizations providing primarily non-financial support for startups in the form of mentoring). Apart from venture capitalists which have already been discussed in the previous sub-chapter, the influences of these different types of networks and partnerships are elaborated in the following section.

Research has shown that *Support by Mentoring Institutions* encourages the founding of startups and improves the rate of startup success with a spectrum of services depending on the needs of the supported startup, ranging from a light touch approach in the form of a *Startup Training or Coaching* to highly engaged organizations, which offer in-house programs to promote sustainable business growth (Murray, 2019, p. 4). Such supporting institutions can be divided into *Incubators*, which usually provide assistance in product and business model development for the pre-startup phase and early-phase startups, and *Accelerators*, which focus on speeding up the growth of startups that have already achieved a product-market-fit (Mason & Brown, 2014, pp. 20–21). Another type of venture associations are *Startup Hubs*, which are often located in geographic proximity to entrepreneurial hotspots and primarily offer local startups reasonably priced office spaces. Sometimes such hubs also focus on startups of a specific sector, which has the beneficial effect of easier networking and collaboration. In practice, however, the boundaries between these types of organizations are fluid, providing startups with a variety of the following services: virtual office service, serviced co-working space, business advisory services, registered business address, access to convenient tenancies, administrative services, and general or sector-specific networking and collaboration opportunities (Murray, 2019, p. 4). However, the results of prior research on the effectivity of such *Mentoring Institutions* are fragmented as outlined by Mason & Brown (2014, pp. 13–15).

Another factor which contributes to the development of networks are the *International Activities* of startups. Several studies suggest that *International Activities* in general have a predominantly positive effect on startup performance, however, the scientific opinions are fragmented on different aspects of internationalization. Chen et al. (2021, p. 430) suggest that especially high-skilled foreign workers enrich startups in the United States with skills and talents that are difficult to replace from the national labor market, and thereby enhance innovation and financial performance. Lu & Beamish (2001, pp. 578, 582) examined the effects of exporting and foreign direct investments, where they found that exporting had a negative relationship with performance, whereas foreign direct investments were generally positively connotated once they reach a certain level. Despite the ambiguous results, these scholars suggest that higher levels of internationalization provide intrinsic value to the startup, irrespective of the form of internationalization. Other research suggests that companies with a high knowledge intensity might profit from an early internationalization because of risk diversification and increased market potential (M. Baum et al., 2011, p. 324), which could be of particular importance for Swiss startups as the domestic market is rather small.

Regarding partnerships, the literature highlights two types of partnerships, aside from partnerships with financing institutions or mentoring organizations: partnerships with other companies in the industry and partnerships with universities. However, the purpose, benefits, and impact on startup performance differ considerably. *Industry Partnerships* are generally seen as immensely valuable to startups and broad evidence points to the positive effects on performance, whereas *University Partnerships* can provide valuable support for high-tech startups in developing the technology, but are also associated with challenges during collaboration (Frølund et al., 2018, p. 74; Kim, 2012, p. 116). *Industry Partnerships* provide access to diverse information, resources and capabilities at minimal cost, conflict and complexity, and significantly increase the innovation performance of startups (J. A. C. Baum et al., 2000, p. 267). Due to the complementary nature of startups and established companies, both sides can benefit from such a partnership – the startups can improve their operations, and the established companies profit from the innovative potential of the startups (Kohler, 2016, p. 348). Empirical results show that *Industry Partnerships* offer more advantages to startups than other potential partnerships (Harlé & Soussan, 2017, p. 2) and that an increasing number of industry partners significantly

improves the performance of startups when it comes to developing new products up to its' commercialization, which is not the case for *University Partnerships*, as concluded by Kim (2012, p. 116). Frølund et al. (2018, p. 74) explain that the difference between university culture – characterized by high autonomy and distributed governance – and corporate culture do not fit each other well, which can lead to frustration during the cooperation. However, startups can also benefit from *University Partnerships*, especially with regard to two aspects: developing technological knowledge, and talent identification and recruitment (Frølund et al., 2018, p. 74; Lee et al., 2001, p. 621). Such collaborations with universities or other research institutes can provide startups with technological knowledge, which the startups would not be able to attain on their own, in particular when it comes to grand scientific or societal challenges or topics requiring deep exploration. Furthermore, people from graduate students to high-caliber researchers who participate in startup-related projects become familiar with the technology and can become a source of migration of human capital to the startup in the long run (Frølund et al., 2018, p. 74; Lee et al., 2001, p. 621). Frølund et al. (2018, p. 74) also mention the aspect of publicity and political influence startups can attain by high-profile partnerships with prestigious universities, which can provide access to high-level government officials.

Partnerships with industry companies or universities sometimes result from spin-offs, hence the partnership is established directly from the founding of the startup. Spin-offs also serve as a mechanism to transfer new technology knowledge to the industry and act as a source of human capital transfer to startups. Thus, scholars emphasize the importance from a societal perspective, as *University Spin-Offs* are expected to significantly contribute to economic development by the creation of knowledge-intensive jobs, productivity enhancements through technology industrialization or tax revenues (Mathisen & Rasmussen, 2019, pp. 1891–1892; Visintin & Pittino, 2014, p. 31). Therefore, governments are increasingly supporting academic entrepreneurship based on the anticipation, that such startups will grow significantly and contribute to the commercialization of scientific developments. However, several scholars show that most academic spin-offs, especially in Europe, remain small firms with negligible growth and question if the economic impact justifies the support they receive from the public (Mathisen & Rasmussen, 2019, pp. 1891–1892; Visintin & Pittino, 2014, p. 31). Several studies compare the performance and societal benefits of *University Spin-Offs* and

Industry Spin-Offs (Czarnitzki et al., 2014, pp. 310–311), whereby *Industry Spin-Offs* are generally found to be more successful. Clarysse et al. (2011, p. 1423) explain that established companies often form *Industry Spin-Offs* when they want to develop and exploit innovative ideas, which require activities that imply the risk of tensions within the parent organization. Pugliese et al. (2016, p. 1641) and Clarysse et al. (2011, p. 1420) explored the role of technological knowledge in the growth process of spin-offs, concluding that *University Spin-Offs* benefit from a broad technological knowledge base which is transferred to the spin-off, whereas *Industry Spin-Offs* grow most from a narrow-focused technology which is distinct from the technology core of the parent company. Several authors identified *Industry Spin-Offs* to experience higher growth than their academic counterparts (Visintin & Pittino, 2014, p. 31), which could be because those spin-offs are founded by managers, who know the market better and thus have a better sense for market opportunities (Clarysse et al., 2011, p. 1435). Wennberg et al. (2011, p. 1128) draws on the same explanation and found higher sales growth for *Industry Spin-Offs*. For employment growth, Wennberg et al. (2011, p. 1128) and Cantner & Goethner (2011) found no significant differences. For innovation performance the results are contradictory: Cantner & Goethner (2011) found higher innovation performance during the first years for *University Spin-Offs*, whereas Hagedoorn et al. (2018, p. 763) found *Industry Spin-Offs* to show a higher innovation performance. Regarding firm survival, the literature attributes better chances to *University Spin-Offs*, as Czarnitzki et al. (2014, pp. 310–311) concluded in their literature review. Looking specifically on Switzerland and data from the Swiss Federal Office for Statistics, Pinter (2015, pp. 11–12) states that Spin-Offs from the Swiss Federal Institute of Technology (ETH) Zurich exhibit a far higher survival rate over the first 5 years than all other startups in Switzerland.

Considering the diverse results presented in the preceding, two more specific research questions are introduced, specifically addressing the type of mentoring institution and the type of industry or university partnership:

1.b) Which impact do different types of partnerships with universities or industry companies have on the performance of startups in the energy and environmental sector?

1.c) Which impact do different types of mentoring institutions have on the performance of startups in the energy and environmental sector?

2.3.3 Team Capabilities & Knowledge

Entrepreneurship research identified the formulation of a great team as one of the most important success factors of startups, in particular in the field of sustainable ventures (Bocken, 2015, p. 654). Most authors emphasize that there is a strong positive relationship between human capital in general and the success of a firm (Miettinen & Littunen, 2013, p. 454) and that it is particularly essential for startup companies (Colombo & Grilli, 2010, p. 610; Pugliese et al., 2016, p. 1640; Unger et al., 2011, pp. 341–342). Colombo & Grilli (2010, pp. 623–624) identified a strong significant direct effect of founders' human capital on startup growth, but also highlight indirect effects via better access to venture capital fundings. The concept of human capital in the context of startups relates primarily to the education, prior experiences, knowledge, skills and competencies of the founders and the key employees, which allow the startup to discover and exploit market opportunities or to obtain further tangible and intangible resources such as financial capital or new knowledge (Coleman et al., 2013, p. 5; Miettinen & Littunen, 2013, pp. 454, 455; Unger et al., 2011, p. 341). However, the importance of different aspects of human capital for startup success varies between studies in the literature, involving studies which found little or none significant relationships for certain indicators (Unger et al., 2011, pp. 354–355). Frequently used indicators for human capital are *Education Level of Founders*, *Prior Experiences of the Founding Team*, *Size of the Founding Team* and the overall *Firm Size*.

Regarding the *Education Level of the Founders*, many studies indicate that entrepreneurs with higher levels of formal education have a better chance of growing a successful business (Miettinen & Littunen, 2013, p. 455). The literature suggests numerous reasons for the positive influence: a correlation of formal education to the entrepreneurs drive and dedication, rational and critical thinking abilities needed for problem-solving to strategically build a new company in a complex business environment, and good social skills required for communication and teamwork (Coleman et al., 2013, p. 5; Ganotakis, 2012, p. 510; Miettinen & Littunen, 2013, p. 455; West & Noel, 2009). Furthermore, Coleman et al. (2013, p. 5) identified indirect effects on startup performance specifically for the education level, via better access to social and financial capital. Breschi et al. (2018, p. 35) found a positive correlation between the *Education Level of the Founders* and the probability for a successful exit via an acquisition. Contradictory to the majority

of results, Miettinen & Littunen (2013, p. 455) noted in their literature review, that there are also studies which found no relationship between higher education and startup performance. Particularly interesting in the context of this work, Breschi et al. (2018, p. 16) highlighted that in Switzerland startups have a higher than average share of founders with a PhD or with previous academic experience, which predestines this work for including the *Education Level of the Founders* in the research model.

In the framework of the RBV, some of the most important intangible resources for the prediction of a startup's success are the *Prior Experiences of the Founding Team* (Coleman et al., 2013, p. 4). The clearly most frequently mentioned beneficial types of experience are *Entrepreneurial Experience* (e.g. by Breschi et al (2018, p. 10), West & Noel (2009, p. 6), Coleman et al. (2013, p. 4) or Zhang (2011, pp. 187, 203–204)) and *Industry Experience* (e.g. by Pugliese et al. (2016, p. 1640), Ganotakis (2012, p. 510), West & Noel (2009, p. 6), Coleman et al. (2013, p. 4), Baptista et al. (2007, p. 29) or Colombo & Grilli (2010, pp. 614, 619)). Whereas prior *Industry Experience* of the founders is identified as a strong and significant predicator of startup success in different forms almost without any exceptions, prior *Entrepreneurial Experience* is also generally associated with above average startup performance but is still subject to some contradictory results. The positive influence of *Industry Experience* as discovered by studies, manifests itself in superior growth (Coleman et al., 2013, p. 4; Colombo & Grilli, 2010, pp. 614, 619; Pugliese et al., 2016, p. 1640), higher survival rate (Baptista et al., 2007, p. 29; Coleman et al., 2013, p. 4) and as an indirect effect by better access to venture capital funding (Breschi et al., 2018, p. 10; Ganotakis, 2012, p. 510). Prior *Entrepreneurial Experience* is also associated with an indirect positive effect via better access to financial capital (Breschi et al., 2018, p. 10; Coleman et al., 2013, p. 4) and a direct effect in the form of superior capabilities regarding the development process from a nascent startup to the growth phase (Coleman et al., 2013, p. 4), but it does not seem to significantly increase the probability of survival (Baptista et al., 2007, p. 29). Other types of experience used in prior studies to explain the startup performance are *Managerial Experience*, *Commercial Experience* (relating primarily to Marketing & Sales) and *Technology Experience*. Although *Managerial Experience* and *Commercial Experience* provide the skills to successfully manage a company, identify market needs or organize financing of projects (Ganotakis, 2012, p. 510), each on their own seem to have no

significant effect on the performance, growth or survival of the startup (Baptista et al., 2007, p. 29; Colombo & Grilli, 2010, pp. 614, 619, 621). Evidence points into the same direction for *Technology Experience*. Although strong technical education and experience are considered as an advantage particularly for technology-intensive startups, prior research is not consent about the influence of technology experience. Whereas Colombo & Grilli (2010, p. 619) found a positive significant effect, Ganotakis (2012, pp. 510–511) found no positive effect of *Technology Experience* on its own, but even significant adverse effects on the performance of startups for very high levels of technical education. The author suggests that the primary reason for this negative relationship can be attributed to the personality characteristics of people with such qualification, which – albeit useful for R&D and manufacturing – often focus too much on the technological aspects of their business but neglect the importance of marketing and general management. However, for founding teams that integrate *Technology Experience* with either *Managerial Experience* or *Commercial Experience*, Colombo & Grilli (2010, p. 619) and Ganotakis (2012, pp. 510–511) found strong evidence that the coexistence of such experiences leads to high levels of performance and can completely reverse the negative effects of sole *Technology Experience*. In general, *Professional Diversity* is seen as beneficial for startup success. The fact that such complementary skills are more likely to be found in teams than in single founders, is part of the reason why startups with founding teams appear to perform better than startups with single founders (Ganotakis, 2012, p. 511). Colombo & Grilli (2010, p. 621) identified that the *Size of the Founding Team* has a significant positive relationship with the sales growth of a startup, but they found no effect on the probability of raising venture capital fundings. However, Breschi et al. (2018, p. 30) found strong evidence that founding teams are more likely to receive venture capital funding, can conduct a higher number of funding rounds and raise a higher amount of financial capital than startups with a single founder. Song et al. (2008, p. 12) also included *Firm Size* (meaning the number of employees) as a resource in their meta-analysis, but ended up with the suggestion of a potential moderating effect. With the same argumentation of the broader set of skills and experiences of a larger employee base, *Firm Size* is included in the research model, although Langguth (personal communication, April 6, 2022) argues that a higher number of employees can be a sign of inefficiencies and that – depending on the business – startups can also grow their sales with a low employment growth.

Regarding organizational knowledge, Song et al. (2008, p. 13) identified *Intellectual Property Protection* as a predictor of startup performance in their meta-analysis. Indeed, the literature recognizes patent ownership of startups as an indicator for better access to venture capital funding and higher sales and employment growth (Farre-Mensa et al., 2020, pp. 676–678). Breschi et al. (2018, pp. 30, 35) state that merely the application for a patent is associated with higher probability of raising venture capital and a successful exit. During the validation interviews with representants of venture capital companies as described in chapter 2.6.1, Langguth (personal communication, April 6, 2022) and Schepers (personal communication, April 22, 2022) both emphasized the importance of having knowledge about market needs and having developed the product, service or technology to the point of market readiness. The scientific literature often designates this state as *Commercial Readiness*, especially in the context of technology, whereas handbooks for practitioners mostly use the term *Product-Market-Fit* (Feinleib, 2011, pp. 3–4; Maurya, 2016; Ries, 2011, p. 75). Similarly, In & Monk (2020, p. 34) state, that for a successful exit it is a requirement to have a product or technology developed to a comparatively mature form that allows deployment to the commercial market.

Considering the preceding elaborations on the *Prior Experiences of the Founding Team* and the fragmented results of prior research, the following more specific research question is proposed:

1.d) Which impact do the prior experiences of the founding team have on the performance of startups in the energy and environmental sector?

2.4 Performance Measurement in the context of Startups

The first question that arises when thinking about measuring the success or performance of startups is a somewhat philosophical one: What do we even mean by success or by high performance of a startup?

Indeed, success is an ambiguous term that can be based on different criteria and is subject to the interpretation of different actors. Most likely, different entrepreneurs would choose different criteria, again different from the criteria investors, customers or the society would define (Santisteban & Mauricio, 2017, p. 9). For instance, one entrepreneur might define success by whether the business can generate higher revenues, another one by

whether it brings personal fulfillment. Whereas investors emphasize a higher share price, the society values creation of jobs and economic prosperity. Nowadays, many startups – and even more so startups pursuing an environmental mission – tend to consider not only financial or growth-oriented criteria, but also factors such as innovation or positive environmental or societal impact as an expression of their performance (Caseiro & Coelho, 2019, p. 141). Santisteban & Mauricio (2017, p. 9) concluded that there is no commonly agreed definition of startup success in the literature. However, they listed a variety of definitions, which contain numerous aspects: number of jobs created, market share, number of customers, employee growth, sales growth, profitability, acquisition or initial public offering, lifestyle of the entrepreneur, improving the lives of others, and financial performance. Consequently, the measures used by scholars to quantify the performance may differ significantly from the objectives which are important to the founders (Siepel & Dejardin, 2020, p. 3). In the following, aside from the ideological dilemma of what success means for different actors, typical methodological issues related to the measurement of startup performance are presented.

2.4.1 Methodological Issues of Startup Performance Measurement

Many studies on startup performance or success use very limited scales – sometimes constituted by a sole item such as firm survival (e.g. Coleman et al. (2013)) – to measure the performance, which does not satisfy scientific aspirations. Miettinen & Littunen (2013, p. 449) emphasize this issue by concluding that the results of prior studies list different predictors of startup success depending on whether a two-point scale or a multiple-point scale of success is used. Slavec & Drnovšek (2012, pp. 45–48) found in their review of measures reported in top-tier entrepreneurship journals, that only 25% of the used measures were appropriately referenced, whereas one third was neither referenced nor developed in the paper. While reliability assessment (Cronbach's alpha) of the scales was accomplished in 91% of the studies, only one third of the measures have been evaluated for construct validity (Slavec & Drnovšek, 2012, p. 47). To accentuate the situation: this review dealt with studies in top journals only! However, in meta-analyses of the key issues in entrepreneurship research design and construct measurement, Crook et al. (2010, pp. 14–18) and Combs et al. (2021) described the weaknesses of constructs used in the past and concluded, that studies in top journals are becoming more robust but that there is still a lot of room for improvement, especially regarding scale development

with the fundamental criteria of construct validity (Slavec & Drnovšek, 2012, p. 47). However, the literature on startup performance assessment is still very confined or often suggests adaptions of measurement models for conventional companies. Hence suitable models are still scarce and require more robust contributions to take into account the organizational agility, limited financial resources and associated risks (Antunes et al., 2021, p. 4; Rompho, 2018, p. 32). Below, the most common methodological problems of startup performance assessment still present in entrepreneurship research are elaborated.

First, many conventional finance-related indicators for established companies (e.g. turnover growth, profitability, productivity etc.) are not representative or not measurable in the early phases of a firm (Frimodig & Torkkeli, 2013, p. 9; Maurya, 2016, p. 3; Rompho, 2018, pp. 34–35). Another prominent issue in entrepreneurship research, especially when firm survival is used as a performance indicator, is the survivor bias, as outline in the systematic literature analysis of Zhang and Cueto (2017), and by Chan (2009) and Rutherford (2017, pp. 95–96). Measuring predictors and indicators of performance at different points in time, alleviates this problem to some degree. However, all startups that would fall under the delimitation of the sample as outlined in chapters 2.1 and 3.1.1 but did not survive until the initial observation, are not considered in this study, thereby constituting a major source of survivorship bias. Other frequent problems in personal interviews and survey questionnaires are that the founders often do not want to disclose data on financial performance indicators (Witt, 2004, p. 398) or that they present their startup more successful than it is due to commercial motives (Siepel & Dejardin, 2020, p. 14). Another prominent aspect of operationalizations of startup performance are growth-related indicators such as sales, number of employees or assets in the balance sheet. However, such indicators imply the issue of relative vs absolute growth (Witt, 2004, p. 397). Relative growth measures such as an annual sales growth rate or employment growth rate favor smaller companies, where small absolute changes result in substantial relative changes, resulting in a bias towards more successful smaller companies. For absolute growth measures the opposite bias is the case. Naturally, even a tiny relative sales growth of a big company can distinctly outperform the sales growth of a small startup when measured in absolute numbers. To reduce the effect of company size, a combination of relative and absolute growth indicators (Witt, 2004, p. 398) or a logarithmic scale can be used. Another issue of growth measurement concerns the

viewing period, as for startups different growth indicators typically rise asynchronously (Coad et al., 2017, p. 538). Besides measuring a variety of growth indicators and calculating a composite value, Witt (2004, p. 398) suggests to observe the startup for several consecutive years and form a compounded annual growth rate. Despite the partially negative implications of relative growth measures, especially for later-stage startups such ratios can be suitable to compare them to incumbent companies, where ratios are the more common indicators. Another dilemma is the trade-off between growth and profitability (Witt, 2004, p. 398). For example, when a study primarily considers growth-related indicators, but a startup focuses on achieving a high profitability by a lean operation, the respective startup might be put in a worse light than it is. On the opposite, some startups' business models deliberately sacrifice short term profitability in favor of a stronger market position in the long run. Keeping in mind that the growth of startups is not linear and does not happen across all indicators at the same time but more in a sequence (Coad et al., 2017, p. 538), it is important to be aware that most studies take a snapshot at a certain point in time, rather than a comprehensive picture of the startup (Siepel & Dejardin, 2020, p. 4). Coad et al. (2017, p. 547) confirmed prior findings, that growth tends to be initiated by employment and sales growth, whereas growth of operating profits and assets tends to follow later. Thus, to obtain a complete and representative picture, a research model with longitudinal data from various indicators is needed. Researches also argue that suitability and importance of certain performance indicators vary with different phases of a startup because they are different in nature (Antunes et al., 2021, pp. 2–3; Rompho, 2018, pp. 34–35). Hence, the phase in the life cycle should be considered for the selection of performance indicators.

2.4.2 Performance Indicators used in the Literature

In the following section potential indicators of startup performance are identified and analyzed. The list of indicators in Table 3 was primarily composed from two publications which specifically address the topic of performance assessment in the context of startups and was complemented with indicators incidentally discovered in studies during the literature analysis for potential predicators of performance. A precondition for listing potential indicators in the table was that the indicator is not only suitable for a specific kind of business model but suits all types of businesses in the more general context of energy and environmental startups. Similar to the independent variables, also the

selection of performance indicators is limited by the available data. Consequently, only the indicators written in bold can be legitimately represented by suitable items provided by the available data and will be subject of further elaboration. These five indicators will serve as items for a compounded performance scale used in the research model. Antunes et al. (2021, p. 15) argue, that the greater the diversification of indicators, the more comprehensive the representation of the real performance of the startup becomes. The scholars further point out, however, that an incoherent selection of indicators can cause issues with the measurement and lead to deteriorated comparability. Therefore, this work tries to rely on the most frequently used indicators in literature within the limitations of the available quantitative data. The formulas for calculating the performance values from the individual items are outlined in chapter 3.1.2.

Table 3: Startup Performance Indicators synthesized primarily from Antunes et al. (2021), Siepel & Dejardin (2020)

Indicator	Description	Source
Survival	the binary state of existence or the duration of survival of a startup	(Antunes et al., 2021, p. 16; Rompho, 2018, p. 34; Siepel & Dejardin, 2020, p. 6; Witt, 2004, p. 397)
Employment Growth	the absolute or relative growth of the number of employees	(Coad et al., 2017, p. 544; Siepel & Dejardin, 2020, p. 4)
Turnover Growth	the absolute or relative growth of annual sales	(Coad et al., 2017, p. 544; Siepel & Dejardin, 2020, pp. 4–5)
Profitability	a binary indicator whether the startup is profitable or not, or expressed by financial indicators such as ROI	(Antunes et al., 2021, p. 16; Coad et al., 2017, p. 547; Siepel & Dejardin, 2020, p. 5)
Productivity	the value-added per employee	(Siepel & Dejardin, 2020, p. 5)
R&D and Innovation	the contribution of a startup to the innovative or technological progression	(Antunes et al., 2021, p. 16; Siepel & Dejardin, 2020, pp. 5–6)
Customer Growth	the absolute or relative growth of the number of customers	(Antunes et al., 2021, p. 16)
Customer Satisfaction	the overall satisfaction of the needs a customer experiences when interacting with the startup's products or services	(Antunes et al., 2021, p. 16; Ripsas et al., 2016, p. 12)
Customer Lifetime Value	monetary value of a customer relationship, based on the present value and the projected future cash flows	(Ripsas et al., 2016, p. 13)
Market Share	a ratio of own sales volume compared to the competitors in the market	(Antunes et al., 2021, p. 16)
Environmental & Social Impact	the positive contribution to the environment or the society	(Antunes et al., 2021, p. 16)
Reached Growth Phase	a binary indicator whether the startup achieved a product-market-fit and reached the growth phase or not	(Feinleib, 2011, pp. 3–4; Maurya, 2016; Ries, 2011, p. 75; Ripsas et al., 2016, pp. 7, 14)(Rompho, 2018, p. 34)

Survival: A prominent non-subjective measure for startup performance is the *Survival* of the startup respectively its persistence in the market, which is an expression of its ability to compete (Siepel & Dejardin, 2020, p. 6; Witt, 2004, p. 397). Although this measure can be obtained relatively easily, this indicator also implies certain difficulties which need to be well thought of by the researchers. The *Survival* can either be expressed on a two-point scale (Miettinen & Littunen, 2013, p. 449), thereby simply indicating whether the startup is still existent or not, or on a metrical scale as the duration a startup existed from its founding to the point it disappears or the time of the scientific observation (Siepel & Dejardin, 2020, p. 6; Witt, 2004, p. 397). It must be noted though, that the disappearance of a startup, cannot necessarily be associated with a business closure due to failure or insolvency of the startup. The operation of the startup can also be ceased due to reasons unrelated to the business (Siepel & Dejardin, 2020, p. 6) or even due to positive developments such as the acquisition by a bigger company, which can mostly be interpreted as a greater success than, for instance, a startup which exists longer but never reaches a performance level which makes it attractive for an acquisition (A. Langguth, personal communication, April 6, 2022). Langguth (personal communication, April 6, 2022) even suggests that startups, which exist for an extraordinary long period without proofing significant traction, are less likely to be successful in the future. Researchers must also be aware of two biases related to the founding dates of the startups in relation to the time of observation (Witt, 2004, p. 397). First, when the *Survival* is measured as a duration, all startups in the sample should be founded in the same year. Otherwise, the later founded startups cannot obtain a score as high as its' older competitors in the sample even though their businesses might be even more successful. Second and important for a digital measurement too, a suitable time period must be determined after which the observation is done. If the period is too short, survival may only be due to a combination of high initial financial resources and a low cash burn rate. If the period is too long, the focus shifts more to established companies and can also be an indicator for lower performance as stated by Langguth (personal communication, April 6, 2022).

Employment Growth: The total number of employees is a common measure for assessing the size of a company for various actors, thus the *Employment Growth* as a measure for the change of the company size is also common, either on its own or as part of a set of indicators (Siepel & Dejardin, 2020, p. 4). While *Employment Growth* is a

widely used metric for economists and policy makers for which the creation of jobs represents a form of economic prosperity and social benefit, Siepel & Dejardin (2020, p. 4) argue that, entrepreneurs not always perceive *Employment Growth* as an indicator for success as a higher number of employees also implies higher personnel costs. This underlines the elaborations from the beginning of chapter 2.4, that different actors have different understandings about what success or high performance of a startup means for them. Although not every actor views *Employment Growth* as the ultimate metric, it is still used as an indicator for performance in this work due to three reasons: First, Coad et al. (2017, p. 547) found that *Employment Growth* is a driver for further sales and profit growth. Second, even though especially for lean organizational setups the growth of sales or profit optimally is proportionally higher than the *Employment Growth*, thereby achieving a higher productivity, such a growth of financial numbers will most often be accompanied by a certain increase of the number of employees. And third, from a societal perspective, job creation as an expression of economic prosperity certainly constitutes a major contribution to the well-being of a society.

Turnover Growth: Based on the explanations in the preceding paragraph, *Turnover Growth* and other related financial metrics are more common indicators in the management literature, as those better express the performance of a company than the size itself (Siepel & Dejardin, 2020, pp. 4–5). Coad et al. (2017, p. 547) outlined that in most companies the growth in turnover succeeds an increase in the number of employees, whereas in high-growth companies the turnover growth can even precede employment growth. Witt (2004) analyzed previous studies on startup success and found out, that many studies which used turnover as a proxy for the company's success, measured the turnover several years in a row and calculated an average annual *Turnover Growth* for a better comparability.

Profitability: When a startup is able to generate profits or achieve a higher *Profitability* than its competitors, this can be interpreted as a clear indicator for a high-performing startup (Siepel & Dejardin, 2020, p. 5), especially under the circumstances that many startups never become profitable at all. According to Coad et al. (2017, p. 546), achieving profitability or growing operating profits is beneficial for the startup in several ways: It can be a sign of the quality of the startup and its business model and can convince the entrepreneurs and the investors to pursue a strategy for significant growth. Furthermore,

profits constitute a source of refinancing the activities of the startup, thereby increasing the independence from investors, which makes it easier to hire new high-performing employees for instance. In addition, Coad et al. (2017, p. 546) confirmed the results of prior research, which suggests that the substantial growth of a startup is often preceded by its ability to generate profits. However, there are also problems associated with the use of *Profitability* as a performance indicator. First, as outlined above, often there is a trade-off between *Profitability* and growth, as Witt (2004, p. 398) explains that 'Profitability and growth measure different aspects of performance as growth is sometimes achieved at the expense of profitability in the short run'. The second problem relates to the measurement of *Profitability*. Often in the early stages of a startup there is a lack of data when it comes to financial ratios typically used in the management literature, which entails that many studies use rather simple operationalizations of *Profitability* (Siepel & Dejardin, 2020, p. 5). Consequently, (2004, p. 398) argued earlier that such measures, which are generally targeted at established companies, can rather be applied for the analysis of later-stage startups which already have several years of track record.

Reached Growth Phase: One of the major challenges of a startup is to reach the point in the product development process where the product or at least a prototype meets the needs of the targeted market segment. This state is usually achieved after several iterations of the prototype based on customer feedbacks and is called *Product-Market-Fit*. At this point there should be sufficient evidence, e.g. in the form of increasing orders or positive customer feedbacks, that the product is ready for the market and the business model is scalable and potentially profitable in the future (Ripsas et al., 2016, pp. 7, 14). Only when the *Product-Market-Fit* is reached the startup should pursue the objective of growing the business substantially, thereby initiating the growth phase (Feinleib, 2011, pp. 3–4; Maurya, 2016; Ries, 2011, p. 75). Depending on the complexity of the product or of the underlying technology, the process until *Reaching the Growth Phase* can take several years and require a considerable amount of human and financial resources. Many startups fail because their financial resources are depleted before they reach this elusive *Product-Market-Fit* (Feinleib, 2011, pp. 3–4). Accordingly, when a startup survives this phase and achieves the *Product-Market-Fit*, thereby moving further to the growth phase, this can justifiably be interpreted as a form of success.

2.4.3 Dealing with a multidimensional Chicken and Egg Problem

Arguably, as startups which *Reached the Growth Phase* have a higher chance of being successful in the future too, *Reaching the Growth Phase* is not only an indicator, but also a predictor of high performance. Coad et al. (2017, p. 537) aptly formulated this as a multi-dimensional chicken and egg problem, as the analogous principle applies to venture capital investments, turnover and employment growth. For instance, when a startup was able to raise a substantial amount of financial capital, this is a predictor for a high probability of being successful and able to raise further capital in the future (A. Langguth, personal communication, April 6, 2022; E. Schepers, personal communication, April 22, 2022). To underline the analogy, researchers found that the mentioned growth dimensions influence each other by stimulating growth in the other dimensions and vice versa (Coad et al., 2017, p. 537; Pugliese et al., 2016, p. 1624). To capture this complexity, achieving this state is integrated into the research model both as an indicator for the dependent variable performance with a simple digital classification whether the startup *Reached the Growth Phase* or not, and as an independent variable *Commercial Readiness* (see chapter 2.3.3) with a more nuanced gradation, whereby both variables were measured at different points in time. A similar handling is applied to *Turnover Growth* and *Employment Growth*, where the *Firm Size* at an earlier point in time and the *Early Turnover* are also incorporated as independent variables. This principle would also make sense for the *Total Capital Raised*, however, the time resolution of the data for this variable is not precise enough as the surveys asked for the *Total Capital Raised* within the last three years, which exceeds the average time between the two observations as described in chapter 3.1.1.

2.5 Handling the Heterogeneity of Startups with Categorical Moderators

A major challenge of entrepreneurship research is the high heterogeneity of startups (Coleman et al., 2013, p. 13), which also applies to this sample. On the one hand, this circumstance poses challenges to the comparability of performance, which is addressed in chapter 3.1.2. On the other hand, this fact suggests the question if the importance of certain resources or capabilities varies according to contextual factors. A prior meta-analysis of Song et al. (2008, pp. 14–17) identified the type of business and the R&D intensity as moderators for relationships between a variety of success factors and the startup performance. Langguth (personal communication, April 6, 2022) also emphasized that the relevant predictors of potentially high-performing startups depend on factors such

as the type of business model, the industry, technology intensity and the stage of the startup. Hence, a moderating effect of these contextual factors can be conjected. Consequently, three categorical moderator variables – *Type of main Offer*, *Technology Intensity* and *Phase in the Life Cycle* – are introduced to the research model as shown in Figure 4 to evaluate whether the importance of certain resources or capabilities varies according to these categories. This is in line with the recommendation of Coleman et al. (2013, p. 13) to use sub-group analyses to deal with the heterogeneity of startups and their founders. Derived thereof, a further research question is proposed:

2.) How do the Type of main Offer, the underlying Technology Intensity and the Phase in the Life Cycle affect the importance of certain resources or capabilities of startups for achieving superior performance?

2.5.1 Startup Life Cycle and Discrepancies in Assessment of Phase

The literature proposes different but similar models to describe the life cycle of startups (Picken, 2017, p. 577). Most publications draw on three major life cycle phases startups undergo from a nascent business to a high-growth company (Marcon & Ribeiro, 2021, p. 3; Paschen, 2017, pp. 182–183; Picken, 2017, p. 588). Sometimes a fourth phase which represents the exit of the startup respectively the transition to a mature business is added (Picken, 2017, p. 588), which however goes beyond the startup growth concept (Marcon & Ribeiro, 2021, p. 3). Although authors use slightly different nomenclature for the phases, the activities associated with each phase are widely the same. Marcon & Ribeiro (2021, p. 3) use the terms *Creation Phase*, *Development Phase*, and *Market Phase*. Paschen (2017, pp. 182–183) calls them *Pre-Startup Stage*, *Startup Stage* and *Growth Stage*. Picken (2017, p. 588) shifts the term *Startup* to the initial phase, but the description of limited time and resource commitment and an informal loose organizational structure, mirrors the initial phase as defined by the other authors. Picken (2017, p. 588) continues with a *Transition Phase*, a *Scaling Phase*, and adds the *Exit Phase*. The life cycle model used for this work is based on these three proposed phases plus the additional maturity phase. However, the designations of the phases are adopted to the corresponding phases as used in the Innovation Monitor database: *Formatio*n, *Validation*, *Growth*, and *Established*. An overview of the life cycle model as used for this thesis is provided with Figure 3, including a brief description of the characteristics of each phase.

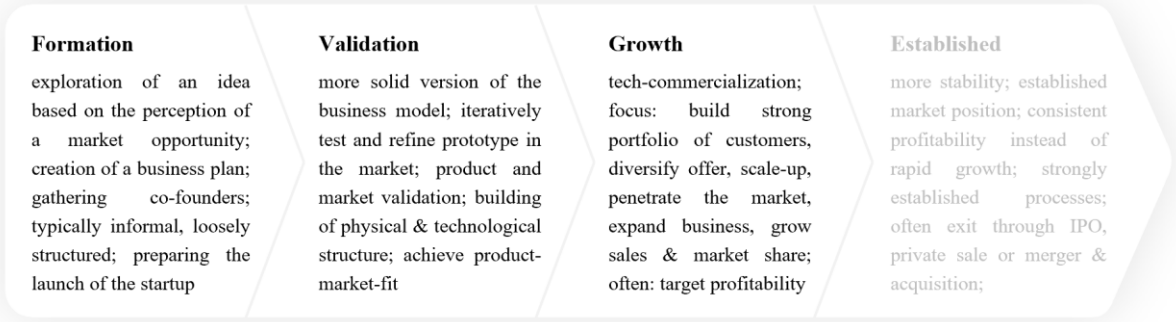

Figure 3: Startup Life Cycle Model based on Marcon & Ribeiro (2021), Paschen (2017) and Picken (2017)

During the initial phase of this thesis a time equivalent of about three working days was spent on the yearly update of the Innovation Monitor database. Besides a thorough desk-research covering the startups' websites, news publications, patent databases, startup tickers and LinkedIn profiles of the founders, a comparison with the answers of the 2021 survey was made for those startups where a response was available (94 startups from which about two thirds are included in the sample for this work). What was noticeable, is that especially for the *Phase in the Life Cycle* and to a lesser degree for the *Commercial Readiness* and for the *Type of Main Offer*, often it was highly questionable whether the respondents' (mostly one of the founders or the CEO) answers reflected the reality of the startup when the answers were compared to the assessment based on the desk research. In some severe cases, the startups seemed to be still in the formation phase developing their idea and did not show any signs of a finished product or a prototype, but the respondents considered their startups to be already in the growth phase. The impression was that this effect occurred in particular with the variable *Phase in the Life Cycle* and the discrepancy appeared to be more pronounced for startups without a founder with prior entrepreneurial experience and for startups which are generally less successful. Why the phase is apparently misjudgment by many respondents remains to be seen. However, self-reported data appears to be unreliable in many cases for the mentioned variables. Therefore, in order to improve the reliability of the data used for the subsequent analyses, the data for the respective variables was taken from the database, which in turn is constituted primarily by hand-collected data from researchers. Those are likely more familiar with the underlying scientific conceptualizations of processual phenomena of startups than most founders or CEOs.

2.6 Complete Conceptual Model

This chapter gives a quick overview of the journey to the final conceptual model by summarizing the inputs from expert interviews and subsequent adaptions to the model. Afterwards, an illustration of the complete conceptual model is presented.

2.6.1 Contributions from Expert Interviews

During the development process of the research model two interviews were conducted with representatives of two venture capitalists for the validation of the research model from a practical perspective. Driven by the objective of maximum financial return on investment, venture capitalists have an intrinsic motivation to identify startups which have a high probability of being successful in the future. To achieve comparable assessments, venture capitalists use systematic evaluation frameworks, which can also provide useful inputs for the research model of this thesis. The first interview partner was A. Langguth (personal communication, April 6, 2022) from Übermorgen Ventures, the second one was E. Schepers (personal communication, April 22, 2022) from Verve Ventures. The interviews were conducted two weeks apart, to have sufficient time for the implementation of the first inputs and to validate the research model in two different states of development. In general, both interview partners agreed, that the research model basically looked good to them from the beginning. Whereas A. Langguth suggested several adjustments (e.g. restructuring of the grouping of predictors by integrating *Team Capabilities & Knowledge* into one group), of which most were implemented until the second interview, E. Schepers proposed only minor alterations, which – noteworthy – concerned aspects which have already been said by A. Langguth, but have not been implemented directly due to concerns of the author. Either way, it is a positive sign that the suggestions of both interview partners largely agreed.

Regarding the independent variables, both experts emphasized the *Commercial Readiness* of the product or technology combined with *Signs of early Traction*, e.g. early orders or early revenue streams, which in turn constitute a source of financial resources. Consequently, *Early Turnover* was added as an independent variable. Furthermore, both highlighted that the *Skills & Experiences of the Founding Team and the Key Employees* are of utmost importance. E. Schepers stated that especially for hardware startups, the affordable access to production and lab facilities is an important factor. However, this

factor could not be included in the model due to the unavailability of data. A similar situation occurred with *External Factors*: Both interview partners emphasized that *External Factors* such as market trends, regulation, crises etc. could have an even bigger impact on the potential performance of a startup than the activities of the startup itself. Although similar signs were discovered during literature research, such factors were not included in the research model because this work clearly focuses on the internal perspective with the underlying theoretical framework of the RBV. However, as it is expected that founders also consider such factors as predictors for future performance anyways, for the qualitative part the view is opened for *External Factors* too, which allows to set the overall power of the RBV to explain the variance of performance in the context of startups into perspective.

Concerning the moderators, the importance of *Technology Intensity* and *Type of Main Offer* was confirmed, and the addition of the *Phase in the Life Cycle* was suggested. E. Schepers also mentioned the type of industry and the type of clients as potential moderators. However, these variables were not implemented due to a lack of data respectively to not further increase the complexity of the research model. Nevertheless, the exploration of the moderation potential of these variables could be subject of future research.

The interview partners also delivered valuable inputs for the assessment of performance. Both agreed that a startup which discontinued its operation should receive a performance score of 0 (see chapter 3.1.2 for the performance scale) because a failed business is of no use to any stakeholder, regardless of what the startup achieved before it failed. They also agreed that the disappearance of a startup due to an acquisition by another company can generally be interpreted as a success and should be scored higher than the sole survival of the startup. Both suggested *Further Fundings* as an additional performance indicator, however, the indicator was not implemented due to the insufficiently precise time resolution of the corresponding data. Both experts also confirmed the impact of the identified moderators on the importance of certain performance indicators, with a distinct emphasis on the *Phase in the Life Cycle*, which was implemented as can be seen in Formula 1 and Formula 2. A. Langguth further suggested to add social or environmental impact indicators. However, such indicators were not implemented due to unavailability of data.

2.6.2 Final Research Model

Based on an iterative consolidation of the literature research and the inputs from the two experts, the final research model is proposed as illustrated in Figure 4.

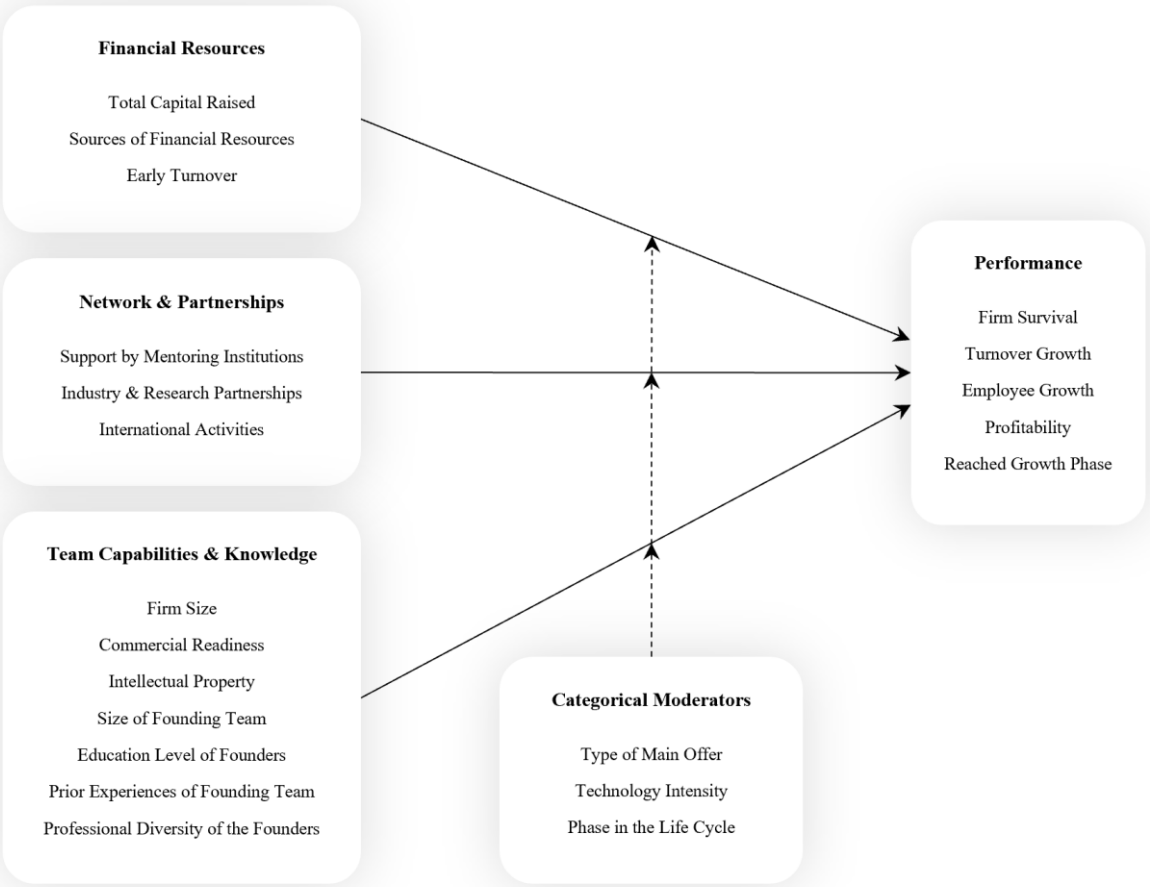

Figure 4: Complete Conceptual Model

Considering the comprehensive character of the research model with its broad spectrum of independent variables, it was decided to refrain from the formulation of hypotheses but formulate a set of specific research questions instead. This allows for more freedom in the quantitative analysis to explore which insights can be derived from the available data. Furthermore, due to the comparatively small sample size, it is questionable if the analysis would deliver any significant results, which would require the rejection of all hypotheses. In favor of the enjoyability for the reader, the work focuses on the significant relationships which could be suggested by the statistical analysis instead. However, it is distinctly emphasized that this approach is not chosen to gloss over the results, but implies that independent variables which are not subject of detailed discussions did not show any or at least no significant correlations with the performance.

3 Methodology

This work mainly takes a secondary research approach, drawing on existing data collected with the Innovation Monitor surveys between 2018 and 2021, complemented by data from the Innovation Monitor database and from desk research. The data is cleaned, structured and integrated into a separate dataset to obtain a larger sample which enables a potentially higher generalizability of the results. Thereafter a mainly quantitative analysis is conducted with SPSS. A brief set of descriptive statistics visualizes the scope and the characteristics of the startups in the sample. A method for automated reduction of independent variables is used in combination with researcher judgement to consolidate the research model to the most important variables, thereby enhancing the validity of the subsequent set of regression analyses for the individual groups of startups determined by the moderator variables *Type of Main Offer* and *Technology Intensity*. The methodological approach is complemented by a qualitative deep dive in the form of semi-structured interviews with founders of seven of the 20% most successful startups in the sample. The qualitative insights from these primary data should test and at most emphasize the results of the previously analyzed secondary data.

A mixed-method approach, in which quantitative data and qualitative data, respectively primary and secondary data, are combined, is a common practice in empirical social sciences for many years (Baur & Blasius, 2014, p. 153). Although the research model for this thesis is primarily designed for the quantitative analysis and is based on the theory of the RBV – thereby following a deductive approach – the nature of secondary research and the broad scope of initially identified independent variables add an explorative respectively inductive element to this work. The integration of qualitative data in the form of semi-structured expert interviews, underlines the mainly deductive characteristics by guiding through the interviews with a list of theory-based topics of interest. This method still offers the possibility to question or refine certain aspects of the theoretical foundation by deepening the interviews on ambiguous topics. This adds comprehensiveness to the work and increases its value for theory and practice. However, opposed to the quantitative analysis which incorporates a large enough sample to achieve statistical significance for the associated population of startups, the number of cases for the qualitative part is too small to legitimately justify a generalization of the results. Therefore, the qualitative results can only be understood as tendencies and directions. This aspect constitutes a

major limitation of this work, especially when compared to similar studies in the scientific literature, which mostly incorporate a substantially larger sample, both for quantitative and qualitative research designs. In conclusion, this work applies the mixed method approach only on a low level, thereby imposing distinct limitations for the generalization of the qualitative results and clearly declaring the qualitative part as a deep dive.

3.1 Quantitative Analysis of Secondary Data

The quantitative analysis was based on a sample of 108 startups, constituted by secondary self-reported data which was complemented with hand-collected information from desk research. First, this chapter presents the data sources and outlines how the dataset was compiled. Subsequently, the measures of the independent and moderating variables are explained and the performance scale is elaborated.

3.1.1 Sources of Data

The main source of data for the quantitative analysis originates from the Innovation Monitor surveys conducted between 2018 and 2021. More than 100 startups took part at those surveys, whereof 73 startups participated at least two times and can therefore be used for the prior explained time comparison. However, the questions of the surveys and consequently the variables (and the scale of the individual variables) which can be represented varied over the years of the survey. Therefore, in order to increase the amount of useable survey responses and to achieve a more comprehensive set of data for the individual data points, the data from the 2018 and 2019 surveys were combined to represent the initial observation, the data from the years 2020 and 2021 were combined to form the second observation which focuses on the measurement of performance. This entails a certain blurriness but is accepted in favor of the higher number of useable responses and the more complete data set. Additionally, 49 startups which responded only to the 2020 survey and exist since 2018 or earlier were also added to the sample, as the survey of this year included several questions about the startups' activities during the last three years. This approximately matches the average time difference between the observations of about two years, which argues for using the corresponding variables for the initial observation. After sorting out those startups which were not in the phases *Formation*, *Validation* or *Growth* at the initial observation, the total useable sample size for the quantitative analysis resulted in 108 startups.

It must be mentioned though, that the datasets of the startups which participated only at the 2020 survey covered fewer independent variables than the datasets of the startups which responded twice. For this reason, among others, the data was complemented by information from the Innovation Monitor database. Such a combination of different datasets can be tremendously beneficial for research, especially when the research questions make a combination necessary because no single dataset exists which covers all the variables in the research model (Siepel & Dejardin, 2020, p. 11). The database offers information for variables which were not covered by the surveys, therefore contributing to the comprehensiveness of the dataset. The other reason is that for some variables the hand-collected data from the database are more reliable than the self-reported data from the responders. This can be legitimately claimed, as a significant amount of time was spent with a database update of the yearly entries of 94 startups prior to the elaboration of this master thesis. The update included a thorough comparison of the individual survey responses and the information gathered by a desk-research covering the startups' websites, news publications, patent databases, startup tickers and LinkedIn profiles of the founders. About two thirds of the group of those startups intersected with the startups in the sample for this quantitative analysis. The comparison has shown that especially the *Phase in the Life Cycle*, the *Commercial Readiness* and the *Type of Main Offer* often appear to be highly questionable when self-reported by the founders, as it is outlined in more detail in chapter 2.5.1. Therefore, the data for these variables was taken from the database. Additionally, as only one survey included questions about the experiences of the founding team, a major part of the datapoints of the corresponding variables was taken either from the founders' descriptions on the startups' websites or from the LinkedIn profiles of the founders. For cases where data was available from multiple years within the initial and the second observation timeframes, the following three rules were applied to determine which data should be transferred to the dataset:

1. For the initial observation, choose the survey response which offers the most complete set of data to cover the set of independent variables.
2. For the second observation, choose the survey response which is as close as possible to a time difference of 2 years from the initial observation.
3. For data from the Innovation Monitor database, choose the entries of the years closest to the years of the respective initial and second observations.

To indicate the origin of certain parts of the dataset as transparently as possible, the dataset was initially composed to a Microsoft Excel file where the individual parts of data were color-coded according to their origin. The headers of the columns of this file also indicate the scale, which was used for the respective variable, as the surveys did not consistently use the same scale or the same categories for each variable in every year. Two rules were applied to determine which scale should be used for a variable:

1. From the occurring variants of scales, use the hierarchically lowest occurring scale, with the hierarchy being from highest to lowest: ratio scale, interval scale, ordinal scale, nominal scale.
2. For ordinal and nominal scales: From the occurring sets of categories, use the set with the lowest number of categories and assign the datapoints with higher resolution to the applicable categories.

Only after this process was finished, the dataset was transferred to SPSS for the statistical analysis. The Excel file and the corresponding SPSS file, including an anonymized version of both files, were handed to the primary supervisor of this thesis. If it is of interest for the reader, the anonymized versions can be requested from Christina Marchand or from the ZHAW School of Management and Law.

Self-reported data and hand-collected data: There is a remarkable difference between the data from the Innovation Monitor surveys and database, respectively from the desk research: The data from the surveys is – as it is the nature of a survey – self-reported from the responder representing the startup, whereas the data from the database and from the desk research is hand-collected and subject to interpretation of a researcher or an expert. In entrepreneurship research, most publications rely on self-reported data, primarily collected by surveys (Crook et al., 2010, p. 19). However, self-reported data can be subject to several biases which have already been extensively discussed in the literature on organizational behavior and entrepreneurship research (e.g. in the literature analyses of Zhang and Cueto (2017) and Chan (2009)). Rutherford (2017, pp. 95–96) mentions the nonresponse bias, which can be the source of a range of distortions. For instance, startups could be less likely to respond to a survey about startup success, when the business is not going well or stopped its operation recently, which also highlights the importance of a possible survivorship bias with self-reported data. In contrast, the participation of high-

performing startups could be more likely as it is appealing to share information about success. Thereby a distorted picture towards a higher average startup performance could arise. Going in a similar direction, Siepel & Dejardin (2020, p. 14) hypothesize, that in a survey the responder may not always tell the truth, particularly when commercially sensitive information is requested. Chan (2009, p. 11) outlines two other distinct problems but defuses that their severity is historically overrated by researchers: the construct validity for an individual self-reported variable and the common method variance when combining several self-reported variables. Common method variance refers to the effect when a major part of variance is caused by the method of measurement rather than by the actual constructs. Rutherford (2017, pp. 95–96) also emphasizes the importance of the biases related to self-reported data but claims that there is little evidence that these biases distort the results of entrepreneurship research to a greater extent. Putting the light on common practices in this field, there are two important datasets, which are well known and widely used by scholars: the Global Entrepreneurship Monitor (GEM) and the US Panel Study of Entrepreneurial Dynamics (PSED) (Siepel & Dejardin, 2020, pp. 6–7). Both are compiled by self-reported data from surveys, which have been designed with utmost attention for construct and measurement validity. Despite their limitations, self-reported data are an important resource for scholars and offer access to information, which is difficult to capture through other sources (Siepel & Dejardin, 2020, pp. 6–7). Those prove particularly important for entrepreneurship research in the form of personal or organizational information such as personality traits, firm cultures, value systems or similar. Compared to self-reported data, hand-collected data usually requires more time by the researcher to collect, which often limits the scope to cross-sectional studies. In this work this problem is addressed by a combination of self-reported and hand-collected data, which allowed a longitudinal research design, but still with a reasonable effort, as it is suggested by Siepel & Dejardin (2020, p. 7). Another advantage of this method is that the expert knowledge of the researcher can be used to perform a more reliable evaluation of variables. For some variables, self-reporting by the founders would be difficult and less reliable because they are often not equipped with knowledge about the concepts in startup research or have no entrepreneurial education at all. However, hand-collected data implies the limitation, that the information of interest might not be available, which was often encountered during the desk research.

3.1.2 Measures

The following section describes the scales used for the operationalization of the variables of the conceptual model. As this work uses data collected with prior surveys, which were designed without a specific research model in mind, a central challenge is the determination of possibilities within the limitations of the existing data regarding items which can be used for the operationalization of variables. For most of the variables it was not possible to rely on scales with tested reliability and validity. However, as outlined earlier, the specificity of the context of this work restricts the availability of such scales to a high extant. Nevertheless, in consideration of the pursuit of entrepreneurship research to a higher methodological robustness as viewed by Crook et al. (2010, pp. 14–18) and Combs et al. (2021), it is was tried to use prior established scales whenever possible or adapt them to the least degree necessary to correspond to the data basis.

Independent Variables

- *Total Capital Raised:* The most precise measure for this variable would obviously be a metric scale such as used by Zhang (2011, pp. 197–198). A part of the secondary data delivered such exact numbers, however, a significant part showed a reduced resolution in the form of an eight-point ordinal scale with potentially increasing steps from <50k CHF up to >10M CHF. A division into ranges was also done in Coleman et al. (2013, p. 7). Consequently, the higher-resolved data was inserted into the ordinal scale. The exact ranges can be viewed in the Excel-spreadsheet with the dataset.
- *Sources of Financial Resources:* Based on Grilli & Murtinu (2014, p. 1527), the different providers of financial resources will be depicted on a nominal scale with the categories *Governmental Financial Support* and *Independent Venture Capitalist*, plus two additional categories *Corporate Venture Capitalist* and *Business Angel*, whereby one startup can also receive fundings from more than one category. For each category a dummy variable was constructed to make the variable processable for the subsequent statistical analysis.
- *Early Turnover:* Only for part of the data exact numbers on the turnover were available. The other part of the data was measured on an ordinal six-point scale with potentially increasing ranges from <50k CHF up to >2M CHF. As this variable additionally constitutes the initial value for measuring turnover growth, this scale provides a compromise between measuring absolute and relative growth as described by Witt (2004,

p. 397). For the same purpose Grilli & Murtinu (2014, p. 1527) used a logarithmic measure for sales, hence, the ordinal six-point scale was used for this variable and the higher-resolved data was assigned to the corresponding ranges. The exact ranges can be viewed in the Excel-spreadsheet with the dataset.

- *Support by Mentoring Institutions:* Several studies use dummy variables to indicate a startup's affiliation to a mentoring institution such as an incubator (Bertoni et al., 2011, p. 1032; Colombo & Grilli, 2010, p. 618) or a science park (Ganotakis, 2012, p. 506). Similarly, three dummy variables were constructed, indicating prior or active participation at an *Incubator or Hub*, *Startup Training or Coaching*, or an *Accelerator*.
- *Industry & Research Partnerships:* Colombo & Grilli (2010, p. 618) and Bertoni et al. (2011, p. 1032) used dummy variables to mark startups which originated from another company or a university. To account for startups which are no spin-offs but established partnerships at a later point in time, four dummy variables are used, indicating *Industry Spin-Offs*, *University Spin-Offs*, *Industry Partnerships*, and *University Partnerships*.
- *International Activities:* The Innovation Monitor database contains only a digital indicator for this variable. Consequently, it was scaled as a dummy variable indicating whether a startup conducted international activities or not.
- *Firm Size:* The simplest and most precise measure would be a metric scale measuring the number of employees such as used by Colombo & Grilli (2010, p. 618). For part of the sample exact employment numbers were available, however, for the bigger part the surveys measured firm size on an ordinal scale with seven numeric ranges with potentially increasing steps from 1 up to 100+ employees. As this variable also constitutes the initial value for measuring employment growth, this scale provides a compromise between measuring absolute and relative growth as described by Witt (2004, p. 397). A similar approach was followed by Bertoni et al. (2011, p. 1032), Colombo & Grilli (2010, p. 612) and Grilli & Murtinu (2014, p. 1527) who alternatively used the logarithmic number of employees to measure firm size. Consequently, the scale of the database was adopted for this study. The exact ranges can be viewed in the Excel spreadsheet with the dataset.
- *Market Readiness:* The scale for this variable is adopted from the Innovation Monitor database, measuring it on an ordinal scale with the categories *Idea or Concept, Prototype in Development*, *Improving Product with Customers*, *Advanced Product*.

- *Intellectual Property:* Farre-Mensa et al. (2020, pp. 676–678) digitally differentiated between filed and approved patent applications, whereas Bertoni et al. (2011, p. 1032) measured the number of granted patents and considered time effects with a discount factor of 0.15 per year. The Innovation Monitor database uses an ordinal scale, dividing into *not applicable*, *not applied for*, *application filed*, *one patent granted*, and *several patents granted*. Consequently, this scale was adopted for this study. In accordance with Coleman et al. (2013, p. 7), an additional dummy variable was created, indicating whether a startup has one or more granted patents or not.
- *Size of Founding Team:* A metrical scale measuring the number of founders is used to represent the size of the founding team as in Colombo & Grilli (2010, p. 617).
- *Education Level of Founders:* A frequently used scale is based on national or international qualification frameworks such as the NQR (Nationaler Qualifikationsrahmen) for Switzerland (CRUS, KFH, COHEP, 2011) or the QF-EHEA (Qualifications Framework for the European Higher Education Area) for the EU (EHEA, 2018). Both scales are comprised of eight congruent education levels. However, due to the resolution of the secondary data, several levels had to be combined into one, resulting in a three-point ordinal scale differentiating between *Non-Academic*, *Bachelor/Master*, and *Phd*.
- *Prior Experiences of the Founding Team:* Coleman et al. (2013, p. 4) used digital indicators to mark prior entrepreneurial experience and prior industry experience of the founders. Colombo & Grilli (2010, p. 617) and Bertoni et al. (2011, p. 1032) individually measure technical, commercial, industry specific, and other work experience in years and managerial experience with a dummy variable. Ganotakis (2012, p. 505) used dummy variables for managerial, technical, commercial and same-sector experience. Since the duration of experiences cannot be expressed with the available data, five dummy variables are constructed, representing prior *Entrepreneurial*, *Industry*, *Technology*, *Marketing & Sales*, and *Managerial & Leadership* experience.
- *Professional Diversity of the Founders:* Ganotakis (2012, p. 507) used dummy variables to indicate whether founding teams have a combination of technical and managerial respectively technical and commercial experiences. Consequently, a dummy variable is constructed to indicate when a founding team has prior technical experience combined with managerial & leadership and/or marketing & sales experience.

Categorical Moderators

- *Type of Main Offer:* The categories for this variable are adopted from the Innovation Monitor database, which differentiates between *Product*, *Software* and *Service*, whereby one startup can also fall into more than one category.
- *Technology Intensity:* Coleman et al. (2013, p. 8) used the three levels high-, medium- and non-tech, based on the categories of the Kauffman Firm Survey (KFS) database, which constitutes the largest longitudinal dataset of new firms in the US. Similarly, Muñoz & Cohen (2018) used the three levels *tech-driven*, *tech-enabled* and *low/no-tech*, which are adopted for this study. Whereas the classification as *low/no-tech* is clear, the boundary between the other two is not self-evident. An example is provided by Huberman (2020): "Tech-enabled companies aren't building the internet, mobile devices or social media platforms; they're using those technologies. Tech[-driven] companies build the hardware, software, algorithms and platforms.", whereby the tech-enabled companies are more direct towards engineering, the tech-driven companies more towards science.
- *Phase in the Life Cycle:* The phase is indicated on a four-point ordinal scale as developed in chapter 2.5.1 based on Marcon & Ribeiro (2021), Paschen (2017) and Picken (2017). Therefore, the phases are congruent with those used in the Innovation Monitor Database: *Formation*, *Validation*, *Growth*, and *Established*.

Dependent Variable Performance

For the scope of startups, most studies use self-constructed context specific performance scales or use isolated indicators such as growth or survival as dependent variables. However, as outlined in chapter 2.4.2, a measure consisting of several indicators – ranging from survival of the startup via progression in the life cycle to growth-related aspects – would provide a more comprehensive picture of the performance of a startup. Therefore, the performance values are calculated according to the Formulas 1 and 2 from the five indicators *Survival*, *Turnover Growth*, *Employee Growth*, *Profitability* and *Reached Growth Phase*. The resulting metric scale provides maximum flexibility for subsequent statistical analyses.

Formula 1: Performance Calculation for Startups in Phases Formation or Validation

$$Perf_{Form/Valid} = Survival * \left(\frac{TurnoverGrowth}{4} + \frac{EmployeeGrowth}{4} + \frac{Profitability}{4} + \frac{ReachedGrowthPhase}{4}\right)$$

Formula 2: Performance Calculation for Startups in Phase Growth

$$Perf_{Growth} = Survival * \left(\frac{TurnoverGrowth}{3} + \frac{EmployeeGrowth}{3} + \frac{Profitability}{3}\right)$$

The rest of this section is organized as follows: reasoning for using two performance formulas, description of scales of the individual indicators.

Handling the Heterogeneity of the Startups in Performance Measurement

The startups included in the sample exhibit a high heterogeneity with regards to the *Phase in the Life Cycle* (Formation, Validation, Growth), the *Type of Main Offer* (Product, Software, Service) and the *Technology Intensity* (tech-driven, tech-enabled, low/no-tech). Researchers agree that the measurement of a company's performance is more complex, and more sector respectively type specific in the scope of startups than it is in the scope of established companies (Ferreira & Otley, 2005, pp. 37–38; Rejc, 2004, p. 246; Wadongo, 2014, p. 685). The literature also suggests, that the viable and relevant indicators for startup performance are dependent on the context of the startup (Ferreira & Otley, 2005, pp. 37–38; Rejc, 2004, p. 246; Wadongo, 2014, p. 685). However, the literature does not offer a dedicated set of indicators, which allows reliable performance measurement across various types of startups along different phases of the life cycle (Wadongo, 2014, p. 685). Accordingly, the measurement methodology should be adapted on the basis of contextual factors and the phase of the startup (Rompho, 2018, p. 33).

Because the chosen performance indicators for this research model are of a rather general nature and do not include business type specific measures, no adaption to the *Technology Intensity* and the *Type of Main Offer* of the startup is undertaken. However, this is not the case for the phase in the life cycle. The progression of a startup from the validation phase to the growth phase can be interpreted as a distinct sign of performance. Contrary, the progression from the growth phase to an established business not necessarily needs to be an intentional step to more stability and profitability, but can also be the result of an inability to further grow the business, facing the fate of many startups which sustain a marginal existence sometimes over many years (Picken, 2017, p. 588). Thus, the performance indicator for reaching the next phase will only be implemented as *Reached Growth Phase* for the group of startups which have been in the *Formation* or *Validation* phase during the initial observation as seen in formula 1. The two phases *Formation* and *Validation* are grouped because for many startups the founding takes place after formation

of the team, or the validation already happens during team formation. In order not to unjustifiably presume a higher or lower performance of startups in the *Growth* phase due to taking different positions in the trade-off between rapid growth and more stability respectively profitability, no indicator for reaching the next phase in the life cycle will be implemented for the group of startups which have been in the growth phase during the initial observation. To compensate for the missing indicator, the weight factors are adjusted accordingly as can be seen in Formulas 1 and 2.

Scales for Performance Indicators

- *Survival:* After consultation of Langguth (personal communication, April 6, 2022) the survival was integrated into the formula as a value factoring the remaining term, because it constitutes the most essential element of startup performance. The variable is ordinally scaled with the values (3) *sold / successful exit*, (2) *survived and operating*, (1) *survived but on hold*, and (0) *closed*. The ordering was done on two basic assumptions: First, an exit via acquisition is considered as more successful than the sole survival. Second, *closed* is valued as 0, because a failed startup does not constitute any value to any stakeholder anymore (A. Langguth, personal communication, April 6, 2022), therefore its achievements prior failing are of no relevance.
- *Turnover Growth* and *Employee Growth:* For both variables the exact same principle applies. Both variables constitute the difference between the turnover respectively firm size at the second observation and the corresponding variable at the initial observation, measured as the number of categories between both observations on the ordinal scale. The potentially increasing ranges constitute a compromise between absolute and relative growth (Witt, 2004, p. 397), similarly to the logarithmic measures for turnover growth used by many studies (e.g. Grilli & Murtinu (2014, p. 1527), Ganotakis (2012, p. 504), Bertoni et al. (2011, p. 1032) or Colombo & Grilli (2010, pp. 618–620)).
- *Profitability:* The available data did only provide information whether a startup was profitable at the time of observation or not, but no information on the level of profitability. Therefore, this indicator was scaled as a dummy variable.
- *Reached Growth Phase:* This indicator was scaled as a dummy variable to indicate whether a startup in the formation or validation phase at the initial observation, progressed to the growth phase at the second observation.

3.2 Qualitative Deep Dive with Primary Data

The qualitative deep dive was conducted by means of semi-structured interviews with founders of seven of the 20% most successful startups out of the sample of the quantitative analysis, discussing about the pertinent topics elaborated in the literature analysis and topics that raised interest during the quantitative analysis.

Collection of Data: The empirics used for the qualitative part of this thesis were collected through semi-structured interviews, as this method encourages an open two-way communication and allows for a comprehensive discussion of the topics of interest (Baur & Blasius, 2014, p. 560). In comparison, entirely unstructured interviews could lead to a loss of thematic focus, leaving the research questions unanswered, whereas structured interviews are used to collect quantifiable data but do not allow the interviewer to depart from the interview guide to deepen certain topics (Saunders et al., 2009, pp. 601–603). A semi-structured interview is used to collect qualitative data based on an interview guideline with a set of prepared questions, narrative prompts or visual stimuli related to several topics of interest. This guideline facilitates that all interviews follow a similar procedure, which promotes the comparability of the answers during the structured evaluation (Baur & Blasius, 2014, p. 565). However, structure also puts limitations on the process with regards to the scope of topics covered during the interview and the level of detail of the discussions. To mitigate this issue, the interviewer can change the order or skip items to adapt according to the situation or ask unprepared follow up questions to go into detail on certain topics (Bogner et al., 2014, p. 28; Saunders et al., 2009, pp. 301–302). Naturally, as every interviewee is different, often slight influence in the form of adjustments to the guidelines is necessary during the interview in order to obtain data which is useful for answering the research questions (Bogner et al., 2014, pp. 58–59). For the interviewer it is a fine line to be specific enough, but not to put too much focus on specific aspects. Too much influence should be avoided, as this can cause a distortion of the results. As Helfferich formulates it in (Baur & Blasius, 2014, p. 560): “As open as possible, as structured as necessary.” In order to restrict the freedom of the answers of the interviewee as less as possible, to obtain the maximum amount of information, the questioning technique of the interviewer should be characterized by open questions and openly formulated narrative prompts (Baur & Blasius, 2014, pp. 565–567).

The design of the interview guide is based on the literature review and augmented by the results of the prior quantitative analysis. It consists of the five topics *Startup Team*, *Life Cycle*, *Success Factors*, *Moderators* and *Performance/Success*, which were extracted from the theoretical part. The topic *Success Factors* further focuses on the sub-topics *Financial Resources*, *Networks &Partnerships* and *Team Capabilities & Knowledge*. Following the interview with A. Langguth (personal communication, April 6, 2022), the sub-topic *External Factors* was added. Being aware of the primarily internal scope of this work imposed by theoretical foundation of the RBV, A. Langguth emphasized the importance of *External Factors*, such as market trends, competitors, or regulation, for estimating the future success of startups in practice. Though the intentional exclusion of external success factors from the conceptual model was mentioned in the theoretical part, the number of independent variables in this research model could erroneously raise the impression of exhaustive comprehensiveness. To point out that this is not the case, as shown by studies which included external factors into the research model such as In & Monk (2020), and to set the results of the quantitative research into perspective, the topic *External Factors* is incorporated into the interviews. Furthermore, the interview guide is constructed in a way that outlines the primarily internal perspective, but leaves room for the interviewee to include *External Factors* when explaining the causalities of successful or unsuccessful situations. Another important aspect is the investigation of negative points. Anderson & Starnawska (2008, p. 228) mentioned that studies in the field of entrepreneurship are often – as the term *success factors* suggests – limited to the positive effects and backgrounds. However, substantial risks, challenges during the life cycle and negative examples are commonly associated with startups. Going in the same direction, the quantitative analysis discovered some negative correlations of certain resources or capabilities with the performance. Hence, the interview guideline incorporates elements which should encourage the interviewee to talk about unovercome challenges, negative situations or detrimental effects. The complete interview guide can be found in Appendix 8. All interviews were conducted via video conferencing in Swiss German and transcribed mutatis mutandis in standard German (see Appendix 9). To avoid further translation-induced distortions (Bogner et al., 2014, pp. 43–47) it was refrained from translating the transcripts to English. However, during the qualitative content analysis all tags were assigned in English, consequently resulting in an English output.

Sampling Selection: The selection of a suitable sample is paramount in qualitative research and requires a comprehensive understanding of the topic at hand to be able to assess which respondents should be considered to obtain information which contributes to the answering of the research question (Bogner et al., 2014, pp. 34–36). A total of 16 startups were contacted, consisting of the 10% startups with the highest performance score in the quantitative analysis and five handpicked startups which were not within the top 10% but already achieved substantial growth and subjectively generated significant impact with their products or services. Attention was also paid to a balanced coverage of the different expressions of the moderator variables *Technology Intensity* and *Type of Main Product* and for the initial phase of the startup. In each case the contact person was either one of the founders or the CEO of the startup. They were approached by e-mail, referring to the primary supervisor of this work – Christina Marchand – who is well known to the respective persons as she is highly engaged in the national startup scene and manages the Innovation Monitor as part of the Institute of Innovation and Entrepreneurship at the ZHAW School of Management and Law. As an additional motivator, the prospect of receiving the insights of this work in a condensed form was mentioned, which eventually could provide a minor contribution to the future success of the startups. After all, seven respondents were willing to participate at the interview.

Analytical Method: For the analysis of the data gathered by the interviews the qualitative content analysis of Mayring (2010) was used. Kuckartz & Rädiker (2022) further divide the content analysis into three types, from which two are relevant for this thesis: the content-structuring qualitative content analysis to identify topics and their mutual relationships; and the evaluative qualitative content analysis, which evaluates the topics and puts its aspects into scale. By scaling, a comparison of the importance of certain positive or negative factors is made possible. For this work mainly the evaluative qualitative content analysis was used because the different topics were already predefined by the theoretical part. However, the content-structuring qualitative content analysis was used two identify mutual relationships between topics or different elements of topics. Furthermore, it was used to assign content which has not been subject of previous discussion in the theoretical part to a suitable topic or, if considered viable, to split an existing topic or create an additional topic.

4 Results

This chapter successively shows the results of the quantitative analyses, followed by the results of the content analysis of the qualitative deep dive.

4.1 Quantitative Analysis

The below section is structured as follows: It begins with descriptive statistics of the sample and a correlation analysis of the explanatory variables. Afterwards, a backward stepwise linear regression is used to reduce the full conceptual model by the elimination of the least significant and predictive variables to find a reduced model that best explains the variance of the performance. Pretests are conducted for both models. Next, a similar approach is used for sub-group-analyses to identify relationships between independent variables and performance which are potentially influenced by one of the moderators. Finally, a series of moderation analyses is conducted to identify effect size, direction and significance of the moderations.

Descriptive Statistics: The output of the analysis can be found in Appendix 2. The sample of 108 startups exhibits a high heterogeneity. 52% have a physical *Product* as their main offer, 34% a *Software* and 50% a *Service* (a startup can also have several types of main offers). While 12% of the startups use no or only low technology, 52% are tech-enabled and 36% exhibit a particularly high technology intensity. 25% of the startups are still in the *Formation* phase, 53% in the *Validation* phase and 22% in the *Growth* phase. For the subsequent analyses the startups in the formation and the validation phase will be grouped together. With 43% almost half of the startups have a founder with prior *Entrepreneurial Experience*. *Industry Experience*, *Technology Experience* and *Managerial or Leadership Experience* are present in about 60% of the startups, while Marketing & Sales Experience falls back with only 32%. About a third of the founding teams (35%) show a *Professional Diversity* by the combination of technical and commercial respectively economic experiences. One third (34%) were single founders, while the rest was founded by teams. While 31% have *Industry Partnerships* and 28% *University Partnerships*, only 17% are *University Spin-Offs* and 9% *Industry Spin-Offs*. 76% pursue *International Activities*. The average *Total Capital Raised* is about 1M CHF, while the financiers are relatively evenly distributed with 33% *Government*, 18% *Independent VCs*, and 19% each *Corporate VCs* and *Business Angels*.

Pearson Correlations: The correlation table can be found in Appendix 2. Due to the large number of variables, only significant correlations which are subject of further elaboration in the discussion are reported. There was a strong positive correlation between *Corporate VCs* and *Independent VCs* (.402**) respectively *Governmental Financial Support* (.264*). *Capital Raised from BA* shows positive significant correlations with both *Industry Partnerships* (.307**) and *University Partnerships* (.468**), while there is also a positive correlation between the two (.393**). Industry Experience is strongly negatively correlated with Support by Accelerator (-.416**), while its correlation with Entrepreneurial Experience is positive (.369**). As can be expected, *Patents Granted* show positive correlation with *Technology Intensity* (.543**). While *Technology Intensity* is also positively correlated with *Main Offer Product* (.443**), the correlations for *Software* and *Service* are distinctly lower and not significant. Furthermore, *Technology Intensity* shows a strong correlation with *Total Capital Raised* (.449**). *Support by Incubator or Hub*, *Support by Accelerator* and *Support by Startup Training or Coaching* all show strong significant correlation with each other (.383**; .446**; 474**).

Multiple Linear Regression Analysis: First, a linear regression with all independent variables but without moderators was conducted. Due to the high number of missing values, a calculation of the regression model was only possible with missing values substituted by average. Still, using the Enter-method the model was marginally significant and the difference between R2 and R2Adjusted was substantial with $F(25, 82) = 1.660$, $p = .046$, $R2 = .336$ and $R2Adjusted = .134$ (for details see the output in Appendix 3). This indicates that the model pretends to explain more variance of the performance than it does, by delivering higher coefficients and lower p-values. This can happen when the sample size is rather small and the number of independent variables relatively high, which was the case because all nominal variables were split into a set of dummy variables. Nevertheless, a series of pretests was conducted to check if the assumptions for multiple linear regression analyses as stipulated by Frey (2018) are fulfilled.

Test of Multiple Linear Regression Assumptions: The linearity of relationships was tested via a scatter plot of the studentized residuals and the unstandardized predictive values, and via the partial regression diagrams of the individual independent variables and the performance. All diagrams showed at least a slight linear relationship. No outliers could be detected, neither by checking the studentized deleted residuals for values greater

than 3 standard deviations, nor by values exceeding the cut-off leverage value of (2*p)/n as suggested by Igo (2010, pp. 600–602), nor by cook values exceeding the value of 1. To test for autocorrelation, the independence of the residuals was tested with a Durbin-Watson criterium of 1.603 which is within typical cut-off values of 1.5 and 2.5. Multicollinearity statistics delivered mostly variance inflation factors (VIF) below 2, with the highest value being 3.013, whereby common cut-off values are 5, sometimes even 10. Homoscedasticity was tested with the scatter plot of the studentized residuals and the unstandardized predictive values, whereby no uneven density was detected. Last, the residuals were tested for normal distribution using a histogram, showing approximately a normal distribution with a mean of 0 and a standard deviation of 0.805. Therefore, all assumptions for a reliable multiple linear regression model were fulfilled.

Backward Stepwise Linear Regression: To mitigate the issues induced by the high number of variables, a backward stepwise linear regression as described by Henderson & Denison (1989) was used. It provides an automated objective way to reduce the number of independent variables by those which describe the least amount of variance. The reduced model exhibits a better fit, lower multicollinearity, improves generalizability and lowers the complexity of interpretation. However, a limitation is that this procedure can output unstable selections of variables, especially when the sample size is small with regards to the number of independent variables (Henderson & Denison, 1989). To compensate for this, not the model with the highest AdjustedR2 was selected, but the model with more variables and a 10% higher AdjustedR2 (complete output in Appendix 4). Table 4 illustrates the coefficients of the selected model. For this regression model also the series of pretests described above has been conducted and revealed no limitations.

The overall model was strongly significant ($F(17, 90) = 2.616$, $p = .002$) and explained 20% of the variance of performance (AdjustedR2 = .204; R2 = .331) showing several significant effects. By the standardized coefficients the effect sizes of the predictors can be compared regardless of the scales. The strongest effect size was found for the initial *Firm Size* which shows a significant negative effect (Beta = -.389, $t(107) = -3.450$, $p = .001$), followed by *Industry Partnerships* with a strong positive effect (Beta = .306, $t(107) = 3.152$, $p = .002$). *Capital Raised from Corporate VCs* (Beta = .227, $t(107) = 2.164$, $p = .033$) and from *Business Angels* (Beta = .217, $t(107) = 2.144$, $p = .035$) both significantly predicted performance, while *Capital Raised from Independent VCs* (Beta = -.180, t(107)

Table 4: Coefficients of reduced Multiple Linear Regression without Moderators

	Coefficients		Std. Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	.064	.361		0.178	.859		
TotalCapitalRaised	.069	.051	.146	1.349	.181	.636	1.573
CapRsdIndependentVC	-.310	.184	-.180	-1.684	.096	.650	1.539
CapRsdCorporateVC	.503	.232	.227	2.164	**.033**	.677	1.476
CapRsdBA	.366	.171	.217	2.144	**.035**	.724	1.381
SupStartupTrainingCoaching	.159	.160	.096	0.995	.322	.797	1.255
IndstrySpinOff	-.236	.206	-.108	-1.143	.256	.840	1.190
IndstryPartnership	.445	.141	.306	3.152	**.002**	.790	1.266
InternationalActivities	.137	.175	.073	0.786	.434	.869	1.151
FirmSizeInitial	-.245	.071	-.389	-3.450	**.001**	.584	1.713
ComReadInitial	.100	.081	.121	1.235	.220	.781	1.281
PatentsGranted	-.342	.180	-.188	-1.904	**.060**	.762	1.313
SizeFoundingTeam	.031	.053	.055	0.583	.561	.839	1.192
EducationLevel	.077	.098	.070	0.779	.438	.919	1.088
EntrepreneurialExperience	.200	.131	.151	1.529	.130	.766	1.305
IndstryExperience	.285	.150	.202	1.900	**.061**	.657	1.521
MarketingSalesExperience	-.102	.137	-.071	-0.749	.456	.826	1.210
ManagerialLeadershipExperience	-.300	.141	-.218	-2.121	**.037**	.703	1.422

a. Dependent Variable: Performance

= -1.684, p = .096) showed a negative effect but without statistical significance. While *Managerial and Leadership Experience* (Beta = -.218, t(107) = -2.121, p = .037) was the only experience with a significant negative effect size, *Industry Experience* (Beta = .202, t(107) = 1.900, p = .061) showed a positive prediction but only with marginal significance. On a similar marginal significance level, *Patents Granted* (Beta = -.188, t(107) = -1.904, p = .060) showed a negative effect size. All other independent variables and variables which were removed from the model did not show significant predictions.

Moderation Analysis: As a next step the moderator variables were included and a moderation analysis with SPSS PROCESS was conducted. However, two issues were discovered: First, the Process plugin does not offer the function of substituting missing values with mean values. Hence, a separate dataset was created with manually inserted mean values. Consequently, the subsequent analyses have been conducted with this file. Second, as the sample size was marginally big enough for the regression analysis, during the moderation analysis with categorical moderators the sub-samples got even smaller, which did not generate significant models or an output at all. To handle this problem, a similar method as before was used. In the form of sub-group analyses, for each moderator

a separate backward stepwise linear regression was conducted for each dimension. For each dimension the model with the highest R2Adjusted was selected. Except for the dimensions *no/low-tech* and *Growth*, this produced regression models with $p < .05$. Next, for each moderator the independent variables of the individual models have been combined. This procedure provides a reproducible and objective way to reduce the number of predictors compared to choosing variables based on expert opinion, which can be biased towards proving the own hypothesis. However, automated variable selection is not meant to replace expert opinion (Henderson & Denison, 1989). Therefore, variables of particular interest have been added even when they were statistically non-significant. The resultant three sets of independent variables for the three moderator variables were suitable for a moderation analysis. However, testing moderation effects for all relationships would have unnecessarily extended the work. To find out which relationships between independent variables and the performance are promising for showing susceptibility to a moderation effect, for each dimension of the moderators a sub-group multiple linear regression was conducted with the determined variable sets. Table 5 to Table 7 each show a summary of these sub-group analyses for the individual moderators (full regression outputs in Appendix 5), whereby distinct differences in the standardized coefficients between the dimensions indicate potential moderations. To quantify these differences, for each variable the sum of the squared differences between the effect sizes has been calculated. Consequently, for the variables with the highest summed squared differences (marked in grey) a moderation analysis with SPSS PROCESS was conducted. The consolidated results are shown in the right sections of Table 5 to Table 7, the detailed output can be found in Appendix 6.

Table 5: Summary of Moderation Analyses for Type of Main Offer

Summary of Sub-Group Analyses for the Moderator TypeOfMainOffer											**Moderation Analysis with PROCESS**			
	Product			Software			Service				Model		Interaction Effect	
		Adjusted R Square	Model Sig.		Adjusted R Square	Model Sig.		Adjusted R Square	Model Sig.	Sum of squared differences between Betas	R Square	Model Sig.	marked vs others OR marked vs marked	
		.356	.004[c]		.335	.065[c]		.288	.019[c]					
Model	Coefficients	Std. Coefficients		Coefficients	Std. Coefficients		Coefficients	Std. Coefficients					Coefficients	
	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.				B	Sig.
(Constant)	1.029		.020	-.522		.606	-.037		.949					
TotalCapitalRaised	.042	.106	.539	.152	.229	.445	.194	.328	.047	.025				
GovernmentalFinancialSup	-.225	-.186	.148	.155	.119	.550	.308	.179	.242	.076				
CapRsdIndependentVC	-.417	-.288	.028	-.631	-.398	.033	-.782	-.405	.035	.009				
CapRsdCorporateVC	1.013	.466	.003	.827	.432	.045	.536	.218	.189	.036				
CapRsdBA	.432	.289	.035	.809	.510	.067	.453	.256	.087	.038				
TurnoverInitial	.014	.022	.894	.281	**.461**	.103	-.027	-.032	.842	**.147**	.314	.010	.139	.327
SupIncubatorHub	-.034	-.019	.902	.052	.014	.949	-.885	-.291	.063	.056				
SupAccelerator	.000	.000	.999	.632	.384	.052	.184	.094	.569	.080				
IndstryPartnership	.336	.253	.053	.082	.063	.771	.603	.384	.010	.052				
InternationalActivities	-.410	-.194	.157	-.842	-.363	.102	.041	.021	.879	.074				
FirmSizeInitial	-.186	-.329	.066	-.208	-.337	.144	-.386	-.554	.001	.033				
PatentsGranted	-.442	**-.296**	.042	.734	**.260**	.334	-.309	-.126	.364	**.162**	.432	.030	.224	.811
SizeFoundingTeam	.129	.282	.065	.130	.203	.317	-.010	-.017	.897	.048				
EducationLevel	-.027	-.029	.832	-.089	-.078	.711	.446	**.336**	.022	**.103**	.339	.004	.551	**.011**
EntrepreneurialExp	.618	**.500**	.001	-.041	-.033	.884	-.068	-.047	.750	**.194**	.306	.014	.434	**.117**
ManagerialLeadershipExp	-.354	-.277	.076	.030	.022	.931	-.086	-.059	.730	.048				
ProfessionalDiversityTechEco	-.425	**-.355**	.041	-.003	-.002	.992	.338	**.218**	.117	**.167**	.347	.022	-.712	.261

Type of Main Offer: Moderation analyses of the relationships of *Early Turnover*, *Patents Granted, Education Level of Founders*, *Entrepreneurial Experience* and *Professional Diversity* with the performance have been conducted. The only significant moderation (B = .551, t(107) = 2.588, p = .011) was shown for the interaction effect of *Education Level of Founders* with *Main Offer Service* when tested against startups without service as a main offer. The entire moderated regression model was significant on a high level (F(19, 88) = 2.372, p = .004, R2 = .339). The sub-group analyses showed a strong positive conditional effect for *Main Offer Service* (B = .446, Beta = .336, t(53) = 2.387, p = .022), whereas the conditional effects for *Product* and *Software* were weak and insignificant. Besides that, the only somewhere marginal moderation effect was shown for the interaction effect of *Entrepreneurial Experience* and *Main Offer Product* (B = .306, t(107) = 1.584, p = .117), however, at best this can be seen as a weak indication for a possible effect, which could probably proof to be significant with a bigger sample. Nevertheless, the sub-group analysis for *Main Offer Product* (F(17, 38) = 2.791, p = .004, R2 = .555, R2Adjusted = .356) showed a strong positive conditional effect for *Entrepreneurial Experience* (Beta = .500, t(55) = 3.627, p = .001).

Table 6: Summary of Moderation Analyses for Technology Intensity

Summary of Sub-Group Analyses for the Moderator TechnologyIntensity											**Moderation Analysis with PROCESS**					
	tech-driven			tech-enabled			low/no-tech				Model		Interaction Effect 1		Interaction Effect 2	
	Adjusted R Square	Model Sig.		Adjusted R Square	Model Sig.		Adjusted R Square	Model Sig.		Sum of squared differences between Betas	R Square	Model Sig.	**low/no-tech** vs tech-enabled + tech-driven		low/no-tech + tech-enabled vs **tech-driven**	
	.646	<.001[c]		.047	.297[c]		.049	.480[c]								
Model	Coefficients	Std. Coefficients		Coefficients	Std. Coefficients		Coefficients	Std. Coefficients					Coefficients		Coefficients	
	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.				B	Sig.	B	Sig.
(Constant)	.947		.019	.595		.145	1.447		.151							
CapRsdCorporateVC	1.610	**.899**	<.001	.346	**.150**	.316				**.281**	.312	.002	.830	.650	1.102	**.023**
CapRsdBA	.225	.170	.193	.130	.072	.618				.005						
TurnoverInitial	-.179	**-.291**	.045	.112	.152	.378	.148	.142	.689	**.128**	.283	.009	.290	.205	-.167	.269
SupStartupTrainingCoaching	-.029	-.019	.866	.522	.307	.082	-.621	-.333	.484	**.205**	.288	.007	.771	.134	-.410	.247
SupIncubatorHub	-.987	**-.551**	.003	-.283	-.105	.537	.039	.016	.974	**.179**	.270	.014	.496	.502	.124	.808
IndstrySpinOff	-.361	-.197	.128	-.096	-.044	.758				.012						
IndstryPartnership	.879	**.757**	<.001	.299	**.189**	.208				**.161**	.284	.008	-.489	.740	.432	**.126**
FirmSizeInitial	.001	**.001**	.994	-.231	-.345	.030	-.483	-.598	.122	**.181**	.319	.002	.251	.254	.268	**.036**
PatentsGranted	-.662	-.412	.002	-.055	-.022	.877				.076						
IndstryExperience	.463	.361	.012	.423	.284	.068	.046	.031	.946	.060						
MarketingSalesExp	-.399	-.237	.059	-.208	-.144	.341	-.049	-.036	.935	.020						
ManagerialLeadershipExp	-.393	-.324	.036	-.352	-.234	.122	-.511	-.382	.299	.011						

Technology Intensity: Relationships of performance and the following independent variables have been tested for a moderation effect: *Capital Raised from Corporate VCs*, *Early Turnover*, *Support by Startup Training or Coaching*, *Support by Incubator or Hub*, *Industry Partnership*, and *Firm Size*. Two significant moderations could be identified: The strongest moderation was shown by the interaction effect of *Technology Intensity* on the *tech-driven* level and *Capital Raised from Corporate VCs* (B = 1.102, t(107) = 2.308, p = .023). The overall moderated regression model was highly significant and explained 31% of the variance in performance (F(16, 91) = 2.579, p = .002, R2 = .312). The conditional effect size of *Capital Raised from Corporate VCs* at the level *tech-driven* was highly significant (B = 1.217, t(107) = 3.102, p = .002), while at the other levels no significant effects could be shown. The other significantly moderated relationship was found between Firm Size and performance (B = .268, t(107) = 2.127, p = .036) when *tech-driven* startups were tested against *low/no-tech* and *tech-enabled* within an overall significant model (F(16, 91) = 2.663, p = .002, R2 = .319). The corresponding sub-group analyses revealed that Firm Size did not predict performance of *tech-driven* startups (overall model: F(12, 26) = 6.775, p < .001, R2Adjusted = .646), while negative effects for *low/no-tech* and for *tech-enabled* startups are suggest by the models, however, the two associated models were not significant overall. Due to the distinctly insignificant regression models for the sub-groups *low/no-tech* and *tech-enabled*, concluding on further moderation effects is problematic. However, in combination with the not unambiguously insignificant interaction effect of *tech-driven* and *Industry Partnership* (B = .432, t(107) = 1.544, p = .126) it could be a hint that such partnerships are more important for *tech-driven* startups than for the other ones. Strengthening this vague suspicion, *Industry Partnerships* significantly predicted performance (Beta = .757, t(38) = 6.744, p < .001) in the highly significant sub-group analysis (F(12, 26) = 6.775, p < .001, R2Adjusted = .646) for tech-driven startups. However, this model showed some multicollinearity which distorts its explanation proportion towards a higher value.

Table 7: Summary of Moderation Analyses for Phase in the Life Cycle

Summary of Sub-Group Analyses for the Moderator PhaseInitial								**Moderation Analysis with PROCESS**			
	Formation/Validation			Growth				Model		Interaction Effect	
		Adjusted R Square	Model Sig.		Adjusted R Square	Model Sig.	Sum of squared differences between Betas	R Square	Model Sig.	Formation/Validation vs Growth	
		.184	.007[c]		.462	.059[c]					
Model	Coefficients	Std. Coefficients		Coefficients	Std. Coefficients					Coefficients	
	B	Beta	Sig.	B	Beta	Sig.				B	Sig.
(Constant)	-.503		.150	-1.025		.471					
CapRsdCorporateVC	.238	.118	.282	.850	.317	.215	.020				
TurnoverInitial	.088	.137	.201	.087	.097	.718	.001				
SupStartupTrainingCoaching	.242	.162	.170	.102	.043	.831	.007				
SupAccelerator	-.209	-.133	.265	-.907	-.367	.251	.027				
IndstrySpinOff	-.294	-.153	.188	.176	.058	.780	.022				
IndstryPartnership	.449	.346	.002	.891	.473	.036	.008				
InternationalActivities	-.224	**-.130**	.252	1.419	**.617**	.028	**.279**	.277	.004	1.004	**.014**
FirmSizeInitial	-.088	**-.153**	.208	-.441	**-.536**	.036	**.073**	.280	.004	-.371	**.012**
ComReadInitial	.258	.324	.003	.612	.416	.112	.004				
IndstryExp	.327	**.262**	.030	-1.316	**-.712**	.050	**.474**	.304	.001	-.982	**.002**
TechnologyExp	.190	**.156**	.147	-.327	**-.189**	.378	**.060**	.267	.006	-.661	**.029**
MarketingSalesExp	-.147	**-.116**	.272	.326	**.157**	.487	**.037**	.233	.025	-.256	.466

Phase in the Life Cycle: Moderation analyses of the relationships of *International Activities*, *Firm Size, Industry Experience*, *Technology Experience* and *Marketing & Sales Experience* with the performance have been conducted. Of those five, four moderations proved to be significant. The interaction effect of *Phase* and *International Activities* (B = 1.004, t(107) = 2.498, p = .014) was highly significant and showed a strong moderation of the relationship with performance (model: F(14, 93) = 2.543, p = .004, R2 = .277). A significant positive and strong conditional effect of *International Activities* in the phase *Growth* was shown (B = .804, t(107) = 2.344, p = .021), while there was no significant effect during *Formation/Validation*. For *Industry Experience* it is vice versa: A strong negative significant interaction was shown (B = -.982, t(107) = -3.171, p = .002) within the highly significant regression model (F(14, 93) = 2.895, p = .001, R2 = .304). The conditional effect for phase *Formation/Validation* was positive and significant (B = .458, t(107) = 2.939, p = .004), while the conditional effect for phase *Growth* was negative and marginally significant (B = -.525, t(107) = -1.883, p = .063). The effect of *Technology Experience* on performance is also moderated by the phase, showing a significant negative interaction effect (B = -.661, t(107) = -2.218, p = .029) and the entire model was highly significant (F(14, 93) = 2.420, p = .006, R2 = .267). Both conditional effects, however, were neither significant in the moderation model (Formation/Validation: B = .240, t(107) = 1.637, p = .105; Growth: B = -.420, t(107) = -1.642, p = .104) nor in the sub-group analyses. The relationship of *Firm Size* and performance was also moderated by the phase with a weaker but significant negative interaction effect (B = -.371, t(107) = 2.572, p = .012) within a highly significant model: F(14, 93) = 2.577, p = .004, R2 = .280). The conditional effect of *Firm Size* was only significant for phase *Growth* (B = -.453, t(107) = -3.557, p < .001). The two sub-group analyses confirm the results of the moderation analyses with only slightly different effect sizes and significance levels. While the sub-group model for phase *Formation/Validation* was highly significant (F(12, 71) = 2.563, p = .007, R2 = 0.302, R2Adjusted = .184), the model for phase *Growth* showed marginal significance (F(12, 11) = 2.648, p = .059, R2 = 0.743, R2Adjusted = .462) and showed minor issues with multicollinearity. Although no significant moderation effect could be shown for *Marketing & Sales Experience*, the sub-group analyses show weak signs of a small negative effect during *Formation/Validation* and a small positive effect in the *Growth* phase.

4.2 Qualitative Deep Dive

The qualitative content analysis was done in three main steps: First, the transcripts of the interviews were read (see Appendix 9) and all text fragments which could be related to the research questions or the topics *Financial Resources*, *Network & Partnerships*, *Team Capabilities & Knowledge*, or *External Factors* were copied into an Excel spreadsheet. Each text fragment was summarized by an appropriate phrase and assigned to one or more suitable topics. During the analysis four additional topics were created to allow for a better structurization of the interviewees' statements: *Other Factors*, *Relationships between Resources*, *Moderating Effects*, and *Performance Aspects*. In a second step, a concise tag was assigned to each phrase, whereby an indicator was added to express the direction or the importance the interviewee awarded to the factor (+ positive; - negative; ~ no major effect or unimportant; ++ particularly important). Moderating effects were written as *CategoricalModerator*: *ImportantFactorForThisCategory*. Relationships were denoted as *InfluencedVariable: InfluencingFactor*. All tags were counted, sorted by number of occurrence and grouped according to similar topics. In a third step, some tags were further consolidated, counting tags marked with "++" twice. Finally, the counts were summarized per topic and sub-topic and portrayed in Table 8 to Table 10. The detailed consolidation of the data can be comprehended by the attached Excel spreadsheet.

Of the main topics, *Team Capabilities & Knowledge* (113) was distinctly addressed most frequently, while the other topics *Financial Resources* (62) and *Network & Partnerships* (49) received less attention by the interviewees. Despite the absence in the framework of the RBV, *External Factors* (65) was the topic with the second most assigned tags. In the area of *Financial Resources*, the importance or positive impact of *Total Capital* was mentioned 21 times. Regarding the sources of the capital, *Early Turnover* (14) was stated most frequently, while *Governmental Financial Support* (6) and capital from *Corporate Venture Capitalists* (5) and *Private Investors* (4) were also considered helpful. However, one founder mentioned that venture capital fundings lead to a loss of independence. *Early Turnover* was also considered particularly valuable for finding investors (3). Within the topic *Network & Partnerships*, *Support by Mentoring Institutions* (6) was viewed far less important than *Industry & Research Partnerships* (38), whereby *Industry Partnerships* (27) were distinctly regarded the most important resource of the whole analysis. Industry Partnerships (7) and related tags such as Network (14) or Network & Partnerships (3)

were most frequently mentioned as influencing factors regarding relationships between different resources, proofing particularly helpful for *Finding Investors* (5), building *Team Capabilities & Knowledge* (5), further expanding *Networks & Partnerships* (3), establishing a good *Reputation* (3) or *Finding Employees* (1). In the area of *Team Capabilities & Knowledge*, *Product-Market-Fit* and related aspects were mentioned most often (27), followed by *Prior Experiences* (26). The interview partners emphasized the importance of achieving a *Product-Market-Fit* or *Commercial Readiness of the Technology or Product* quickly, as this period is usually characterized by a high burn rate. In this regard, it was repeatedly emphasized to test the market early with a prototype (5) and listen closely to the customer needs (5). Also, the *Total Capital Raised* was mentioned twice as being paramount for survival of the product development time until reaching *Product-Market-Fit* or *Commercial Readiness*. The relevance of *Technology Experience* (9) was stated most frequently, followed by *Marketing & Sales Experience* (7), whereby *Technology Experience* was viewed crucial for startups with a high *Technology Intensity* (7). *Entrepreneurial* and *Industry Experience* fell back with only 3 and 2 references. Other particularly stressed aspects were the importance of *Team Culture* (7) including related facets such as mindset, motivation, passion, and *Persistence* (5). *Intellectual Property Protection* (4) received not much attention and *Patents* (2) were not considered important. *Focusing on Key Competencies* (5) was mentioned several times and *Outsourcing of Production* (3) was considered helpful for startups with a physical product. In this respect, following the *Lean Startup Principles* (3) was perceived beneficial, while a too big *Firm Size* (2) was considered detrimental. *International Activities* (5) were not only mentioned as a positive aspect for startups in general, but also as a factor influencing other resources or capabilities (4). They are useful for resolving the limitations of the *small Swiss Market* (3), or for saving *Financial Resources* with foreign employees (2) or by outsourcing production (2). Regarding the *External Factors*, the positive influence of *Market Trends* (9) was particularly emphasized, however, two founders also mentioned detrimental effects. *External Shocks* (12) such as the *Covid19 Pandemic* (10) or the *Ukraine War* (2) were stated frequently, which had mostly negative effects on the startups (9), in particular when trying to find investors (3). However, three startups benefited from the external shocks' influences on the energy market. The sub-topic with the most assigned tags was *Switzerland as a Startup Environment* (29). While Switzerland is generally seen as a good

Location for Startups (5), e.g. due to the *Regulatory Framework* (3), the *Governmental Support* (3) or the *Startup Community* (2), some negative aspects are mentioned too. The interview partners stated the *Difficulty of getting Investments* (5) particularly for startups in the energy and environmental sector, negative effects induced by *Public Customers* (4) the small *Swiss Market* (3) and the high *Salary Level in Switzerland* (3). Although the Regulatory Framework was generally considered positive (3), one founder mentioned negative effects due to the non-liberal electricity market in Switzerland.

Table 8: Level 3 Summary of qualitative Content Analysis: Predictors of Performance

Financial Resources	**62**
TotalCapital+	21
Sources of Financial Resources	**38**
SourcesOfFinancialResources+	3
EarlyTurnover+	14
EarlyTurnover~	1
GovFinancialSupport+	6
CorporateVCs+	5
CorporateVCs-	1
PrivateInvestors+	4
BusinessAngels+	2
CrowdFunding+	1
IndependentVCs-	1
Other	
NoSalary	3

Network & Partnerships	**49**
Network+	5
Industry & Research Partnerships	**38**
IndustryPartnerships+	27
IndustrySpinOff+	5
UniversityPartnerships+	5
PartnerManagement++	1
Mentoring Institutions	**6**
SupportByMentoringInstitutions+	2
StartupTrainingCoaching+	2
StartupTrainingCoaching~	1
SupportAccelerator+	1

Team Capabilities & Knowledge	**113**
Team+	11
TeamCulture+	7
Persistence+	5
Product-Market-Fit	**27**
ProductMarketFit+	10
CommercialReadiness+	6
EarlyPrototype+	5
ListenToCustomers+	5
ProductCertification+	1
Experiences	**26**
TechnologyExperience+	9
MarketingSalesExperience+	7
EntrepreneurialExperience+	3
BusinessDevExperience+	2
FinancialMgmtExperience+	2
IndustryExperience+	2
ProfessionalDiversityTechEco+	1
Firm Size	**11**
FocusOnKeyCompetencies+	5
LeanStartup+	3
FirmSize-	2
SizeFoundingTeam+	1
Intellectual Property	**4**
IntellectualPropertyProtection+	2
Patents~	2
Other	
InternationalActivities+	5
SolidContractBetweenFounders+	2
OutsourceHardwareProduction+	2
RiskTolerance+	2
LowFluctuation+	2
ExpectationManagement+	2
PartTimeStartup-	1
NoClearStrategy-	1
OverloadDevelopers-	1
DifficultToFindEmployees-	1
Agility/Flexibility+	1
Scalability+	1
ManufactoringEquipment+	1

External Factors	**65**
ExternalFactors+	4
Switzerland	**29**
HardToGetInvestmentsInCH	5
LocationCH+	4
PublicCustomers-	4
SmallSwissMarket-	3
SalaryLevelInCH-	3
RegulatoryFramework+	3
RegulatoryFramework-	1
GovSupportInCH+	3
GovSupportInCH-	1
StartupCommunity+	2
Market	**16**
MarketTrends+	9
MarketTrends-	2
TechnologyTrends+	1
Competitors-	3
BigCustomers-	1
External Shocks	**12**
Pandemic-	8
Pandemic+	2
War-	1
War+	1
Other	
EnvironmentalFactors+	2
SupplyChainIssues-	2

Table 9: Level 3 Summary of qualitative Content Analysis: Moderating Effects

Type of Main Offer		**Technology Intensity**	
Product: OutsourceProduction+	3	HighTechIntensity: TechnologyExperience+	7
Product: IndustryPartnerships+	1	HighTechIntensity: UniversityPartnerships+	2
Product: LongerTimeToMarket	1	HighTechIntensity: FinancialResources+	2
Software: MarketingSalesExperience+	2	HighTechIntensity: ListenToCustomers+	1
Software: TechnologyExperience+	2	HighTechIntensity: ProductMarketFit+	1
Software: ListenToCustomers+	1		
Software: LowFluctuation+	1	**Phase in the Life Cycle**	
Software: HigherAgility	1	EarlyStage: EarlyTurnover+	2
Software: IncomeLevelInCH-	1	LaterStage: TotalCapital+	2
Software: TotalCapital+	1	LaterStage: TotalCapital~	1

Table 10: Level 3 Summary of qualitative Content Analysis: Relationships within Resource Base

Relationships grouped by influenced Variable		**Influencing Factor**	
FindInvestors: Network+	5	Network+	14
FindInvestors: EarlyTurnover+	3	IndustryPartnerships+	7
FindInvestors: ExternalFactors	3	EarlyTurnover+	4
FindInvestors: InternationalActivities+	1	InternationalActivities+	4
FindInvestors: EntrepreneurialExperience+	1	TotalCapital+	4
FindInvestors: PublicCustomers-	1	TechnologyInhouse	4
TeamCapabilities&Knowledge: Network+	5	ExternalFactors	3
Network&Partnerships: Network&Partnerships+	3	Network&Partnerships+	3
Network&Partnerships: Investors+	2	Investors+	2
Network&Partnerships: InternationalActivities+	1	MentoringInstitutions+	2
Reputation: IndustryPartnerships+	3	InternationalEmployees+	2
Reputation: BigCustomers+	1	IndustrySpinOff+	2
Reputation: Awards+	1	EntrepreneurialExperience+	1
Growth: Network+	3	PublicCustomers-	1
Growth: TotalCapital+	2	BigCustomers+	1
Growth: EarlyTurnover+	1	Awards+	1
Growth: FirmSize+	1	FirmSize+	1
Growth: InternationalActivities+	1	UniversityPartnerships+	1
FindEmployees: MentoringInstitutions+	2	FirmSize-	1
FindEmployees: Network+	1	CommercialReadiness+	1
ProductDevelopment: IndustryPartnerships+	2	CorporateVCs-	1
ProductDevelopment: TotalCapital+	2	CorporateVCs+	1
TechDevelopment: UniversityPartnerships+	1	SalaryLevelInCH-	1
FinancialResources: InternationalEmployees+	2		
FinancialRecources: FirmSize-	1		
FinancialResources: IndustrySpinOff+	1		
Independency: CommercialReadiness+	1		
Independency: CorporateVCs-	1		
Independency: CorporateVCs+	1		
Independency: TechnologyInhouse+	1		
InternationalActivities: IncomeLevelInCH-	1		
InternationalActivities: IndustrySpinOff+	1		
HardwareProduction: IndustryPartnerships+	2		
HardwareProduction: InternationalActivities+	1		
SymbiosisOfResources	2		
Committment: TechnologyInhouse+	1		
Flexibility: TechnologyInhouse-	1		
LimitedCapacity: TechnologyInhouse-	1		

5 Discussion of Results and Implications for Research and Practice

Due to the broad spectrum of this work, the discussion of the results, implications and recommendations for theory and practice, as well as associated topic-specific limitations and possibilities for future research are integrated in this chapter and elaborated topic by topic. The discovered moderating effects are also incorporated into the corresponding topics, however, a comparison of the moderators is provided in a separate sub-chapter which also elaborates associated limitations and implications for future research. The subsequent conclusion consolidates the discussion, elaborates general limitations and implications of this work, and presents associated possibilities for future research.

5.1 Networks & Partnerships

Both the quantitative and the qualitative analysis demonstrated the importance of *Networks & Partnerships* for startups. Addressing research question 1.b, *Industry Partnerships* clearly constituted the most important predictor of performance across all types of startups and phases. However, the moderator analysis showed that *Technology Intensity* moderates the relationship, suggesting that *Industry Partnerships* have an even stronger positive effect on the performance of startups with higher *Technology Intensity*. The qualitative deep dive indisputably confirmed the results and discovered some causalities behind the strong positive effect of *Industry Partnerships*. The most frequently mentioned benefits were positive influences on finding investors, building team capabilities and knowledge, and outsourcing of production of startups with a physical product. Furthermore, such partnerships give a good reputation and help to find qualified employees or further partners in the industry. Surprisingly, no significant effects were found for *University Partnerships* or *Spin-Offs*. This was mostly confirmed by the interviews, however, some founders considered *University Partnerships* valuable when fundamental research is required for the startup's technology or product. Basically, these findings confirm prior research in the sense that *Industry Partnerships* are consistently perceived as positive, while findings to the benefit of *University Partnerships* and *Spin-Offs* are fragmented as outlined in chapter 2.3.2. However, the size of the positive effect of *Industry Partnerships* in comparison to other partnerships or prominent predictors such as *Prior Experiences of the Founding Team* was surprising. The results contribute to entrepreneurship research by setting the positive effect of *Industry Partnerships* into a holistic perspective by the comparison with effect sizes of other resources or capabilities.

With reference to research question 1.c, *Mentoring Institutions* generally did not show a considerable significant positive effect on startup performance. Noteworthy, *Support by Incubators or Hubs* even had a strong significant negative effect on the performance of tech-driven startups. The interview partners did not give much positive credit to *Mentoring Institutions* either. One founder explained that the coaches of such institutions usually do not understand the business models of high-tech startups, particularly not in the energy sector where complex regulations require close collaboration with public authorities and public customers. The results of prior research predominantly elaborate on the positive effects of *Mentoring Institutions*, however, its effectiveness is not without controversy as outlined in chapter 2.3.2. Accordingly, the results of this work further underline this controversy.

These findings imply that startups should put much effort into building strong partnerships with established companies in the industry to benefit of various positive effects. Particularly for tech-driven startups such *Industry Partnerships* seem to be crucial and can be helpful for overcoming challenges associated with the industrialization or commercialization of a new technology, where established companies can aid with experience, production facilities and sales- & supply networks. When fundamental research is required to make a new technology commercially usable, *University Partnerships* can also constitute a valuable resource. The implications for policy makers are to promote industry specific networking events for startups and established companies or to specifically incentivize the cooperation with energy and environmental startups for established companies.

However, the results are subject to important limitations related to the used measures. All explanatory variables discussed in this section have been scaled as dichotomous variables, primarily due to the availability of secondary data. Hence, no information of the number of partnerships or the reason why a startup engaged in an industry partnership entered the model. Accordingly, future research could have a more detailed look at the types of industry partnerships a startup has (e.g. suppliers, customers, knowledge providers, facility providers etc.) and the effects different types of partnerships have on different aspects or other resources of the startup (e.g. finding investors, knowledge, employees, further partnerships, reputation etc.).

5.2 Team Capabilities & Knowledge

In this area the *Prior Experiences of the Founders and the Key Employees* as well as the importance of reaching *Commercial Readiness* by achieving a *Product-Market-Fit* stand out in particular. While the results regarding the experiences originate from both the quantitative and the qualitative analyses, the importance of achieving *Commercial Readiness* and a *Product-Market-Fit* was primarily emphasized by the interview partners.

Experiences: This section discusses the effects of different experiences of the founders, thereby addressing research question 1.d. Interestingly, *Entrepreneurial Experience* and *Industry Experience* were found to be less important than suggested by prior research. However, the sub-group analysis for startups with physical products as a main offer showed a strong significant positive effect of *Entrepreneurial Experience*, which could be caused by the inherent complexity of setting up a production system, where associated prior experience is certainly beneficial. While *Industry Experience* at least showed a small significant positive effect in the quantitative analysis, *Managerial or Leadership Experience* even had a significant negative effect on the performance. Although a major part of the startups in the sample had a high technology intensity, *Technology Experience* was not found as a significant predictor of performance in the general model, which is clearly contradictory to previous research. However, the moderator analysis showed that *Technology Experience* had a positive effect during the *Formation & Validation Phase*, whereas the effect inverts to a negative prediction in the *Growth Phase*. The same effect could be observed with *Industry Experience*, which showed an even stronger significant negative effect in the *Growth Phase*. Although not significant, *Marketing & Sales Experience* showed the opposite behavior, having a negative effect in the beginning, but turning into a positive effect in the *Growth Phase*. While the results of the qualitative deep dive widely align with these findings, the interview partners particularly emphasized the importance of having *Technology Experience* and associated competencies internally, particularly for startups with a high technology intensity, which is clearly more in line with previous research than the quantitative results suggested. The founders also frequently mentioned *Marketing & Sales Experience* as a positive predictor. Considering these observations, it would be natural to assume that *Professional Diversity* with a combination of technical and economical skills would be beneficial. However, the quantitative analysis did not directly deliver evidence for this suggestion. Only the sub-

group analysis for startups with physical products showed a weak significant effect for *Professional Diversity*, but surprisingly a negative one. Also, the interview partners did not specifically emphasize *Professional Diversity*, however, some of them attributed high importance to several experiences at the same time. Considering the moderating effect of the *Phase in the Life Cycle* as described above, still allows the conclusion that some sort of *Professional Diversity* could be beneficial for startups as different experiences are required along the life cycle.

These findings imply for practice, that ambitious individuals with primarily technical skills but without *Entrepreneurial Experience* do not need to shy away from founding in the energy and environmental sector, as *Entrepreneurial Experience* seems to be less important in this context. However, when aiming for a startup with a physical product, looking explicitly for co-founders or key employees with prior *Entrepreneurial Experience* is recommended to set up the production either internally or organize it with well-structured partnerships. When building the team, in the beginning the focus should be set on *Industry and Technology Experience*, whereas people with *Marketing & Sales Experience* should be hired when the *Product-Market-Fit* is achieved and growth is targeted.

Several limitations are applicable to this topic. First, the average timespan of approximately 2.5 years between the two observations is rather short for high-tech startups to achieve major breakthroughs in their product or technology development processes. Hence, the performance scores of tech-driven startups were lower on average, which would probably not have been the case with a longer time between the observations. This could also be the reason why *Patents Granted* showed such a strong negative effect on performance, because patenting technology is usually only applicable to startups with a particularly high technology intensity. Second, the small sample size – in particular for the sub-group and moderation analyses – did only allow for pronounced effects to achieve statistical significance. With a larger sample, more subtle effects which could only be interpreted as vague signs in this work, would probably also be statistically significant. Third, the variables representing the different experiences were scaled as dichotomous variables, as opposed to several previous studies which measured the years of experience.

The findings and limitations of this work entail implications for future research. Many studies focus on the two most prominent performance predicting experiences of founders: *Entrepreneurial* and *Industry Experience*. However, in the context of energy and environmental startups, these were found to be less important than suggested by prior research. Hence, further studies could be conducted to confirm the lower relevance of *Entrepreneurial* and *Industry Experience* in this field. The results of this work could also act as a nudge for future research to put more effort into the exploration of other experiences, e.g. Marketing & Sales, Technology, or Management & Leadership. For future studies with a similar longitudinal research model, a longer timespan between the observations is recommended to ensure that the observed startups have enough time to make significant achievements, particularly when the focus is on high-tech startups.

Commercial Readiness: The qualitative analysis found *Product-Market-Fit* as the most frequently mentioned sub-topic. It was particularly emphasized to test the market with a prototype early and improve the product with iterative steps in close collaboration with the customers to achieve a *Product-Market-Fit* quickly. For technology intensive startups the same principle applies with developing their technology to the point of *Commercial Readiness*, which equally requires frequent interaction with the future consumers of the technology. Doing so reduces the time and required financial capital until the first sales can be made and lowers the risk of developing a product or technology without a market. The results of the quantitative sub-group analysis support these findings with a strong significant positive effect of *Commercial Readiness* on the performance of startups in the formation & validation phase. However, objectively measuring the *Product-Market-Fit* without having reviews of customers available is difficult. Therefore, the maturity of the product or technology was researcher-assessed, based on data from the Innovation Monitor database and desk research. Recognizing the implicit subjectivity of this assessment constitutes a limitation of this quantitative finding. Nevertheless, the entirety of the interview partners provided clear evidence for the importance of achieving a *Product-Market-Fit* respectively *Commercial Readiness* in a reasonable time. Thereby this work confirmed the recommendations of practice-oriented entrepreneurship literature (e.g. *The Lean Startup* from Ries (2011)) from a scientific perspective. However, there is still potential for future research to develop a scientifically robust scale for *Product-Market-Fit* or a set of generalizable criteria to determine its achievement in practice.

Firm Size: A negative effect of a larger *Firm Size* on performance was the strongest effect identified in the quantitative analysis, except for tech-driven startups where no effect of *Firm Size* was found. However, the moderation analyses showed that the negative effect was even stronger for startups in the growth phase. The qualitative analysis partially confirmed this finding, but mainly with statements on other topics which allow a deduction regarding *Firm Size*. Particularly emphasized recommendations were to apply the lean startup principles (see Ries (2011)) and focus on the own key competencies, e.g. by outsourcing production instead of tying own capacity to it. Langguth (personal communication, April 6, 2022) also mentioned that a large number of employees is sometimes a sign of low productivity and a high burn rate, which is often viewed critical by investors. Prior research did not find a significant effect but suggested *Firm Size* as a moderator for other predictors of performance. However, the strength of the effect could be partially induced by a limitation concerning the scale used for *Firm Size* in this work. It was not logarithmic as most previous studies suggested but consisted of categories with incrementally increasing sizes induced by the available data. Therefore, for larger companies a distinctly higher absolute employee growth was required to reach the next category, than for smaller companies. Considering this methodological limitation, issuing a recommendation for keeping the startup small would not be appropriate. On top, firm growth is one, if not the most important implicit target of startups in general. However, based on the interviewed founders' statements, it is recommended to focus on growing the startup within the scope of the own key competencies and use external partners for production, which also gives more flexibility in adjusting capacity to the current needs. Employment growth will follow naturally as soon as the orders require more workforce. For future replication studies it is recommended to use a more robust logarithmic scale as most other studies do to eliminate distortions induced by the methodology.

5.3 Financial Resources

While the *Total Capital Raised* did not show any significant effects in any of the regression models, the *Sources of the Financial Resources* proved to be relevant for performance, which represent the topic of interest of research question 1.a. *Capital Raised from Corporate VCs* and *Capital Raised from BAs* both had significant positive effects on performance, whereas *Capital Raised from Independent VCs* had significant negative effects across all *Types of Main Offer*. Furthermore, *Capital Raised from Corporate VCs*

had a significantly more positive effect on tech-driven startups when compared to startups with lower tech-intensity. Statements of the interview partners are not numerous but still confirm the results of the quantitative analysis. Three possible reasons were suggested by the founders for this observation: First, *Corporate VCs* and *BAs* usually know the characteristics of the business better than *Independent VCs* and therefore have more understanding for challenging times during the product or technology development process. Second, they can provide additional non-financial support to their client startups such as knowledge, networks, or access to production and lab facilities. And third, *Independent VCs* tend to shy away from investing in startups with high technology intensity and associated long product development time when the point of possible high growth lies far in the future, while *Corporate VCs* and *BAs* do not insist on fast growth so much. Earlier research also mentioned the additional non-financial values offered by *Corporate VCs* and *BAs*, but suggested *Independent VCs* to clearly make a positive contribution, particularly related to growth aspects. However, the quantitative analysis showed no significant effect in the growth-sub-sample, but at least no negative effect.

Two limitations are worth mentioning regarding this topic: First, in the research model different modes of financing (equity investment; debt financing) have not been considered. Second, growth related aspects only accounted for part of the performance score, while profitability was also included. Considering the frequent trade-off between growth and profitability, and that *Independent VCs* focus on growing their client startups, the negative effect of *Independent VCs* could be partially caused by the weighting of growth aspects and profitability in the performance scale.

These findings lead to several implications for research and practice: Foremost, this work showed that in the context of energy and environmental startups investments from *Corporate VCs* and *BAs* seem to be more effective than those of *Independent VCs*, which could be due to the generally high technology intensity associated with many startups in this sector. Consequently, startups should not see financial capital as the priority when looking for investors, but also consider possible non-financial contributions the investors can make. Policy makers and administrators could foster such investments by promoting industry-specific networking events. For future research on the effectivity of startup financiers, a comprehensive framework would be desirable, which considers not only financial capital but also explores divers non-financial contributions in more detail.

5.4 Moderators

While the findings related to moderating effects and thereby to research question 2 have been integrated into the topic-specific discussions, this sub-chapter compares the moderation potential of *Type of Main Offer*, *Technology Intensity* and *Phase in the Life Cycle*. To contribute to the advancement of research, it consolidates the eligibility of the investigated variables as moderators in the framework of the RBV.

The *Type of Main Offer* showed the least potential as a moderator, with only one significant but subtle moderation effect concerning the relationship between *Education Level* and performance, whereby a higher *Education Level* appeared to be more beneficial for service startups. Similarly, *Technology Intensity* only showed two significant moderation effects with *Capital Raised from Corporate VCs* and *Firm Size*, whereby the qualitative deep dive suggested a third moderation effect in form of a higher importance of *Technology Experience* for startups with higher *Technology Intensity*. This could, however, not be confirmed by the quantitative analysis. Although the results do not contradict previous research, more numerous moderation effects on resources or capabilities would have been expected for these two variables. Generally, the sub-group regression analyses provided indications for several other moderation effects, but all without statistical significance. Similarly, the qualitative deep dive showed many other potential moderation effects with low occurrences, of which some would probably emerge to stand out if more startups of each category would have been interviewed. This limitation equally applies to the quantitative analysis, where a larger sample size would have been required to achieve statistical significance for subtle effects too. Consequently, a replication study could be conducted when a larger sample is available in the future.

In the quantitative analysis, the *Phase in the Life Cycle* showed the highest number of significant moderation effects with strong to moderate effect sizes in decreasing order: *International Activities*, *Industry Experience*, *Technology Experience* and *Firm Size*. The qualitative deep dive, however, offered only few statements and results on moderating effects of the *Phase in the Life Cycle*. Retrospectively, in the interviews not enough attention was paid to this moderator. Therefore, this could be part of the reason why the qualitative analysis produced few results to confirm or deep dive on the findings of the quantitative analysis on this topic. Nevertheless, among the analyzed moderators the *Phase in the Life Cycle* is probably the variable with the highest moderating potential

within the framework of the RBV. Therefore, future research could focus on the effects of this moderator regarding the importance of certain resources or capabilities. Furthermore, a qualitative study with a similar scope (e.g. *Financial Resources*, *Networks & Partnerships*, *Team Capabilities & Knowledge*, *External Factors*) could be conducted to discover the causalities behind the interaction effects.

5.5 External Factors

One of the main criticisms of scholars on the RBV is that it creates the impression of comprehensiveness, while its focus is mainly on the internal perspective of a company. Considering that prominent instruments for environmental analysis, such as Porter's Five Forces or the PESTEL analysis, represent a large part of strategic management processes, disregarding *External Factors* appears to be a major limitation of the RBV, particularly in the context of startups whose dynamics are strongly tied to societal or technological trends. To advocate for Barney, the RBV as it was intended, takes into account a facet of the external view. It stipulated key resources and capabilities to be valuable, rare, and difficult to be imitated or substituted to be a viable basis for developing a competitive advantage (Barney, 1991, pp. 105–106; Wiklund & Shepherd, 2011, p. 929), thereby setting the own company into a relation with the competitors. While those provisions have rarely been considered when the RBV has been used as a research framework, other *External Factors* such as market trends, technological trends, geopolitical conditions, regulatory frameworks or natural phenomena are not covered by the theory at all. While some quantitative sub-group regression analyses provided a subtle hint for the existence of unconsidered important factors by a low degree of explanation, the qualitative deep dive revealed much clearer evidence. Of the covered topics, *External Factors* obtained the second highest count behind *Team Capabilities & Knowledge*, although no particular emphasizes has been put on them by the interviewer. *Market Trends* and *External Shocks* have been considered highly influential, whereby *Market Trends* were mainly perceived beneficial for the performance of the startups. Though, the risk of competing established companies with considerably more resources hopping on positive *Market Trends* must be considered. Primarily negative influences by *External Shocks* in form of the Covid19 pandemic and the Ukraine war have been mentioned, whereby some startups noted that the associated increase of energy prices was beneficial for their business model. However, the most frequently addressed sub-topic was *Switzerland as a Startup Environment*.

Swiss Environment for Energy & Environmental Startups: In general, Switzerland was considered as a conducive location for startups due to the regulatory framework, the governmental support mechanisms and the valuable startup community. However, also some detrimental factors have been mentioned, particularly applicable to energy and environmental startups: the difficulty of getting investments, negative effects by slow-moving public customers, the small Swiss market and the high salary level. While the legal framework and cooperative custom solutions between policy makers and companies are generally considered beneficial for startups, in some specific areas the regulatory framework considerably hinders startups. One founder forcefully insisted: "The non-liberalized electricity market destroys business cases related to a decentralized energy production. Although special arrangements are made by the authorities, the startups' solutions need to be customized to the Swiss electricity market, which hampers international scalability."

Keeping in mind the limitations of being primarily based on qualitative data and the small interview sample, some implications are proposed for practice. First, startups should not stick to their idea against all market trends but rather identify opportunities and benefit from them, also in externally induced difficult situations which seem to be detrimental in the beginning. Second, policy making is considered cooperative in Switzerland. Therefore, startups should not hesitate to engage in cooperation with administrating institutions to adjust the regulatory framework when required. The sub-group regression analyses showed a strong significant positive effect of *International Activities* on the performance of startups in the growth phase. However, due to a lack of data, no information on the type of the *International Activities* was included into the quantitative analysis. Nevertheless, the interview partners underlined the findings by considering internationalization to be crucial for growing beyond the limitations of the small Swiss market. They further suggested to employ foreign developers to limit the burn rate during the product or technology development phase. Accordingly, it is recommended to setup the business model for an international scope right from the beginning. Once the *Product-Market-Fit* is achieved and growth is targeted, aiming for an international market is highly recommended, especially when the Swiss market is small. For Swiss policy makers two recommendations are made to foster the impact of energy and environmental startups. First, supporting institutions such as *Swiss Global Enterprise* should be further promoted

and startups' participation incentivized. Second, for the specific scope of the electricity market, a liberalization of the regulations in cooperation with associated startups is suggested. This would improve the international scalability of related business models which would offer Switzerland the possibility to adopt a pioneering role in the global transition to a decentralized renewable energy production and sustainable economic activity.

Considering the outlined methodological limitations, implications for future research are made. Most studies focus on clearly defined small areas of entrepreneurship research which allows for highly specific insights. However, as two founders outlined, in an organization almost everything is interconnected somehow and viewing isolated areas implies the risk of missing the big picture. Consequently, research models should either take a comprehensive approach, or control for various internal and external factors with a thoughtful selection of control variables when a specific area is researched. Concerning the limited external perspective of the RBV, more holistic frameworks comprising an internal and an external view, as well as associated interaction effects of moderators or relationships between different resources or capabilities, are needed to better understand startup success.

6 Conclusion and Recommendations for the Innovation Monitor

This study drawing on secondary data examined success factors of Swiss energy and environmental startups in the framework of the RBV and analyzed moderating effects of the startups' *Type of main Offer*, *Technology Intensity* and *Phase in the Life Cycle*. While similar studies have previously been conducted in the US with larger datasets, this study appears to be the first in the context of the Swiss energy and environmental sector. Compared to most previous studies, this work draws on a more comprehensive research model, covering a large part of the RBV with a comparably high number of examined resources and capabilities. While narrower studies tend to produce more detailed results on a single type of resource or capability, this work allowed to compare the importance of different types of resources and capabilities against each other. A detailed discussion of the results has been provided in the previous chapter. While the methodologies of entrepreneurship research became more robust during the recent years, many studies still use rather simplified operationalizations of performance or consider only a single aspect such as survival or turnover growth. Within this work, a comparably sophisticated measure has been used, considering growth-related, profitability-related and product-development-related aspects of performance. Longitudinal studies became increasingly popular in entrepreneurship research and constitute about one third of the studies nowadays. Consequently, this work also used a longitudinal research design, however consisting of only two observations with a relatively short time difference of about 2.5 years on average. What sets this study apart from the others is the mixed method design, which is rare in this field. A primarily quantitative analysis based on a combination of self-reported data and hand-collected data has been complemented by a qualitative deep dive with seven startup founders. This approach allowed for a more comprehensive picture than a single method design would offer.

However, there are several methodological limitations that need to be mentioned. First, the sample of 108 startups was compiled from secondary data of several sources and only marginally sufficient for a multiple linear regression analysis with categorical moderators. As a comparison, similar studies in the US use samples with several thousand startups. Consequently, highly statistically significant results could only be obtained for strong effect sizes, whereas more subtle effects showed at most marginal significance levels. Accordingly, such results could only be interpreted as vague signs. In addition, the

dataset contained many missing values which had to be substituted by average values to enable the moderated multiple linear regression analysis. This procedure induced a bias by reducing the variance in the sample, thereby reducing the explanation level of the model and increasing multicollinearity. However, the multicollinearity still remained well below common cut-off values. In general, a lack of completeness and consistent use of scales in the secondary data put major limitations on the design of the research model and the operationalization of variables. Due to this reason and a generally low scientific robustness of scales used in entrepreneurship research, the measures of the variables were often not adopted from prior studies. However, within the limitations of the secondary data, it was tried to adjust previously used scales as little as possible. Besides biases related to self-reported data as discussed in the methodological part, this study is subject to a survivorship bias, as are most studies in this field. Two concerns need to be highlighted regarding the general research design: First, although the RBV conveys the impression of comprehensiveness, the framework does not take *External Factors* into account, which certainly play a major role in startup success, as it was highlighted by the qualitative deep dive. Second, it is questionable if quantitative research is the optimum method for the field of entrepreneurship research because of the high heterogeneity of the startups and difficult comparability of their business models. Nevertheless, a quantitative analysis provides a higher objectivity than a qualitative one and can raise awareness of less prominent effects. But for a detailed exploration, a qualitative analysis in the form of interviews with founders is probably better suited, as it gives more direct access to the causalities of certain effects.

Besides those identified in the previous chapter, this leads to possibilities for further research and recommendations for the Innovation Monitor. Based on the effects which have been discovered quantitatively, focused qualitative studies could be conducted to investigate their causalities in detail. Exploring causalities quantitatively is difficult in entrepreneurship research because for most aspects it is not possible to conduct experiments. However, further increasing the sample size and keeping track of the startups quantitatively is still recommended, as this would enable advanced longitudinal studies in the future. With a larger sample, statistically significant assertions could be made even for smaller effects. Moreover, complete datasets with the same variables from several consecutive years would provide the opportunity to explore cause-and-effect

relationships. Consequently, it is recommended for the Innovation Monitor surveys to use the same questions every year in order to obtain more complete data and allow for a study with a longer timespan between the observations in the future. Furthermore, it is strongly suggested to use metric scales for the surveys whenever possible. Metrical data can always be downgraded to categories later on, but allows adherence to commonly used measures and gives more flexibility for research design and advanced statistical methods. Referring to the discovered importance of external factors, the Innovation Monitor could consider extending its scope from monitoring mainly startups to monitoring the environment of innovative energy and environmental startups in Switzerland too. As suggested by the qualitative deep dive, such external factors need to go hand in hand with the startups' developments to progress towards a more environmentally sustainable economy. Having longitudinal data and statistics available not only from the startups but also from their innovation environment, would give more power to the Innovation Monitor's recommendations for policy makers. By doing so, the Innovation Monitor could eventually even enhance its contribution to a hopefully successful transition towards clean energy and a sustainable Swiss economy.

7 Literature

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Appendix

Appendix 1 Frequencies and Percentages of Valid Cases

Variable	Frq. 0	valid% 0	Frq. 1	valid% 1	Frq. 2	valid% 2	Frq. 3	valid% 3	Frq. 4	valid% 4	Frq. 5	valid% 5	Frq. 6	valid% 6	Frq. 7	valid% 7	Frq. 8	valid% 8	Missing
TotalCapitalRaised			5	10%	4	8%	13	25%	5	10%	11	22%	5	10%	5	10%	3	6%	57
GovernmentalFinancialSup	66	67%	33	33%															9
CapRsdIndependentVC	82	82%	18	18%															8
CapRsdCorporateVC	46	81%	11	19%															51
CapRsdBA	82	81%	19	19%															7
TurnoverInitial			12	24%	5	10%	19	38%	7	14%	6	12%	1	2%					58
SupStartupTrainingCoaching	37	57%	28	43%															43
SupIncubatorHub	53	84%	10	16%															45
SupAccelerator	38	64%	21	36%															49
IndstrySpinOff	98	91%	10	9%															10
IndstryPartnership	66	69%	30	31%															12
UniSpinOff	89	83%	18	17%															1
UniPartnership	68	72%	27	28%															13
InternationalActivities	16	24%	52	76%															40
FirmSizeInitial			13	12%	46	43%	30	28%	11	10%	6	6%							2
ComReadInitial			3	3%	27	25%	52	49%	25	23%									1
PatentsGranted	43	69%	19	31%															45
Size of Founding Team			33	34%	33	34%	17	17%	12	12%	2	2%	0	0%	1	1%			10
EntrepreneurialExp	58	57%	43	43%															7
IndstryExp	35	37%	59	63%															14
TechnologyExp	38	37%	64	63%															6
MarketingSalesExp	65	68%	31	32%															12
ManagerialLeadershipExp	39	41%	57	59%															12
ProfessionalDiversityTechEco	70	65%	38	35%															0
MainOfferProduct	52	48%	56	52%															0
MainOfferSoftware	71	66%	37	34%															0
MainOfferService	54	50%	54	50%															0
TechIntensity	13	12%	56	52%	39	36%													0
PhaseInitial			27	25%	57	53%	24	22%											0
FirmSizeEnd			13	12%	37	35%	28	26%	18	17%	9	8%	2	2%					1
PhaseEnd	6	6%	9	8%	42	39%	44	41%	7	6%									0
ComReadEnd			2	2%	11	10%	46	43%	48	45%									1
TurnoverEnd			29	33%	7	8%	30	34%	8	9%	10	11%	4	5%					20
Profitability	58	66%	30	34%															20
Survival	9	8%	8	7%	90	83%	1	1%											0

Appendix 2 Descriptive Statistics and Pearson Correlations

	Variable	Mean	SD	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	TotalCapitalRaised	4.235	1.976	51																													
2	GovernmentalFinancialSup	0.333	0.474	99	.081																												
3	CapRsdIndependentVC	0.180	0.386	100	**.381****	.130																											
4	CapRsdCorporateVC	0.193	0.398	57	**.435***	**.264***	**.402****																										
5	CapRsdBA	0.188	0.393	101	.136	.108	.187	.213																									
6	TurnoverInitial	2.860	1.370	50	.339	-.218	.042	-.021	.032																								
7	SupStartupTrainingCoaching	0.431	0.499	65	-.146	.152	.022	.020	**.296***	-.006																							
8	SupIncubatorHub	0.159	0.368	63	-.004	.146	**.258***	**.421****	.146	-.211	**.383****																						
9	SupAccelerator	0.356	0.483	59	-.217	**.354****	.203	.052	-.024	-.020	**.446****	**.474****																					
10	IndstrySpinOff	0.093	0.291	108	-.073	-.075	-.056	-.183	.027	.042	-.137	-.166	**-.273***																				
11	IndstryPartnership	0.313	0.466	96	.141	.159	.057	.105	**.307****	.063	.186	.015	.177	.169																			
12	UniSpinOff	0.168	0.376	107	.128	.187	**.253***	.221	**-.227***	.140	-.006	.121	.161	-.059	.118																		
13	UniPartnership	0.284	0.453	95	.202	.174	.173	.102	**.468****	.028	**.336****	.038	-.034	.035	**.393****	-.084																	
14	InternationalActivities	0.765	0.427	68	.213	.168	.101	.250	.131	.289	**.335***	.115	.171	-.120	.210	**.244***	.248																
15	FirmSizeInitial	2.538	1.025	106	**.692****	.109	.197	**.346****	**.306****	**.419****	.001	.036	.002	-.075	.188	.024	**.372****	.226															
16	ComReadInitial	2.925	0.773	107	.122	-.082	**-.199***	.146	.038	.197	-.124	-.059	.018	-.094	.006	-.114	-.052	-.013	.190														
17	PatentsGranted	0.306	0.465	62	**.425***	**.303***	**.333****	.131	**.309***	-.333	.261	.230	-.020	.057	.184	.238	**.372****	.275	.168	-.230													
18	SizeFoundingTeam	2.194	1.190	98	.069	.114	.142	-.052	.003	-.277	.127	-.217	-.028	.067	.186	.134	**.257***	.063	.155	.015	.235												
19	EducationLevel	1.314	0.593	105	.085	.028	.049	.090	-.049	**.332***	-.080	-.023	.231	-.118	.053	**.246***	.126	-.024	.146	-.018	-.008	-.015											
20	EntrepreneurialExp	0.426	0.497	101	.239	.067	-.096	-.100	.047	.118	-.044	-.134	-.076	.082	-.028	-.095	.036	.051	**.225***	.099	.227	.174	-.088										
21	IndstryExp	0.628	0.486	94	.261	-.100	-.184	.067	-.058	.100	-.091	-.119	**-.416****	.194	-.118	-.135	.125	-.042	.173	-.004	.235	.180	-.081	**.369****								
22	TechnologyExp	0.627	0.486	102	-.044	.043	-.127	.022	-.044	-.148	-.051	-.017	.014	.049	-.104	.169	-.140	-.224	.060	-.085	.152	.162	.112	.156	.175								
23	MarketingSalesExp	0.323	0.470	96	.004	-.078	-.006	-.173	.019	-.008	-.019	-.101	-.109	.160	-.006	-.155	.023	-.050	.065	.048	.059	.197	-.137	**.250***	**.298****	.043							
24	ManagerialLeadershipExp	0.594	0.494	96	.086	.186	-.132	**.263***	.106	.015	.224	.000	.025	.074	.103	-.024	.032	.199	.049	-.173	.067	.093	-.064	.201	**.331****	-.060	.163						
25	ProfessionalDiversityTechEco	0.352	0.480	108	.068	-.030	-.180	.051	.022	-.076	-.031	.017	-.035	.166	-.044	-.012	-.094	-.063	.060	-.083	.190	.130	.002	**.301****	**.397****	**.594****	**.385****	**.437****					
26	MainOfferProduct	0.519	0.502	108	.173	**.315****	.128	-.036	.052	-.133	.227	**.268***	.164	-.012	.003	**.329****	.164	**.258***	.073	-.093	**.443****	**.206***	-.128	-.006	-.006	.152	-.051	.073	.128				
27	MainOfferSoftware	0.343	0.477	108	.091	.105	.028	.069	.012	**.292***	.178	**-.251***	**.261***	-.029	.190	-.117	.065	.207	.138	.069	**-.271***	.074	.114	.010	.109	-.152	.001	.107	-.123	**-.281****		
28	MainOfferService	0.500	0.502	108	-.125	**-.200***	-.043	-.036	.030	.221	-.173	-.153	-.023	-.064	.028	-.096	-.084	-.037	.018	.147	**-.294***	-.060	.076	-.069	-.094	-.177	.067	-.081	**-.194***	**-.667****	**.215***	
29	TechIntensity	1.241	0.654	108	**.449****	**.206***	.131	.162	.159	.242	.189	.142	.175	.078	**.237***	**.377****	.200	**.262***	.144	**-.205***	**.543****	.007	**.284****	-.074	.124	**.218***	**-.233***	.017	.085	**.356****	.093	-.171	
30	PhaseInitial	1.972	0.690	108	.027	.000	**-.221***	-.011	.081	**.347***	-.148	-.218	-.206	.059	.066	-.158	.079	.169	**.243***	**.612****	**-.262***	-.023	.006	**.209***	.086	-.170	-.076	-.081	-.140	-.120	.143	.121	-.172

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix 3 Regression with all Independent Variables without Moderators

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.580[a]	.336	.134	.594588	1.603

a. Predictors: (Constant), ProfessionalDiversityTechEconomics, EducationLevel, SupIncubatorHub, IndstryPartnership, ComReadInitial, TotalCapitalRaised, InternationalActivities, GovernmentalFinancialSupport, SizeFoundingTeam, IndstrySpinOff, CapRsdBA, EntrepreneurialExperience, MarketingSalesExperience, PatentsGranted, SupStartupTrainingCoaching, UniSpinOff, IndstryExperience, TurnoverInitial, CapRsdCorporateVC, ManagerialLeadershipExperience, SupAccelerator, UniPartnership, CapRsdIndependentVC, FirmSizeInitial, TechnologyExperience

b. Dependent Variable: Performance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.676	25	.587	1.660	.046[b]
	Residual	28.990	82	.354		
	Total	43.666	107			

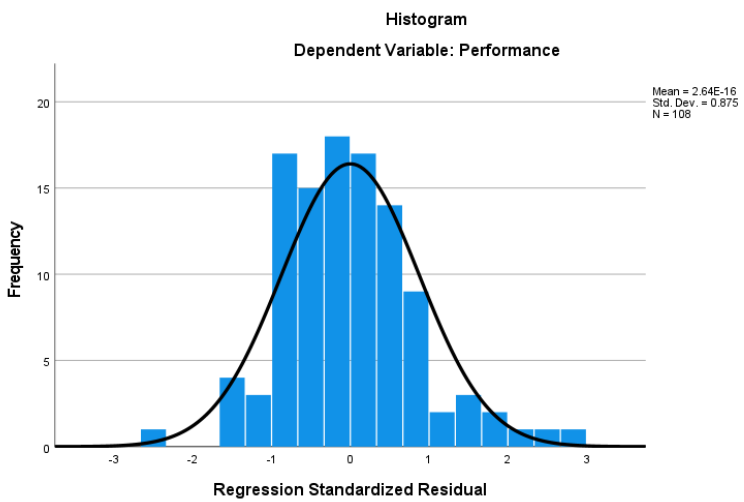
a. Dependent Variable: Performance

b. Predictors: (Constant), ProfessionalDiversityTechEconomics, EducationLevel, SupIncubatorHub, IndstryPartnership, ComReadInitial, TotalCapitalRaised, InternationalActivities, GovernmentalFinancialSupport, SizeFoundingTeam, IndstrySpinOff, CapRsdBA, EntrepreneurialExperience, MarketingSalesExperience, PatentsGranted, SupStartupTrainingCoaching, UniSpinOff, IndstryExperience, TurnoverInitial, CapRsdCorporateVC, ManagerialLeadershipExperience, SupAccelerator, UniPartnership, CapRsdIndependentVC, FirmSizeInitial, TechnologyExperience

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.108	.430		.250	.803	-.748	.963					
	TotalCapitalRaised	.070	.055	.148	1.281	.204	-.039	.178	.048	.140	.115	.608	1.644
	GovernmentalFinancialSupport	-.053	.146	-.037	-.360	.720	-.343	.238	-.028	-.040	-.032	.752	1.330
	CapRsdIndependentVC	-.295	.214	-.172	-1.383	.171	-.720	.130	-.145	-.151	-.124	.525	1.904
	CapRsdCorporateVC	.541	.264	.244	2.053	.043	.017	1.066	.166	.221	.185	.573	1.746
	CapRsdBA	.335	.202	.199	1.659	.101	-.067	.737	.177	.180	.149	.562	1.781
	TurnoverInitial	-.012	.078	-.017	-.151	.880	-.167	.143	.002	-.017	-.014	.635	1.576
	SupStartupTrainingCoaching	.146	.199	.088	.736	.464	-.249	.541	.121	.081	.066	.563	1.778
	SupIncubatorHub	-.093	.263	-.041	-.354	.724	-.617	.430	.022	-.039	-.032	.607	1.647
	SupAccelerator	.087	.222	.049	.392	.696	-.355	.529	.040	.043	.035	.530	1.888
	IndstrySpinOff	-.233	.220	-.106	-1.058	.293	-.670	.205	-.077	-.116	-.095	.807	1.240
	IndstryPartnership	.438	.159	.301	2.761	.007	.122	.754	.276	.292	.248	.680	1.470
	UniSpinOff	-.064	.193	-.037	-.330	.742	-.447	.320	-.083	-.036	-.030	.636	1.572
	UniPartnership	.052	.190	.035	.275	.784	-.325	.430	.126	.030	.025	.508	1.970
	InternationalActivities	.155	.193	.082	.803	.424	-.229	.540	.083	.088	.072	.773	1.293
	FirmSizeInitial	-.246	.079	-.391	-3.114	.003	-.403	-.089	-.078	-.325	-.280	.514	1.947
	ComReadInitial	.099	.088	.119	1.123	.265	-.076	.273	.205	.123	.101	.723	1.382
	PatentsGranted	-.326	.204	-.179	-1.599	.114	-.732	.080	-.080	-.174	-.144	.645	1.549
	SizeFoundingTeam	.027	.062	.047	.435	.665	-.096	.149	.024	.048	.039	.681	1.469
	EducationLevel	.071	.115	.065	.618	.538	-.158	.301	.032	.068	.056	.726	1.377
	EntrepreneurialExperience	.196	.140	.147	1.400	.165	-.082	.473	.075	.153	.126	.734	1.363
	IndstryExperience	.276	.169	.196	1.638	.105	-.059	.612	.060	.178	.147	.566	1.768
	TechnologyExperience	-.009	.191	-.007	-.047	.963	-.388	.370	-.007	-.005	-.004	.408	2.451
	MarketingSalesExperience	-.123	.154	-.085	-.794	.430	-.430	.185	-.087	-.087	-.071	.706	1.415
	ManagerialLeadershipExperience	-.311	.181	-.226	-1.723	.089	-.670	.048	-.036	-.187	-.155	.468	2.135
	ProfessionalDiversityTechEconomics	.050	.208	.037	.238	.812	-.364	.463	-.019	.026	.021	.332	3.013

a. Dependent Variable: Performance


Histogram
Dependent Variable: Performance
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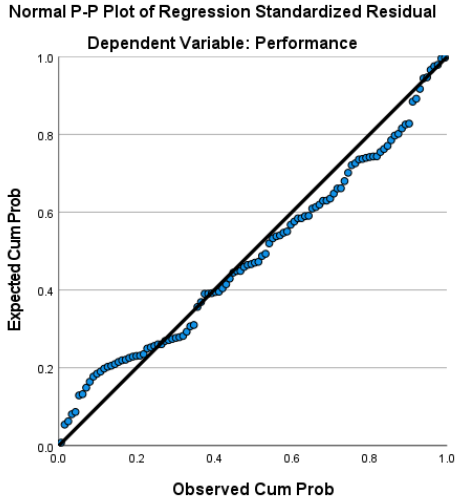
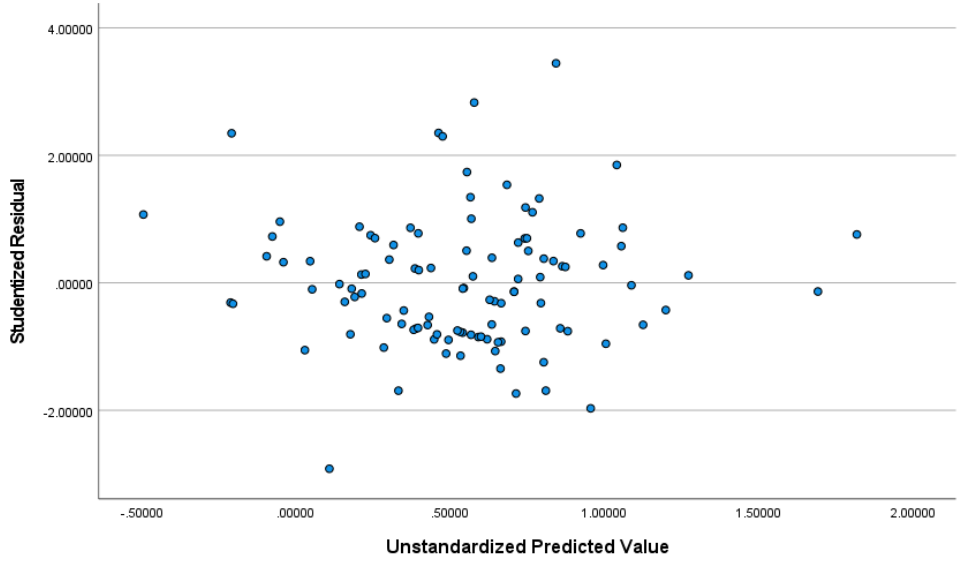
Std. Dev. = 0.875
N = 108
Frequency
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Performance
Expected Cum Prob
Observed Cum Prob


Studentized Residual
Unstandardized Predicted Value

Appendix 4 Regression with reduced Independent Variables without Moderators

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.580[a]	.336	.134	.594588
2	.580[b]	.336	.144	.591003
3	.580[c]	.336	.154	.587554
4	.579[d]	.335	.163	.584369
5	.579[e]	.335	.172	.581207
6	.578[f]	.334	.181	.578216
7	.577[g]	.333	.189	.575273
8	.577[h]	.332	.197	.572308
9	.575[i]	.331	.204	.569852
10	.573[j]	.328	.210	.567781
11	.570[k]	.325	.214	.566198
12	.565[l]	.320	.217	.565134
13	.561[m]	.315	.220	.564092
14	.553[n]	.305	.218	.565079
15	.544[o]	.296	.215	.565943
16	.533[p]	.284	.210	.567841
17	.514[q]	.264	.196	.572703
18	.498[r]	.248	.188	.575800
19	.479[s]	.229	.175	.580140
20	.457[t]	.209	.162	.584806

a. Predictors: (Constant), ProfessionalDiversityTechEconomics, EducationLevel, SupIncubatorHub, IndstryPartnership, ComReadInitial, TotalCapitalRaised, InternationalActivities, GovernmentalFinancialSupport, SizeFoundingTeam, IndstrySpinOff, CapRsdBA, EntrepreneurialExperience, MarketingSalesExperience, PatentsGranted, SupStartupTrainingCoaching, UniSpinOff, IndstryExperience, TurnoverInitial, CapRsdCorporateVC, ManagerialLeadershipExperience, SupAccelerator, UniPartnership, CapRsdIndependentVC, FirmSizeInitial, TechnologyExperience

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
9	.575[a]	.331	.204	.569852	1.620

a. Predictors: (Constant), ManagerialLeadershipExperience, FirmSizeInitial, IndstrySpinOff, PatentsGranted, EducationLevel, SizeFoundingTeam, InternationalActivities, MarketingSalesExperience, IndstryPartnership, CapRsdIndependentVC, SupStartupTrainingCoaching, ComReadInitial, EntrepreneurialExperience, CapRsdBA, CapRsdCorporateVC, IndstryExperience, TotalCapitalRaised

b. Dependent Variable: Performance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
9	Regression	14.440	17	.849	2.616	.002[b]
	Residual	29.226	90	.325		
	Total	43.666	107			

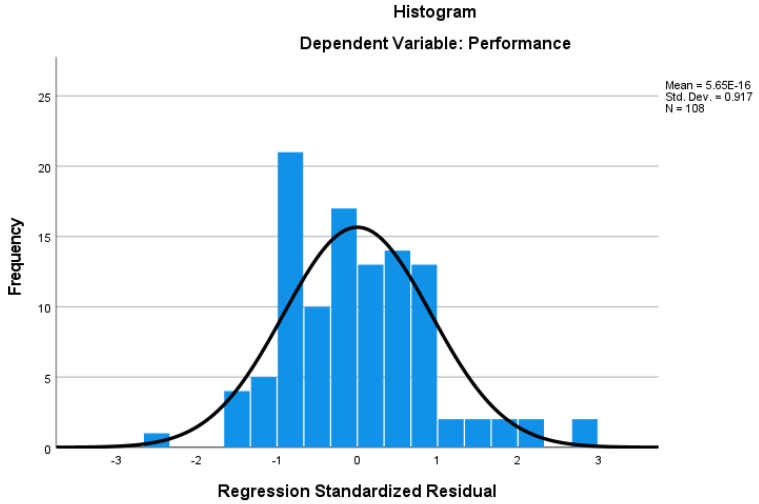
a. Dependent Variable: Performance

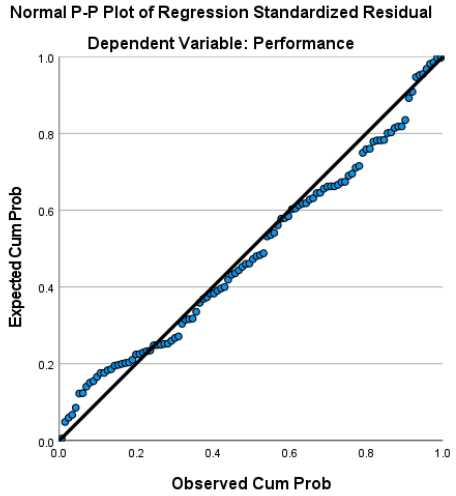
b. Predictors: (Constant), ManagerialLeadershipExperience, FirmSizeInitial, IndstrySpinOff, PatentsGranted, EducationLevel, SizeFoundingTeam, InternationalActivities, MarketingSalesExperience, IndstryPartnership, CapRsdIndependentVC, SupStartupTrainingCoaching, ComReadInitial, EntrepreneurialExperience, CapRsdBA, CapRsdCorporateVC, IndstryExperience, TotalCapitalRaised

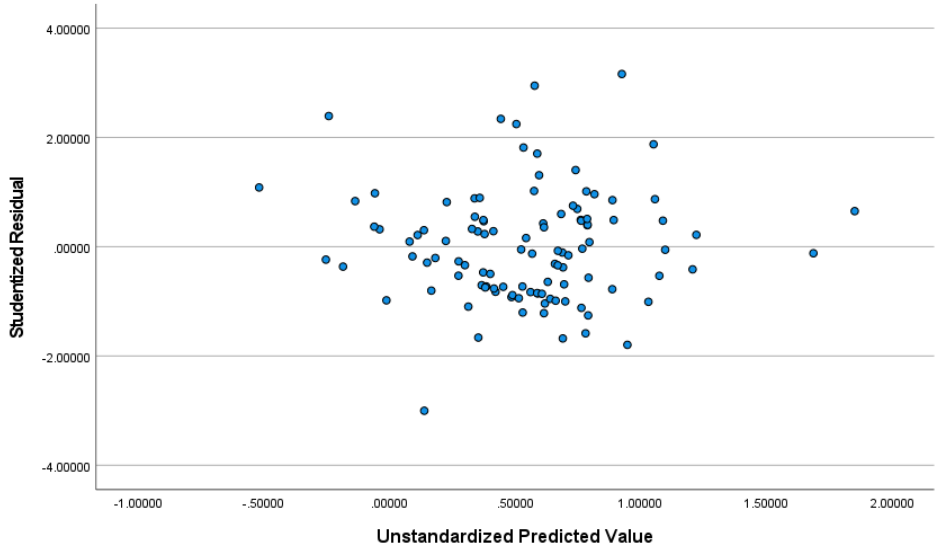
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
9	(Constant)	.064	.361		.178	.859	-.653	.782					
	TotalCapitalRaised	.069	.051	.146	1.349	.181	-.033	.171	.048	.141	.116	.636	1.573
	CapRsdIndependentVC	-.310	.184	-.180	-1.684	.096	-.676	.056	-.145	-.175	-.145	.650	1.539
	CapRsdCorporateVC	.503	.232	.227	2.164	.033	.041	.965	.166	.222	.187	.677	1.476
	CapRsdBA	.366	.171	.217	2.144	.035	.027	.704	.177	.220	.185	.724	1.381
	SupStartupTrainingCoaching	.159	.160	.096	.995	.322	-.158	.477	.121	.104	.086	.797	1.255
	IndstrySpinOff	-.236	.206	-.108	-1.143	.256	-.646	.174	-.077	-.120	-.099	.840	1.190
	IndstryPartnership	.445	.141	.306	3.152	.002	.165	.726	.276	.315	.272	.790	1.266
	InternationalActivities	.137	.175	.073	.786	.434	-.210	.485	.083	.083	.068	.869	1.151
	FirmSizeInitial	-.245	.071	-.389	-3.450	<.001	-.386	-.104	-.078	-.342	-.298	.584	1.713
	ComReadInitial	.100	.081	.121	1.235	.220	-.061	.261	.205	.129	.106	.781	1.281
	PatentsGranted	-.342	.180	-.188	-1.904	.060	-.700	.015	-.080	-.197	-.164	.762	1.313
	SizeFoundingTeam	.031	.053	.055	.583	.561	-.075	.136	.024	.061	.050	.839	1.192
	EducationLevel	.077	.098	.070	.779	.438	-.119	.272	.032	.082	.067	.919	1.088
	EntrepreneurialExperience	.200	.131	.151	1.529	.130	-.060	.461	.075	.159	.132	.766	1.305
	IndstryExperience	.285	.150	.202	1.900	.061	-.013	.583	.060	.196	.164	.657	1.521
	MarketingSalesExperience	-.102	.137	-.071	-.749	.456	-.374	.169	-.087	-.079	-.065	.826	1.210
	ManagerialLeadershipExperience	-.300	.141	-.218	-2.121	.037	-.580	-.019	-.036	-.218	-.183	.703	1.422

a. Dependent Variable: Performance


Histogram
Dependent Variable: Performance
Mean = 5.65E-16
Std. Dev. = 0.917
N = 108
Frequency
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Performance
Expected Cum Prob
Observed Cum Prob


Studentized Residual
Unstandardized Predicted Value

Appendix 5 Sub-Group Regressions

Type of Main Offer – Product

Model Summary[b,c]

Model	R MainOfferProduct = 1 (Selected)	R MainOfferProduct ~= 1 (Unselected)	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson Statistic MainOfferProduct = 1 (Selected)	Durbin-Watson Statistic MainOfferProduct ~= 1 (Unselected)
1	.745[a]	0.119	0.555	0.356	0.476642	2.222	2.101

a. Predictors: (Constant), ProfessionalDiversityTechEconomics, GovernmentalFinancialSupport, SupIncubatorHub, TotalCapitalRaised, CapRsdBA, InternationalActivities, EducationLevel, IndstryPartnership, CapRsdIndependentVC, SizeFoundingTeam, PatentsGranted, EntrepreneurialExperience, SupAccelerator, CapRsdCorporateVC, ManagerialLeadershipExperience, TurnoverInitial, FirmSizeInitial

b. Unless noted otherwise, statistics are based only on cases for which MainOfferProduct = 1.

c. Dependent Variable: Performance

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.779	17	0.634	2.791	.004[c]
	Residual	8.633	38	0.227		
	Total	19.412	55			

a. Dependent Variable: Performance

b. Selecting only cases for which MainOfferProduct = 1

c. Predictors: (Constant), ProfessionalDiversityTechEconomics, GovernmentalFinancialSupport, SupIncubatorHub, TotalCapitalRaised, CapRsdBA, InternationalActivities, EducationLevel, IndstryPartnership, CapRsdIndependentVC, SizeFoundingTeam, PatentsGranted, EntrepreneurialExperience, SupAccelerator, CapRsdCorporateVC, ManagerialLeadershipExperience, TurnoverInitial, FirmSizeInitial

Coefficients[a,b]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	1.029	0.425		2.424	0.020		
	TotalCapitalRaised	0.042	0.068	0.106	0.620	0.539	0.401	2.492
	GovernmentalFinancialSupport	-0.225	0.152	-0.186	-1.476	0.148	0.740	1.351
	CapRsdIndependentVC	-0.417	0.183	-0.288	-2.281	0.028	0.733	1.364
	CapRsdCorporateVC	1.013	0.315	0.466	3.218	0.003	0.558	1.792
	CapRsdBA	0.432	0.197	0.289	2.192	0.035	0.671	1.490
	TurnoverInitial	0.014	0.101	0.022	0.135	0.894	0.453	2.206
	SupIncubatorHub	-0.034	0.274	-0.019	-0.124	0.902	0.511	1.956
	SupAccelerator	0.000	0.233	0.000	0.001	0.999	0.570	1.754
	IndstryPartnership	0.336	0.168	0.253	2.001	0.053	0.734	1.362
	InternationalActivities	-0.410	0.285	-0.194	-1.442	0.157	0.649	1.541
	FirmSizeInitial	-0.186	0.098	-0.329	-1.890	0.066	0.386	2.591
	PatentsGranted	-0.442	0.209	-0.296	-2.108	0.042	0.592	1.688
	SizeFoundingTeam	0.129	0.068	0.282	1.900	0.065	0.531	1.885
	EducationLevel	-0.027	0.128	-0.029	-0.214	0.832	0.637	1.570
	EntrepreneurialExperience	0.618	0.170	0.500	3.627	0.001	0.616	1.622
	ManagerialLeadershipExperience	-0.354	0.194	-0.277	-1.824	0.076	0.506	1.978
	ProfessionalDiversityTechEconomics	-0.425	0.201	-0.355	-2.115	0.041	0.415	2.409

a. Dependent Variable: Performance

b. Selecting only cases for which MainOfferProduct = 1

Type of Main Offer – Software

Model Summary[b,c]

Model	R: MainOfferSoftware = 1 (Selected)	R: MainOfferSoftware ~= 1 (Unselected)	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson Statistic: MainOfferSoftware = 1 (Selected)	Durbin-Watson Statistic: MainOfferSoftware ~= 1 (Unselected)
1	.806[a]	.	0.649	0.335	0.512062	1.980	1.699

a. Predictors: (Constant), ProfessionalDiversityTechEconomics, EducationLevel, CapRsdBA, InternationalActivities, TotalCapitalRaised, CapRsdCorporateVC, SizeFoundingTeam, GovernmentalFinancialSupport, CapRsdIndependentVC, SupAccelerator, SupIncubatorHub, PatentsGranted, IndstryPartnership, FirmSizeInitial, EntrepreneurialExperience, ManagerialLeadershipExperience, TurnoverInitial

b. Unless noted otherwise, statistics are based only on cases for which MainOfferSoftware = 1.

c. Dependent Variable: Performance

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.207	17	0.542	2.066	.065[c]
	Residual	4.982	19	0.262		
	Total	14.189	36			

a. Dependent Variable: Performance

b. Selecting only cases for which MainOfferSoftware = 1

c. Predictors: (Constant), ProfessionalDiversityTechEconomics, EducationLevel, CapRsdBA, InternationalActivities, TotalCapitalRaised, CapRsdCorporateVC, SizeFoundingTeam, GovernmentalFinancialSupport, CapRsdIndependentVC, SupAccelerator, SupIncubatorHub, PatentsGranted, IndstryPartnership, FirmSizeInitial, EntrepreneurialExperience, ManagerialLeadershipExperience, TurnoverInitial

Coefficients[a,b]

Model		Unstandardized Coefficients: B	Unstandardized Coefficients: Std. Error	Standardized Coefficients: Beta	t	Sig.	Collinearity Statistics: Tolerance	Collinearity Statistics: VIF
1	(Constant)	-0.522	0.994		-0.525	0.606		
	TotalCapitalRaised	0.152	0.195	0.229	0.780	0.445	0.214	4.664
	GovernmentalFinancialSupport	0.155	0.255	0.119	0.608	0.550	0.481	2.077
	CapRsdIndependentVC	-0.631	0.274	-0.398	-2.303	0.033	0.620	1.614
	CapRsdCorporateVC	0.827	0.386	0.432	2.142	0.045	0.455	2.199
	CapRsdBA	0.809	0.417	0.510	1.942	0.067	0.268	3.736
	TurnoverInitial	0.281	0.164	0.461	1.711	0.103	0.254	3.930
	SupIncubatorHub	0.052	0.809	0.014	0.064	0.949	0.418	2.392
	SupAccelerator	0.632	0.304	0.384	2.076	0.052	0.541	1.849
	IndstryPartnership	0.082	0.277	0.063	0.295	0.771	0.399	2.505
	InternationalActivities	-0.842	0.490	-0.363	-1.717	0.102	0.413	2.419
	FirmSizeInitial	-0.208	0.136	-0.337	-1.526	0.144	0.378	2.642
	PatentsGranted	0.734	0.741	0.260	0.991	0.334	0.269	3.719
	SizeFoundingTeam	0.130	0.126	0.203	1.029	0.317	0.475	2.104
	EducationLevel	-0.089	0.236	-0.078	-0.377	0.711	0.429	2.329
	EntrepreneurialExperience	-0.041	0.276	-0.033	-0.148	0.884	0.380	2.629
	ManagerialLeadershipExperience	0.030	0.346	0.022	0.087	0.931	0.298	3.354
	ProfessionalDiversityTechEconomics	-0.003	0.320	-0.002	-0.010	0.992	0.351	2.847

a. Dependent Variable: Performance

b. Selecting only cases for which MainOfferSoftware = 1

Type of Main Offer – Service

Model Summary[b,c]

Model	R		R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson Statistic	
	MainOfferService = 1 (Selected)	MainOfferService ~= 1 (Unselected)				MainOfferService = 1 (Selected)	MainOfferService ~= 1 (Unselected)
1	.719[a]	0.090	0.517	0.288	0.578455	1.758	2.101

a. Predictors: (Constant), ProfessionalDiversityTechEconomics, SupIncubatorHub, SizeFoundingTeam, TotalCapitalRaised, PatentsGranted, EducationLevel, InternationalActivities, CapRsdBA, EntrepreneurialExperience, GovernmentalFinancialSupport, IndstryPartnership, CapRsdCorporateVC, SupAccelerator, FirmSizeInitial, TurnoverInitial, ManagerialLeadershipExperience, CapRsdIndependentVC

b. Unless noted otherwise, statistics are based only on cases for which MainOfferService = 1.

c. Dependent Variable: Performance

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.875	17	0.757	2.263	.019[c]
	Residual	12.046	36	0.335		
	Total	24.921	53			

a. Dependent Variable: Performance

b. Selecting only cases for which MainOfferService = 1

c. Predictors: (Constant), ProfessionalDiversityTechEconomics, SupIncubatorHub, SizeFoundingTeam, TotalCapitalRaised, PatentsGranted, EducationLevel, InternationalActivities, CapRsdBA, EntrepreneurialExperience, GovernmentalFinancialSupport, IndstryPartnership, CapRsdCorporateVC, SupAccelerator, FirmSizeInitial, TurnoverInitial, ManagerialLeadershipExperience, CapRsdIndependentVC

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-0.037	0.568		-0.064	0.949		
	TotalCapitalRaised	0.194	0.094	0.328	2.060	0.047	0.529	1.889
	GovernmentalFinancialSupport	0.308	0.259	0.179	1.190	0.242	0.593	1.685
	CapRsdIndependentVC	-0.782	0.358	-0.405	-2.186	0.035	0.391	2.561
	CapRsdCorporateVC	0.536	0.401	0.218	1.338	0.189	0.507	1.974
	CapRsdBA	0.453	0.257	0.256	1.758	0.087	0.631	1.585
	TurnoverInitial	-0.027	0.134	-0.032	-0.201	0.842	0.524	1.908
	SupIncubatorHub	-0.885	0.461	-0.291	-1.919	0.063	0.582	1.717
	SupAccelerator	0.184	0.320	0.094	0.575	0.569	0.498	2.008
	IndstryPartnership	0.603	0.222	0.384	2.711	0.010	0.669	1.495
	InternationalActivities	0.041	0.267	0.021	0.153	0.879	0.695	1.439
	FirmSizeInitial	-0.386	0.106	-0.554	-3.648	0.001	0.581	1.720
	PatentsGranted	-0.309	0.336	-0.126	-0.919	0.364	0.713	1.403
	SizeFoundingTeam	-0.010	0.080	-0.017	-0.130	0.897	0.796	1.257
	EducationLevel	0.446	0.187	0.336	2.387	0.022	0.677	1.478
	EntrepreneurialExperience	-0.068	0.211	-0.047	-0.321	0.750	0.617	1.620
	ManagerialLeadershipExperience	-0.086	0.248	-0.059	-0.347	0.730	0.468	2.135
	ProfessionalDiversityTechEconomics	0.338	0.210	0.218	1.605	0.117	0.730	1.371

a. Dependent Variable: Performance

b. Selecting only cases for which MainOfferService = 1

Technology Intensity – no/low-tech

Model Summary[b,c]

Model	R TechIntensity = 0 (Selected)	R TechIntensity ~= 0 (Unselected)	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson Statistic TechIntensity = 0 (Selected)	Durbin-Watson Statistic TechIntensity ~= 0 (Unselected)
1	.777[a]	.	0.604	0.049	0.642710	2.658	1.405

a. Predictors: (Constant), ManagerialLeadershipExperience, MarketingSalesExperience, SupStartupTrainingCoaching, FirmSizeInitial, TurnoverInitial, IndstryExperience, SupIncubatorHub

b. Unless noted otherwise, statistics are based only on cases for which TechIntensity = 0.

c. Dependent Variable: Performance

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.145	7	0.449	1.088	.480[c]
	Residual	2.065	5	0.413		
	Total	5.210	12			

a. Dependent Variable: Performance

b. Selecting only cases for which TechIntensity = 0

c. Predictors: (Constant), ManagerialLeadershipExperience, MarketingSalesExperience, SupStartupTrainingCoaching, FirmSizeInitial, TurnoverInitial, IndstryExperience, SupIncubatorHub

Coefficients[a,b]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	1.447	0.854		1.695	0.151		
	TurnoverInitial	0.148	0.348	0.142	0.424	0.689	0.705	1.419
	SupStartupTrainingCoaching	-0.621	0.823	-0.333	-0.755	0.484	0.407	2.459
	SupIncubatorHub	0.039	1.155	0.016	0.034	0.974	0.354	2.827
	FirmSizeInitial	-0.483	0.259	-0.598	-1.862	0.122	0.768	1.302
	IndstryExperience	0.046	0.647	0.031	0.071	0.946	0.411	2.436
	MarketingSalesExperience	-0.049	0.570	-0.036	-0.085	0.935	0.437	2.291
	ManagerialLeadershipExperience	-0.511	0.441	-0.382	-1.158	0.299	0.729	1.373

a. Dependent Variable: Performance

b. Selecting only cases for which TechIntensity = 0

Technology Intensity – tech-enabled

Model Summary[b,c]

Model	R TechIntensity = 1 (Selected)	R TechIntensity ~= 1 (Unselected)	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson Statistic TechIntensity = 1 (Selected)	Durbin-Watson Statistic TechIntensity ~= 1 (Unselected)
1	.505[a]	0.283	0.255	0.047	0.667309	1.557	1.108

a. Predictors: (Constant), ManagerialLeadershipExperience, IndstrySpinOff, PatentsGranted, CapRsdBA, SupIncubatorHub, FirmSizeInitial, MarketingSalesExperience, CapRsdCorporateVC, IndstryPartnership, IndstryExperience, TurnoverInitial, SupStartupTrainingCoaching

b. Unless noted otherwise, statistics are based only on cases for which TechIntensity = 1.

c. Dependent Variable: Performance

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.558	12	0.547	1.227	.297[c]
	Residual	19.148	43	0.445		
	Total	25.706	55			

a. Dependent Variable: Performance

b. Selecting only cases for which TechIntensity = 1

c. Predictors: (Constant), ManagerialLeadershipExperience, IndstrySpinOff, PatentsGranted, CapRsdBA, SupIncubatorHub, FirmSizeInitial, MarketingSalesExperience, CapRsdCorporateVC, IndstryPartnership, IndstryExperience, TurnoverInitial, SupStartupTrainingCoaching

Coefficients[a,b]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	0.595	0.401		1.483	0.145		
	CapRsdCorporateVC	0.346	0.340	0.150	1.015	0.316	0.794	1.259
	CapRsdBA	0.130	0.258	0.072	0.502	0.618	0.832	1.202
	TurnoverInitial	0.112	0.125	0.152	0.891	0.378	0.593	1.688
	SupStartupTrainingCoaching	0.522	0.293	0.307	1.780	0.082	0.580	1.723
	SupIncubatorHub	-0.283	0.456	-0.105	-0.622	0.537	0.606	1.651
	IndstrySpinOff	-0.096	0.308	-0.044	-0.311	0.758	0.876	1.141
	IndstryPartnership	0.299	0.234	0.189	1.278	0.208	0.789	1.267
	FirmSizeInitial	-0.231	0.103	-0.345	-2.241	0.030	0.729	1.372
	PatentsGranted	-0.055	0.357	-0.022	-0.156	0.877	0.834	1.199
	IndstryExperience	0.423	0.225	0.284	1.875	0.068	0.752	1.329
	MarketingSalesExperience	-0.208	0.216	-0.144	-0.962	0.341	0.773	1.293
	ManagerialLeadershipExperience	-0.352	0.223	-0.234	-1.579	0.122	0.790	1.266

a. Dependent Variable: Performance

b. Selecting only cases for which TechIntensity = 1

Technology Intensity – tech-driven

Model Summary[b,c]

Model	R		R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson Statistic	
	TechIntensity = 2 (Selected)	TechIntensity ~= 2 (Unselected)				TechIntensity = 2 (Selected)	TechIntensity ~= 2 (Unselected)
1	.870[a]	0.206	0.758	0.646	0.334747	1.780	2.049

a. Predictors: (Constant), ManagerialLeadershipExperience, IndstryPartnership, FirmSizeInitial, SupStartupTrainingCoaching, SupIncubatorHub, PatentsGranted, MarketingSalesExperience, IndstrySpinOff, CapRsdBA, IndstryExperience, TurnoverInitial, CapRsdCorporateVC

b. Unless noted otherwise, statistics are based only on cases for which TechIntensity = 2.

c. Dependent Variable: Performance

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.110	12	0.759	6.775	<.001[c]
	Residual	2.913	26	0.112		
	Total	12.024	38			

a. Dependent Variable: Performance

b. Selecting only cases for which TechIntensity = 2

c. Predictors: (Constant), ManagerialLeadershipExperience, IndstryPartnership, FirmSizeInitial, SupStartupTrainingCoaching, SupIncubatorHub, PatentsGranted, MarketingSalesExperience, IndstrySpinOff, CapRsdBA, IndstryExperience, TurnoverInitial, CapRsdCorporateVC

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	0.947	0.378		2.505	0.019		
	CapRsdCorporateVC	1.610	0.324	0.899	4.970	0.000	0.285	3.513
	CapRsdBA	0.225	0.168	0.170	1.335	0.193	0.575	1.739
	TurnoverInitial	-0.179	0.085	-0.291	-2.107	0.045	0.488	2.050
	SupStartupTrainingCoaching	-0.029	0.172	-0.019	-0.170	0.866	0.761	1.314
	SupIncubatorHub	-0.987	0.301	-0.551	-3.278	0.003	0.329	3.037
	IndstrySpinOff	-0.361	0.229	-0.197	-1.572	0.128	0.593	1.687
	IndstryPartnership	0.879	0.130	0.757	6.744	0.000	0.740	1.351
	FirmSizeInitial	0.001	0.072	0.001	0.007	0.994	0.529	1.892
	PatentsGranted	-0.662	0.197	-0.412	-3.358	0.002	0.618	1.617
	IndstryExperience	0.463	0.171	0.361	2.710	0.012	0.524	1.907
	MarketingSalesExperience	-0.399	0.202	-0.237	-1.974	0.059	0.645	1.550
	ManagerialLeadershipExperience	-0.393	0.178	-0.324	-2.214	0.036	0.435	2.301

a. Dependent Variable: Performance

b. Selecting only cases for which TechIntensity = 2

Phase in the Life Cycle – Formation/Validation

Model Summary[b,c]

Model	R		R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson Statistic	
	PhaseInitial <= 2 (Selected)	PhaseInitial > 2 (Unselected)				PhaseInitial <= 2 (Selected)	PhaseInitial > 2 (Unselected)
1	.550[a]	0.133	0.302	0.184	0.511839	1.640	1.873

a. Predictors: (Constant), MarketingSalesExperience, SupStartupTrainingCoaching, TurnoverInitial, CapRsdCorporateVC, IndstryPartnership, ComReadInitial, TechnologyExperience, IndstryExperience, InternationalActivities, IndstrySpinOff, SupAccelerator, FirmSizeInitial

b. Unless noted otherwise, statistics are based only on cases for which PhaseInitial <= 2.

c. Dependent Variable: Performance

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.057	12	0.671	2.563	.007[c]
	Residual	18.601	71	0.262		
	Total	26.657	83			

a. Dependent Variable: Performance

b. Selecting only cases for which PhaseInitial <= 2

c. Predictors: (Constant), MarketingSalesExperience, SupStartupTrainingCoaching, TurnoverInitial, CapRsdCorporateVC, IndstryPartnership, ComReadInitial, TechnologyExperience, IndstryExperience, InternationalActivities, IndstrySpinOff, SupAccelerator, FirmSizeInitial

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-0.503	0.346		-1.457	0.150		
	CapRsdCorporateVC	0.238	0.220	0.118	1.085	0.282	0.833	1.201
	TurnoverInitial	0.088	0.068	0.137	1.292	0.201	0.876	1.142
	SupStartupTrainingCoaching	0.242	0.174	0.162	1.386	0.170	0.717	1.394
	SupAccelerator	-0.209	0.186	-0.133	-1.124	0.265	0.705	1.418
	IndstrySpinOff	-0.294	0.221	-0.153	-1.330	0.188	0.740	1.351
	IndstryPartnership	0.449	0.140	0.346	3.218	0.002	0.848	1.180
	InternationalActivities	-0.224	0.194	-0.130	-1.156	0.252	0.774	1.293
	FirmSizeInitial	-0.088	0.070	-0.153	-1.271	0.208	0.678	1.475
	ComReadInitial	0.258	0.082	0.324	3.126	0.003	0.914	1.094
	IndstryExperience	0.327	0.148	0.262	2.212	0.030	0.703	1.423
	TechnologyExperience	0.190	0.129	0.156	1.466	0.147	0.866	1.154
	MarketingSalesExperience	-0.147	0.133	-0.116	-1.108	0.272	0.888	1.126

a. Dependent Variable: Performance

b. Selecting only cases for which PhaseInitial <= 2

Phase in the Life Cycle – Growth

Model Summary[b,c]

Model	R		R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson Statistic	
	PhaseInitial = 3 (Selected)	PhaseInitial ~= 3 (Unselected)				PhaseInitial = 3 (Selected)	PhaseInitial ~= 3 (Unselected)
1	.862[a]	0.074	0.743	0.462	0.628862	2.240	1.612

a. Predictors: (Constant), MarketingSalesExperience, FirmSizeInitial, InternationalActivities, ComReadInitial, SupStartupTrainingCoaching, CapRsdCorporateVC, SupAccelerator, IndstryPartnership, TechnologyExperience, IndstrySpinOff, TurnoverInitial, IndstryExperience

b. Unless noted otherwise, statistics are based only on cases for which PhaseInitial = 3.

c. Dependent Variable: Performance

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.566	12	1.047	2.648	.059[c]
	Residual	4.350	11	0.395		
	Total	16.916	23			

a. Dependent Variable: Performance

b. Selecting only cases for which PhaseInitial = 3

c. Predictors: (Constant), MarketingSalesExperience, FirmSizeInitial, InternationalActivities, ComReadInitial, SupStartupTrainingCoaching, CapRsdCorporateVC, SupAccelerator, IndstryPartnership, TechnologyExperience, IndstrySpinOff, TurnoverInitial, IndstryExperience

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-1.025	1.373		-0.746	0.471		
	CapRsdCorporateVC	0.850	0.645	0.317	1.317	0.215	0.403	2.481
	TurnoverInitial	0.087	0.236	0.097	0.371	0.718	0.339	2.950
	SupStartupTrainingCoaching	0.102	0.465	0.043	0.219	0.831	0.597	1.676
	SupAccelerator	-0.907	0.749	-0.367	-1.211	0.251	0.255	3.927
	IndstrySpinOff	0.176	0.616	0.058	0.286	0.780	0.569	1.757
	IndstryPartnership	0.891	0.373	0.473	2.388	0.036	0.595	1.680
	InternationalActivities	1.419	0.563	0.617	2.521	0.028	0.390	2.565
	FirmSizeInitial	-0.441	0.185	-0.536	-2.388	0.036	0.464	2.154
	ComReadInitial	0.612	0.354	0.416	1.725	0.112	0.402	2.488
	IndstryExperience	-1.316	0.598	-0.712	-2.200	0.050	0.223	4.476
	TechnologyExperience	-0.327	0.356	-0.189	-0.919	0.378	0.553	1.809
	MarketingSalesExperience	0.326	0.453	0.157	0.719	0.487	0.492	2.031

a. Dependent Variable: Performance

b. Selecting only cases for which PhaseInitial = 3

Appendix 6 Outputs of Moderation Analyses with SPSS PROCESS V4.1

```
Model  : 1
    Y  : Performa
    X  : IndstryE
    W  : PhaseIni

Covariates:
 CapRsdCo Turnover SupStart SupAccel IndstryS IndstryP Internat FirmSize ComReadI Technolo Marketin

Sample
Size:  108

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5510      .3036      .3270     2.8954    14.0000    93.0000      .0011

Model
              coeff         se          t          p       LLCI       ULCI
constant     -.3828      .3467    -1.1043      .2723    -1.0712      .3056
IndstryE      .4575      .1557     2.9386      .0042      .1483      .7667
PhaseIni      .5737      .2447     2.3443      .0212      .0877     1.0597
Int_1        -.9824      .3098    -3.1710      .0021    -1.5976     -.3672
CapRsdCo      .3648      .2085     1.7495      .0835     -.0493      .7788
Turnover      .0285      .0647      .4404      .6607     -.1000      .1570
SupStart      .1563      .1632      .9578      .3407     -.1678      .4805
SupAccel     -.1457      .1823     -.7993      .4261     -.5077      .2163
IndstryS     -.3754      .2112    -1.7771      .0788     -.7948      .0441
IndstryP      .5114      .1365     3.7451      .0003      .2402      .7826
Internat      .1806      .1806      .9996      .3201     -.1781      .5393
FirmSize     -.2043      .0645    -3.1653      .0021     -.3325     -.0761
ComReadI      .2433      .0839     2.8992      .0047      .0767      .4100
Technolo      .0882      .1230      .7171      .4751     -.1561      .3325
Marketin     -.0942      .1357     -.6943      .4892     -.3637      .1753

Product terms key:
 Int_1    :        IndstryE x        PhaseIni

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0753    10.0551     1.0000    93.0000      .0021
----------
    Focal predict: IndstryE (X)
          Mod var: PhaseIni (W)

Conditional effects of the focal predictor at values of the moderator(s):

   PhaseIni     Effect         se          t          p       LLCI       ULCI
      .0000      .4575      .1557     2.9386      .0042      .1483      .7667
     1.0000     -.5249      .2787    -1.8831      .0628    -1.0784      .0286

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : Internat
    W  : PhaseIni

Covariates:
 CapRsdCo Turnover SupStart SupAccel IndstryS IndstryP FirmSize ComReadI IndstryE Technolo Marketin

Sample
Size:  108

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5261      .2768      .3396     2.5424    14.0000    93.0000      .0040

Model
              coeff         se          t          p       LLCI       ULCI
constant      .0226      .3469      .0652      .9481     -.6662      .7115
Internat     -.1993      .2119     -.9406      .3493     -.6201      .2215
PhaseIni     -.8284      .3612    -2.2935      .0241    -1.5458     -.1111
Int_1        1.0036      .4017     2.4983      .0142      .2059     1.8013
CapRsdCo      .3032      .2119     1.4310      .1558     -.1175      .7239
Turnover      .0429      .0666      .6451      .5204     -.0892      .1751
SupStart      .1706      .1666     1.0241      .3085     -.1602      .5014
SupAccel     -.1288      .1856     -.6940      .4894     -.4975      .2398
IndstryS     -.2162      .2136    -1.0121      .3141     -.6405      .2080
IndstryP      .4659      .1394     3.3417      .0012      .1890      .7428
FirmSize     -.1485      .0655    -2.2662      .0258     -.2786     -.0184
ComReadI      .2120      .0847     2.5021      .0141      .0437      .3803
IndstryE      .1443      .1475      .9786      .3303     -.1485      .4371
Technolo      .0844      .1254      .6733      .5024     -.1645      .3333
Marketin     -.1222      .1378     -.8868      .3775     -.3958      .1514

Product terms key:
 Int_1    :        Internat x        PhaseIni

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0485     6.2413     1.0000    93.0000      .0142
----------
    Focal predict: Internat (X)
          Mod var: PhaseIni (W)

Conditional effects of the focal predictor at values of the moderator(s):

   PhaseIni     Effect         se          t          p       LLCI       ULCI
      .0000     -.1993      .2119     -.9406      .3493     -.6201      .2215
     1.0000      .8043      .3431     2.3441      .0212      .1229     1.4856

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : FirmSize
    W  : PhaseIni

Covariates:
 CapRsdCo Turnover SupStart SupAccel IndstryS IndstryP Internat ComReadI IndstryE Technolo Marketin

Sample
Size:  108

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5287      .2795      .3383     2.5768    14.0000    93.0000      .0035

Model
              coeff         se          t          p       LLCI       ULCI
constant     -.3775      .3569    -1.0578      .2929    -1.0863      .3312
FirmSize     -.0823      .0734    -1.1208      .2652     -.2280      .0635
PhaseIni     1.0291      .4383     2.3478      .0210      .1587     1.8996
Int_1        -.3710      .1442    -2.5717      .0117     -.6574     -.0845
CapRsdCo      .2587      .2125     1.2176      .2265     -.1632      .6807
Turnover      .0586      .0675      .8684      .3874     -.0755      .1928
SupStart      .1559      .1660      .9387      .3503     -.1739      .4856
SupAccel     -.0412      .1842     -.2236      .8235     -.4069      .3246
IndstryS     -.1723      .2155     -.7994      .4261     -.6003      .2557
IndstryP      .5247      .1393     3.7659      .0003      .2480      .8013
Internat      .0128      .1823      .0700      .9444     -.3493      .3748
ComReadI      .1953      .0847     2.3070      .0233      .0272      .3634
IndstryE      .2086      .1427     1.4623      .1470     -.0747      .4919
Technolo      .1050      .1256      .8361      .4053     -.1445      .3545
Marketin     -.1531      .1377    -1.1119      .2690     -.4264      .1203

Product terms key:
 Int_1    :        FirmSize x        PhaseIni

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0512     6.6134     1.0000    93.0000      .0117
----------
    Focal predict: FirmSize (X)
          Mod var: PhaseIni (W)

Conditional effects of the focal predictor at values of the moderator(s):

   PhaseIni     Effect         se          t          p       LLCI       ULCI
      .0000     -.0823      .0734    -1.1208      .2652     -.2280      .0635
     1.0000     -.4532      .1274    -3.5568      .0006     -.7063     -.2002

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : Technolo
    W  : PhaseIni

Covariates:
 CapRsdCo Turnover SupStart SupAccel IndstryS IndstryP Internat FirmSize ComReadI IndstryE Marketin

Sample
Size:  108

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5167      .2670      .3441     2.4200    14.0000    93.0000      .0061

Model
              coeff         se          t          p       LLCI       ULCI
constant     -.3457      .3603     -.9595      .3398    -1.0612      .3698
Technolo      .2403      .1468     1.6366      .1051     -.0513      .5318
PhaseIni      .3305      .2261     1.4619      .1471     -.1185      .7795
Int_1        -.6607      .2979    -2.2178      .0290    -1.2522     -.0691
CapRsdCo      .3784      .2153     1.7576      .0821     -.0491      .8058
Turnover      .0227      .0663      .3424      .7328     -.1090      .1545
SupStart      .1622      .1676      .9677      .3357     -.1706      .4949
SupAccel     -.1055      .1861     -.5672      .5720     -.4750      .2640
IndstryS     -.2868      .2141    -1.3394      .1837     -.7120      .1384
IndstryP      .5285      .1409     3.7513      .0003      .2487      .8083
Internat      .0606      .1823      .3323      .7404     -.3015      .4227
FirmSize     -.1714      .0653    -2.6237      .0102     -.3012     -.0417
ComReadI      .2502      .0875     2.8593      .0052      .0764      .4240
IndstryE      .2238      .1436     1.5588      .1224     -.0613      .5088
Marketin     -.1316      .1386     -.9496      .3448     -.4070      .1437

Product terms key:
 Int_1    :        Technolo x        PhaseIni

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0388     4.9186     1.0000    93.0000      .0290
----------
    Focal predict: Technolo (X)
          Mod var: PhaseIni (W)

Conditional effects of the focal predictor at values of the moderator(s):

   PhaseIni     Effect         se          t          p       LLCI       ULCI
      .0000      .2403      .1468     1.6366      .1051     -.0513      .5318
     1.0000     -.4204      .2560    -1.6424      .1039     -.9287      .0879

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : Marketin
    W  : PhaseIni

Covariates:
 CapRsdCo Turnover SupStart SupAccel IndstryS IndstryP Internat FirmSize ComReadI IndstryE Technolo

Sample
Size:  108

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .4824      .2327      .3603     2.0145    14.0000    93.0000      .0247

Model
              coeff         se          t          p       LLCI       ULCI
constant     -.1394      .3545     -.3931      .6951     -.8433      .5646
Marketin     -.0890      .1542     -.5769      .5654     -.3953      .2173
PhaseIni      .0376      .1831      .2052      .8379     -.3261      .4013
Int_1        -.2557      .3489     -.7329      .4655     -.9485      .4371
CapRsdCo      .3011      .2188     1.3759      .1721     -.1335      .7356
Turnover      .0240      .0682      .3519      .7257     -.1114      .1594
SupStart      .1379      .1717      .8035      .4238     -.2030      .4788
SupAccel     -.0818      .1903     -.4300      .6682     -.4598      .2961
IndstryS     -.2685      .2190    -1.2261      .2233     -.7033      .1663
IndstryP      .4786      .1444     3.3134      .0013      .1918      .7655
Internat      .0812      .1866      .4351      .6645     -.2893      .4516
FirmSize     -.1721      .0669    -2.5738      .0116     -.3049     -.0393
ComReadI      .2087      .0873     2.3905      .0188      .0353      .3820
IndstryE      .2451      .1469     1.6689      .0985     -.0465      .5367
Technolo      .0737      .1290      .5708      .5695     -.1826      .3299

Product terms key:
 Int_1    :        Marketin x        PhaseIni

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0044      .5371     1.0000    93.0000      .4655

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : CapRsdCo
    W  : TechInte

Covariates:
 CapRsdBA Turnover SupStart SupIncub IndstryS IndstryP FirmSize PatentsG IndstryE Marketin Manageri

Sample
Size:  108

Coding of categorical W variable for analysis:
 TechInte       W1       W2
     .000     .000     .000
    1.000    1.000     .000
    2.000    1.000    1.000

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5585      .3119      .3302     2.5786    16.0000    91.0000      .0024

Model
              coeff         se          t          p       LLCI       ULCI
constant      .7783      .2840     2.7399      .0074      .2140     1.3425
CapRsdCo     -.7150     1.8018     -.3968      .6924    -4.2941     2.8640
W1            .0979      .2828      .3461      .7301     -.4638      .6595
W2           -.4017      .1631    -2.4625      .0157     -.7257     -.0777
Int_1         .8301     1.8214      .4557      .6497    -2.7880     4.4482
Int_2        1.1016      .4774     2.3075      .0233      .1533     2.0499
CapRsdBA      .2533      .1693     1.4963      .1380     -.0830      .5895
Turnover      .0069      .0705      .0973      .9227     -.1332      .1470
SupStart      .2779      .1714     1.6209      .1085     -.0627      .6184
SupIncub     -.4298      .2720    -1.5800      .1176     -.9700      .1105
IndstryS     -.3324      .2078    -1.5998      .1131     -.7451      .0803
IndstryP      .5623      .1452     3.8731      .0002      .2739      .8507
FirmSize     -.1859      .0652    -2.8513      .0054     -.3154     -.0564
PatentsG     -.3122      .1968    -1.5862      .1162     -.7032      .0788
IndstryE      .4008      .1457     2.7509      .0072      .1114      .6902
Marketin     -.1111      .1419     -.7829      .4357     -.3930      .1708
Manageri     -.3137      .1399    -2.2421      .0274     -.5916     -.0358

Product terms key:
 Int_1    :        CapRsdCo x        W1
 Int_2    :        CapRsdCo x        W2

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0473     3.1310     2.0000    91.0000      .0484
----------
    Focal predict: CapRsdCo (X)
          Mod var: TechInte (W)

Conditional effects of the focal predictor at values of the moderator(s):

   TechInte     Effect         se          t          p       LLCI       ULCI
      .0000     -.7150     1.8018     -.3968      .6924    -4.2941     2.8640
     1.0000      .1151      .2764      .4163      .6782     -.4340      .6641
     2.0000     1.2167      .3923     3.1015      .0026      .4374     1.9959

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : Turnover
    W  : TechInte

Covariates:
 CapRsdCo CapRsdBA SupStart SupIncub IndstryS IndstryP FirmSize PatentsG IndstryE Marketin Manageri

Sample
Size:  108

Coding of categorical W variable for analysis:
 TechInte       W1       W2
     .000     .000     .000
    1.000    1.000     .000
    2.000    1.000    1.000

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5315      .2825      .3443     2.2392    16.0000    91.0000      .0088

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.1155      .5280     2.1126      .0374      .0667     2.1644
Turnover     -.1844      .2075     -.8886      .3765     -.5966      .2278
W1           -.5753      .5935     -.9694      .3349    -1.7541      .6036
W2            .2758      .4546      .6068      .5455     -.6271     1.1788
Int_1         .2904      .2272     1.2780      .2045     -.1609      .7416
Int_2        -.1668      .1499    -1.1128      .2687     -.4646      .1310
CapRsdCo      .4767      .2319     2.0558      .0427      .0161      .9373
CapRsdBA      .2787      .1726     1.6149      .1098     -.0641      .6215
SupStart      .1566      .1718      .9119      .3642     -.1846      .4979
SupIncub     -.0686      .2433     -.2821      .7785     -.5519      .4146
IndstryS     -.3280      .2120    -1.5471      .1253     -.7491      .0931
IndstryP      .4921      .1446     3.4023      .0010      .2048      .7794
FirmSize     -.1837      .0666    -2.7576      .0070     -.3160     -.0514
PatentsG     -.2518      .1990    -1.2658      .2088     -.6470      .1434
IndstryE      .4248      .1496     2.8392      .0056      .1276      .7219
Marketin     -.1705      .1463    -1.1652      .2470     -.4612      .1202
Manageri     -.3324      .1454    -2.2854      .0246     -.6213     -.0435

Product terms key:
 Int_1    :        Turnover x        W1
 Int_2    :        Turnover x        W2

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0179     1.1341     2.0000    91.0000      .3262

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : SupStart
    W  : TechInte

Covariates:
 CapRsdCo CapRsdBA Turnover SupIncub IndstryS IndstryP FirmSize PatentsG IndstryE Marketin Manageri

Sample
Size:  108

Coding of categorical W variable for analysis:
 TechInte       W1       W2
     .000     .000     .000
    1.000    1.000     .000
    2.000    1.000    1.000

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5370      .2883      .3415     2.3044    16.0000    91.0000      .0069

Model
             coeff         se          t          p       LLCI       ULCI
constant      .8001      .2893     2.7656      .0069      .2254     1.3747
SupStart     -.3605      .4806     -.7502      .4551    -1.3151      .5941
W1           -.1227      .2581     -.4755      .6356     -.6354      .3899
W2           -.0315      .2061     -.1529      .8788     -.4409      .3778
Int_1         .7706      .5095     1.5125      .1339     -.2415     1.7827
Int_2        -.4099      .3516    -1.1657      .2468    -1.1083      .2886
CapRsdCo      .4852      .2310     2.0998      .0385      .0262      .9441
CapRsdBA      .2732      .1718     1.5899      .1153     -.0681      .6145
Turnover      .0048      .0701      .0678      .9461     -.1345      .1441
SupIncub     -.1712      .2419     -.7075      .4810     -.6518      .3094
IndstryS     -.2931      .2116    -1.3851      .1694     -.7135      .1272
IndstryP      .4771      .1442     3.3083      .0013      .1906      .7636
FirmSize     -.1690      .0669    -2.5264      .0133     -.3019     -.0361
PatentsG     -.1915      .2015     -.9502      .3445     -.5918      .2088
IndstryE      .4096      .1500     2.7311      .0076      .1117      .7075
Marketin     -.1570      .1440    -1.0901      .2785     -.4432      .1291
Manageri     -.3063      .1387    -2.2088      .0297     -.5818     -.0308

Product terms key:
 Int_1    :        SupStart x        W1
 Int_2    :        SupStart x        W2

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0237     1.5180     2.0000    91.0000      .2247

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : SupIncub
    W  : TechInte

Covariates:
 CapRsdCo CapRsdBA Turnover SupStart IndstryS IndstryP FirmSize PatentsG IndstryE Marketin Manageri

Sample
Size:  108

Coding of categorical W variable for analysis:
 TechInte       W1       W2
     .000     .000     .000
    1.000    1.000     .000
    2.000    1.000    1.000

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5198      .2702      .3502     2.1057    16.0000    91.0000      .0144

Model
              coeff         se          t          p       LLCI       ULCI
constant      .6656      .2647     2.5146      .0137      .1398     1.1914
SupIncub     -.6479      .6659     -.9730      .3331    -1.9706      .6748
W1            .0851      .2247      .3786      .7058     -.3612      .5313
W2           -.2171      .1622    -1.3383      .1841     -.5392      .1051
Int_1         .4963      .7368      .6735      .5023     -.9673     1.9599
Int_2         .1240      .5084      .2440      .8078     -.8858     1.1338
CapRsdCo      .4502      .2499     1.8016      .0749     -.0462      .9465
CapRsdBA      .2882      .1740     1.6561      .1011     -.0575      .6339
Turnover      .0182      .0719      .2535      .8005     -.1246      .1611
SupStart      .2119      .1787     1.1859      .2388     -.1430      .5669
IndstryS     -.3083      .2142    -1.4394      .1535     -.7337      .1172
IndstryP      .4832      .1459     3.3122      .0013      .1934      .7729
FirmSize     -.1798      .0672    -2.6746      .0089     -.3133     -.0463
PatentsG     -.2587      .2024    -1.2782      .2044     -.6608      .1434
IndstryE      .3967      .1513     2.6224      .0102      .0962      .6972
Marketin     -.1169      .1468     -.7964      .4279     -.4085      .1747
Manageri     -.2973      .1401    -2.1217      .0366     -.5756     -.0190

Product terms key:
 Int_1    :        SupIncub x        W1
 Int_2    :        SupIncub x        W2

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0056      .3489     2.0000    91.0000      .7064

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : IndstryP
    W  : TechInte

Covariates:
 CapRsdCo CapRsdBA Turnover SupStart SupIncub IndstryS FirmSize PatentsG IndstryE Marketin Manageri

Sample
Size:  108

Coding of categorical W variable for analysis:
 TechInte       W1       W2
     .000     .000     .000
    1.000    1.000     .000
    2.000    1.000    1.000

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5327      .2838      .3437     2.2533    16.0000    91.0000      .0083

Model
             coeff         se          t          p       LLCI       ULCI
constant      .5704      .2646     2.1557      .0337      .0448     1.0961
IndstryP      .7677     1.4604      .5256      .6004    -2.1333     3.6686
W1            .2129      .2111     1.0088      .3158     -.2064      .6323
W2           -.3553      .1746    -2.0350      .0448     -.7021     -.0085
Int_1        -.4894     1.4702     -.3329      .7400    -3.4097     2.4309
Int_2         .4320      .2799     1.5435      .1262     -.1240      .9880
CapRsdCo      .5457      .2372     2.3002      .0237      .0745     1.0170
CapRsdBA      .2781      .1722     1.6150      .1098     -.0640      .6202
Turnover      .0190      .0698      .2720      .7863     -.1196      .1576
SupStart      .2088      .1713     1.2185      .2262     -.1316      .5491
SupIncub     -.1892      .2385     -.7930      .4298     -.6630      .2847
IndstryS     -.2917      .2121    -1.3753      .1724     -.7129      .1296
FirmSize     -.1726      .0667    -2.5885      .0112     -.3050     -.0401
PatentsG     -.2512      .1982    -1.2672      .2083     -.6449      .1426
IndstryE      .4037      .1482     2.7234      .0077      .1093      .6981
Marketin     -.1533      .1443    -1.0621      .2910     -.4400      .1334
Manageri     -.2870      .1388    -2.0678      .0415     -.5627     -.0113

Product terms key:
 Int_1    :        IndstryP x        W1
 Int_2    :        IndstryP x        W2

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0192     1.2171     2.0000    91.0000      .3009

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : FirmSize
    W  : TechInte

Covariates:
 CapRsdCo CapRsdBA Turnover SupStart SupIncub IndstryS IndstryP PatentsG IndstryE Marketin Manageri

Sample
Size:  108

Coding of categorical W variable for analysis:
 TechInte       W1       W2
     .000     .000     .000
    1.000    1.000     .000
    2.000    1.000    1.000

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5647      .3189      .3268     2.6630    16.0000    91.0000      .0018

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.2610      .4606     2.7378      .0074      .3461     2.1759
FirmSize     -.5054      .2058    -2.4551      .0160     -.9143     -.0965
W1           -.3064      .4921     -.6227      .5351    -1.2840      .6711
W2           -.8660      .3459    -2.5034      .0141    -1.5531     -.1789
Int_1         .2514      .2192     1.1473      .2542     -.1839      .6868
Int_2         .2678      .1259     2.1265      .0362      .0176      .5179
CapRsdCo      .4682      .2271     2.0621      .0421      .0172      .9193
CapRsdBA      .2346      .1694     1.3849      .1695     -.1019      .5710
Turnover      .0150      .0676      .2214      .8252     -.1193      .1492
SupStart      .1725      .1665     1.0357      .3031     -.1583      .5033
SupIncub     -.2026      .2350     -.8623      .3908     -.6694      .2641
IndstryS     -.2290      .2097    -1.0916      .2779     -.6456      .1877
IndstryP      .5085      .1414     3.5964      .0005      .2276      .7893
PatentsG     -.3209      .1953    -1.6432      .1038     -.7089      .0670
IndstryE      .4105      .1447     2.8379      .0056      .1232      .6979
Marketin     -.1230      .1405     -.8752      .3838     -.4021      .1561
Manageri     -.2668      .1358    -1.9643      .0525     -.5365      .0030

Product terms key:
 Int_1    :        FirmSize x        W1
 Int_2    :        FirmSize x        W2

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0543     3.6277     2.0000    91.0000      .0305
----------
    Focal predict: FirmSize (X)
          Mod var: TechInte (W)

Conditional effects of the focal predictor at values of the moderator(s):

   TechInte     Effect         se          t          p       LLCI       ULCI
      .0000     -.5054      .2058    -2.4551      .0160     -.9143     -.0965
     1.0000     -.2539      .0836    -3.0373      .0031     -.4200     -.0879
     2.0000      .0138      .1019      .1357      .8924     -.1886      .2162

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : Turnover
    W  : MainOffe

Covariates:
 TotalCap Governme CapRsdIn CapRsdCo CapRsdBA SupIncub SupAccel IndstryP Internat FirmSize PatentsG SizeFoun

Sample
Size:  108

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5603      .3140      .3404     2.1198    19.0000    88.0000      .0100

Model
             coeff         se          t          p       LLCI       ULCI
constant      .5924      .3855     1.5364      .1280     -.1738     1.3585
Turnover     -.0654      .0973     -.6721      .5033     -.2588      .1280
MainOffe     -.1755      .4313     -.4068      .6852    -1.0327      .6818
Int_1         .1388      .1409      .9855      .3271     -.1411      .4187
TotalCap      .0739      .0531     1.3927      .1672     -.0316      .1794
Governme     -.0924      .1392     -.6641      .5084     -.3690      .1841
CapRsdIn     -.4571      .1853    -2.4672      .0156     -.8253     -.0889
CapRsdCo      .6872      .2497     2.7518      .0072      .1909     1.1834
CapRsdBA      .3399      .1774     1.9161      .0586     -.0126      .6924
SupIncub      .0480      .2575      .1864      .8526     -.4638      .5597
SupAccel      .0516      .1959      .2633      .7929     -.3377      .4408
IndstryP      .3246      .1445     2.2460      .0272      .0374      .6118
Internat      .0919      .1845      .4979      .6198     -.2748      .4586
FirmSize     -.2215      .0738    -3.0012      .0035     -.3682     -.0748
PatentsG     -.1779      .1975     -.9005      .3703     -.5705      .2147
SizeFoun      .0412      .0571      .7216      .4725     -.0723      .1547
Educatio      .0481      .1056      .4551      .6502     -.1618      .2579
Entrepre      .2322      .1329     1.7462      .0843     -.0321      .4964
Manageri     -.2990      .1457    -2.0525      .0431     -.5886     -.0095
Professi     -.0019      .1421     -.0132      .9895     -.2844      .2806

Product terms key:
 Int_1    :        Turnover x        MainOffe

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0076      .9712     1.0000    88.0000      .3271

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : PatentsG
    W  : Productv

Covariates:
 TotalCap Governme CapRsdIn CapRsdCo CapRsdBA Turnover SupIncub SupAccel IndstryP Internat FirmSize SizeFoun

Sample
Size:  69

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .6569      .4315      .3331     1.9574    19.0000    49.0000      .0304

Model
             coeff         se          t          p       LLCI       ULCI
constant      .4182      .5360      .7802      .4390     -.6589     1.4953
PatentsG     -.6893      .8815     -.7819      .4380    -2.4607     1.0821
Productv     -.0815      .2734     -.2981      .7669     -.6310      .4679
Int_1         .2240      .9297      .2410      .8106    -1.6442     2.0923
TotalCap      .0822      .0712     1.1551      .2536     -.0608      .2253
Governme     -.1808      .1768    -1.0224      .3116     -.5362      .1746
CapRsdIn     -.4872      .2301    -2.1177      .0393     -.9495     -.0249
CapRsdCo      .7741      .3220     2.4042      .0200      .1271     1.4212
CapRsdBA      .6792      .2205     3.0802      .0034      .2361     1.1223
Turnover      .1327      .1101     1.2048      .2341     -.0886      .3540
SupIncub      .1998      .3034      .6586      .5132     -.4099      .8095
SupAccel      .2171      .2549      .8518      .3985     -.2951      .7294
IndstryP      .2501      .1819     1.3752      .1753     -.1154      .6155
Internat     -.3060      .2874    -1.0650      .2921     -.8835      .2714
FirmSize     -.2539      .1048    -2.4225      .0192     -.4645     -.0433
SizeFoun      .1258      .0800     1.5720      .1224     -.0350      .2865
Educatio     -.0357      .1358     -.2629      .7937     -.3086      .2372
Entrepre      .4525      .1854     2.4403      .0183      .0799      .8252
Manageri     -.1767      .2302     -.7675      .4465     -.6392      .2859
Professi     -.2557      .2113    -1.2103      .2320     -.6803      .1689

Product terms key:
 Int_1    :        PatentsG x        Productv

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0007      .0581     1.0000    49.0000      .8106

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : Educatio
    W  : MainOffe

Covariates:
 TotalCap Governme CapRsdIn CapRsdCo CapRsdBA Turnover SupIncub SupAccel IndstryP Internat FirmSize PatentsG

Sample
Size:  108

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5819      .3386      .3282     2.3716    19.0000    88.0000      .0036

Model
              coeff         se          t          p       LLCI       ULCI
constant      .4498      .3197     1.4072      .1629     -.1855     1.0851
Educatio     -.1538      .1330    -1.1563      .2507     -.4182      .1106
MainOffe     -.8117      .3052    -2.6599      .0093    -1.4181     -.2052
Int_1         .5514      .2130     2.5881      .0113      .1280      .9748
TotalCap      .1188      .0543     2.1885      .0313      .0109      .2266
Governme     -.0966      .1383     -.6988      .4865     -.3715      .1782
CapRsdIn     -.5344      .1818    -2.9403      .0042     -.8956     -.1732
CapRsdCo      .6462      .2392     2.7013      .0083      .1708     1.1217
CapRsdBA      .3951      .1678     2.3550      .0207      .0617      .7286
Turnover      .0260      .0729      .3574      .7217     -.1188      .1709
SupIncub      .0493      .2458      .2007      .8414     -.4391      .5378
SupAccel      .1053      .1875      .5615      .5759     -.2673      .4778
IndstryP      .4116      .1404     2.9323      .0043      .1326      .6905
Internat      .1412      .1787      .7901      .4316     -.2139      .4963
FirmSize     -.2352      .0727    -3.2371      .0017     -.3796     -.0908
PatentsG     -.3445      .1899    -1.8143      .0730     -.7218      .0328
SizeFoun      .0683      .0559     1.2228      .2247     -.0427      .1794
Entrepre      .2209      .1307     1.6907      .0944     -.0388      .4805
Manageri     -.2050      .1447    -1.4166      .1601     -.4926      .0826
Professi     -.0588      .1403     -.4196      .6758     -.3376      .2199

Product terms key:
 Int_1    :        Educatio x        MainOffe

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0503     6.6983     1.0000    88.0000      .0113
----------
    Focal predict: Educatio (X)
          Mod var: MainOffe (W)

Conditional effects of the focal predictor at values of the moderator(s):

   MainOffe     Effect         se          t          p       LLCI       ULCI
      .0000     -.1538      .1330    -1.1563      .2507     -.4182      .1106
     1.0000      .3976      .1660     2.3942      .0188      .0676      .7275

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : Entrepre
    W  : MainOffe

Covariates:
 TotalCap Governme CapRsdIn CapRsdCo CapRsdBA Turnover SupIncub SupAccel IndstryP Internat FirmSize PatentsG

Sample
Size:  108

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5528      .3055      .3446     2.0378    19.0000    88.0000      .0138

Model
              coeff         se          t          p       LLCI       ULCI
constant      .4671      .3278     1.4247      .1578     -.1845     1.1186
Entrepre      .0238      .1944      .1224      .9029     -.3626      .4102
MainOffe     -.1031      .1684     -.6124      .5418     -.4377      .2315
Int_1         .4344      .2743     1.5838      .1168     -.1107      .9795
TotalCap      .0681      .0539     1.2632      .2099     -.0391      .1753
Governme     -.1588      .1489    -1.0662      .2892     -.4548      .1372
CapRsdIn     -.4833      .1850    -2.6120      .0106     -.8510     -.1156
CapRsdCo      .6636      .2498     2.6569      .0094      .1672     1.1600
CapRsdBA      .4131      .1719     2.4029      .0184      .0715      .7548
Turnover      .0428      .0783      .5473      .5856     -.1127      .1984
SupIncub     -.0344      .2535     -.1356      .8925     -.5380      .4693
SupAccel      .1275      .1917      .6651      .5077     -.2535      .5085
IndstryP      .3560      .1445     2.4625      .0157      .0687      .6432
Internat      .0838      .1885      .4447      .6576     -.2907      .4584
FirmSize     -.2135      .0742    -2.8762      .0050     -.3611     -.0660
PatentsG     -.2803      .1966    -1.4260      .1574     -.6710      .1103
SizeFoun      .0398      .0582      .6829      .4965     -.0759      .1555
Educatio      .0339      .1094      .3098      .7574     -.1835      .2512
Manageri     -.2547      .1464    -1.7405      .0853     -.5456      .0361
Professi     -.0534      .1439     -.3709      .7116     -.3392      .2325

Product terms key:
 Int_1    :        Entrepre x        MainOffe

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0198     2.5085     1.0000    88.0000      .1168

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

```
Model  : 1
    Y  : Performa
    X  : Professi
    W  : Productv

Covariates:
 TotalCap Governme CapRsdIn CapRsdCo CapRsdBA Turnover SupIncub SupAccel IndstryP Internat FirmSize PatentsG

Sample
Size:  90

**************************************************************************
OUTCOME VARIABLE:
 Performa

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5892      .3471      .3645     1.9586    19.0000    70.0000      .0224

Model
             coeff         se          t          p       LLCI       ULCI
constant      .1050      .3808      .2758      .7835     -.6546      .8646
Professi      .3600      .2193     1.6419      .1051     -.0773      .7973
Productv      .2944      .1863     1.5802      .1186     -.0772      .6660
Int_1        -.7122      .3133    -2.2730      .0261    -1.3371     -.0873
TotalCap      .0835      .0596     1.4004      .1658     -.0354      .2024
Governme     -.0699      .1725     -.4053      .6865     -.4140      .2741
CapRsdIn     -.4478      .2192    -2.0432      .0448     -.8850     -.0107
CapRsdCo      .5946      .2909     2.0438      .0447      .0144     1.1748
CapRsdBA      .4884      .1904     2.5652      .0125      .1087      .8681
Turnover      .0009      .0904      .0103      .9918     -.1794      .1812
SupIncub     -.0139      .2850     -.0488      .9612     -.5823      .5545
SupAccel      .2073      .2304      .8997      .3714     -.2522      .6668
IndstryP      .3708      .1710     2.1682      .0335      .0297      .7119
Internat      .1001      .2057      .4867      .6280     -.3101      .5103
FirmSize     -.2284      .0839    -2.7230      .0082     -.3956     -.0611
PatentsG     -.2589      .2354    -1.1001      .2751     -.7283      .2105
SizeFoun      .1055      .0745     1.4166      .1610     -.0430      .2541
Educatio      .1067      .1284      .8312      .4087     -.1493      .3628
Entrepre      .1714      .1580     1.0849      .2817     -.1437      .4864
Manageri     -.2497      .1760    -1.4193      .1602     -.6007      .1012

Product terms key:
 Int_1    :        Professi x        Productv

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0482     5.1665     1.0000    70.0000      .0261
----------
    Focal predict: Professi (X)
          Mod var: Productv (W)

Conditional effects of the focal predictor at values of the moderator(s):

   Productv     Effect         se          t          p       LLCI       ULCI
      .0000      .3600      .2193     1.6419      .1051     -.0773      .7973
     1.0000     -.3522      .2294    -1.5353      .1292     -.8097      .1053

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

Appendix 7 Notes of Validation Interviews with Venture Capitalists

Validation Interview Übermorgen Ventures

Datum: 06.04.2022, Zeit: 14:00 bis 14:30

Teilnehmer: Alexander Langguth, Alexander Wagner

Leitfragen & Themen:

Kurze Einführung ins Thema: Masterarbeit an der ZHAW (Master BA I&E) mit Christina Marchand vom Innovation Monitor; Ziel: Erfolg von Schweizer Energie- & Umwelt-Startups auf bestimmte Erfolgsfaktoren herunterbrechen; basierend auf der Resource-based View; also greifbare & nicht greifbare Resourcen und Capabilities als Erfolgsfaktoren; Datenbasis jährliche Innovation Monitor Umfragen + Datenbank; dafür ein Forschungsmodell entwickelt; um Erfolgsfaktoren herauszufinden müssen 2 Probleme gelöst werden:

1) Vorab mögliche Erfolgsfaktoren herausfinden, um auf diese zu überprüfen.
2) Performance von Startups messen, um herauszufinden, ob gewisse Faktoren zu mehr Erfolg geführt haben.

➔ Praxisperspektive von euch als Venture Capitalist soll ins Forschungsmodell mit einfliessen.

Grobes Forschungsmodell zeigen.

Frage 1: Welche Faktoren zieht ihr in Betracht, um potenziell erfolgreiche Startups herauszufiltern?

HR: Founder Team (Anzahl; Erfahrungen: Entrepreneurial, Markt, Management, Technologie), andere Mitarbeiter

Zugang zu Kapital: sehr wichtig!

IP-Rights: Patente

Business Modell, mögliche Unfair Advantages

Netzwerk: Investoren, wichtige Kunden (allgemein Traction), Marktmacht

Produkt-Reife bzw. Service-Reife

Externe Faktoren: Marktgrösse, Marktwachstum, kulturelle Capabilities, regulatorisches Umfeld, Competition

Frage 2: Versucht ihr die Performance der Startups zu messen? Wenn ja, welche Kriterien zieht ihr dafür in Betracht oder würdet ihr in Betracht ziehen?

Wachstums-KPIs: Revenue, EBITDA, Profit Margins, Anzahls FTEs, Profit Margins, Customer Acquisition Costs, Customer Lifetime Value. Aber Achtung: stark abhängig von der Phase des Startups bzw. vom Business Modell!

Impact-KPIs: CO2-Einsparungen, Carbon Footprint, Gender Diversity

Produktreife, Markteintritte

Weiteres Kapital geraised

Frage 3: Sind es immer die gleichen Faktoren, welche für euch Indizien für besonders erfolgreiche Startups darstellen oder ändern die Faktoren? Wenn ja, aufgrund welcher Kriterien ändern die wichtigen Faktoren für euch (Moderatoren, z.B. Phase, Technologie Intensität, Art des Produkts)?

Stage (=Phase) hat einen riesigen Einfluss!

Art des Business Modells bzw. Produkts/Services

Detailliertes Forschungsmodell Schritt für Schritt durchgehen. Was würdest du ändern?

Gruppierung «General» ist etwas random, so als hätte man nicht gewusst wo man die Faktoren sonst einordnen soll

«Founders Capabilities» vielleicht umbenennen auf «Team Capabilities» und auch Tech-Erfahrung miteinbeziehen, FirmSize miteinbeziehen, wobei Firm Size relativ ist, je nach Geschäftsmodell kann man auch mit wenigen Mitarbeitern schnell wachsen und viel Mitarbeiter könnten sogar ein Zeichen von Ineffizienzen sein.

Early Revenue Streams (bei mir InitialTurnover) sind noch eine finanzielle Ressource

FirmAge würde Alexander eher als Moderator sehen und ist für ihn eigentlich ähnlich wie die Phase. Kurze Diskussion kam zum Entschluss, dass FirmAge doch eher ein Faktor ist, weil es z.B. eine «Yellow Flag» ist wenn ein Startup schon seit vielen Jahren herumtümpelt aber nicht wirklich vorwärts kommt. Gedanke von Alexander: Ist aber nicht wirklich eine Ressource oder Capability oder?

Was fehlt? Ein Indikator für frühe Traction/Sales (könnte z.B. auch InitialTurnover sein); Produkt-/Service-bezogene Indikatoren (z.B. Produktreife), wobei die Phase dies auch irgendwie abbildet, weil ein Startup z.B. definitiv nicht in der Growth-Phase ist, wenn das Produkt noch nicht marktreif ist.

Formel zur Messung der Performance zeigen. Was würdest du ändern?

«Discontinued Operation» würde Alexander auf 0 setzen, weil es aus Investoren-, Founder- und Kundenperspektive der worst case ist.

«sold» würde Alexander sogar höher bewerten als «survived» weil ein Verkauf indiziert, dass der Markt Potenzial für das Geschäftsmodell sieht.

Gewichtung der 4 anderen Faktoren stark abhängig von der Perspektive (Investor, Founder, Growth-orientiert, Wachstums-orientiert, Researcher, etc.). Zum Beispiel ist Uber immer noch nicht profitabel, aber trotzdem sehr erfolgreich. Aber prinzipiell würde er die Gewichtung für uns als Researcher so lassen.

Bitte von Alexander: Wenn Arbeit fertig, ihm den Abstract (oder vielleicht sogar die ganze Arbeit) senden. -> Mit Christina abklären!

Validation Interview Verve Ventures

Datum: 22.04.2022, Zeit: 15:10 bis 15:40

Teilnehmer: Emma Schepers, Alexander Wagner

Note: At the request of the interviewee, the entire interview was conducted in English. All notes were also taken down in English, however the German interview guide was still used and translated ad-hoc during the interview.

Leitfragen & Themen:

Kurze Einführung ins Thema: Masterarbeit an der ZHAW (Master BA I&E) mit Christina Marchand vom Innovation Monitor; Ziel: Erfolg von Schweizer Energie- & Umwelt-Startups auf bestimmte Erfolgsfaktoren herunterbrechen; basierend auf der Resource-based View; also greifbare & nicht greifbare Resourcen und Capabilities als Erfolgsfaktoren; Datenbasis jährliche Innovation Monitor Umfragen + Datenbank; dafür ein Forschungsmodell entwickelt; um Erfolgsfaktoren herauszufinden müssen 2 Probleme gelöst werden:

3) Vorab mögliche Erfolgsfaktoren herausfinden, um auf diese zu überprüfen.
4) Performance von Startups messen, um herauszufinden, ob gewisse Faktoren zu mehr Erfolg geführt haben.

➔ Praxisperspektive von euch als Venture Capitalist soll ins Forschungsmodell mit einfliessen.

Grobes Forschungsmodell zeigen.

Frage 1: Welche Faktoren zieht ihr in Betracht, um potenziell erfolgreiche Startups herauszufiltern?

Most important: HR meaning mainly the founding team / management team + the early key employees. The team needs to consist of the right people at the right time (phase in the life cycle).

Important skills of the people:

- scientific excellence (mainly for R&D-intense startups)
- market insights (somebody that understands the market, market developments, market needs)
- organizational skills (to build the team and organize funding)
- someone who sells the products -> needs to understand the customer needs
- the will to commercialize the technology (some startups want to remain a R&D powerhouse, but usually they are less successful in the perspective of an investor)

Single founders appear to be less successful because they have a smaller network than a team of founders. Most teams consist of 3 to 4 founders.

First leads / traction is really important, or generally early signs of product-market-fit (this can also be information from big partner companies which state, that they want to buy the product -> that's why partnerships can be really important).

Another very important aspect is capital! Mostly early stage investors (VC follow the "dumb" practice to use prior investments as a reason for their own investment -> bit of a chicken-or-egg-problem). For really tech-intensive startups often a strong track record of grants.

For hardware startups cheap access to facilities (e.g. lab, production facilities etc.) is really important. -> also for this collaborations with other bigger companies can help a lot, less often also partnerships with universities.

R&D startups need a strong IP-strategy from the beginning, but this does not mean that they need a patent for everything.

Memberships at Incubators, Accelerators, Venture Builders etc. are kind of double-edged. On the one side they are surely helpful for the young startups, especially when the founding team consists only of tech-people. But on the other side, VCs usually are not so happy about Venture Builders etc. because they often already own some equity which makes it less attractive for the VCs, and often the Venture Builder companies have their own ideas, networks, people and projects and want to put startups together like with building blocks.

Macro-environment also consists of really important factors! E.g. when there is a big push in a certain direction this helps a lot (example of Climeworks which secures one investment after the other but actually the solution is terribly inefficient). Regulations are a big factor, particularly when the regulations are different in every country this makes the scale-up much more difficult.

Frage 2: Versucht ihr die Performance der Startups zu messen? Wenn ja, welche Kriterien zieht ihr dafür in Betracht oder würdet ihr in Betracht ziehen?

Growth in any aspect, meaning turnover, employees, more products / new features, more customers

Further fundings (typical funding cycle is about every 18 months and the fundings should get significantly bigger every time, but yeah again bit of a dumb practice that we trust much more in a startup because it received funding before)

Of course, survival is key because a failed startup delivers no benefit for anyone.

But the relevant performance indicators also depend on the industry, the business model etc. (e.g. in med-tech certifications take really long and that's why the time to the next phase usually gets much longer, Software startups can easily measure things like customer acquisition cost, lifetime value etc.).

A good indicator is also how much new capital is needed to generate one additional million of profit.

Frage 3: Sind es immer die gleichen Faktoren, welche für euch Indizien für besonders erfolgreiche Startups darstellen oder ändern die Faktoren? Wenn ja, aufgrund welcher Kriterien ändern die wichtigen Faktoren für euch (Moderatoren, z.B. Phase, Technologie Intensität, Art des Produkts)?

R&D-intensity and Industry are really important. Also the type of clients (it is for example much more difficult to sell to Samsung than to a private customers online, but once you manage to sell to Samsung you are done). Depending on the industry the timeframes can vary substantially (e.g. time to market or time to the next phase can be really long in med-tech).

Detailliertes Forschungsmodell Schritt für Schritt durchgehen. Was würdest du ändern?

Looks basically good and already really detailed, but of course there are always further factors you could add, like several factors mentioned before.

Formel zur Messung der Performance zeigen. Was würdest du ändern?

Further fundings could be added. Maybe an indicator to represent the product-market-fit, but Reached_next_Phase goes in this direction. Apart from that it looks viable.

In the eyes of an investor a successful exit or an acquisition can definitely be considered as a higher performance compared to when the startup just survived. Therefore the classification seams good to me.

Arbeit zukommen lassen?

Yes of course!

Appendix 8 Interview Guideline for Startup Interviews

English

Introduction: Master Thesis at ZHAW with Christina Marchand and Innovation Monitor.
Target: Discovering success factors of Swiss energy & environmental startups based on the resource-based view, i.e. based on tangible & intangible resources and capabilities. Data basis: annual Innovation Monitor surveys.

➔ **Show high-level research model with 3 groups of variables.**

Quantitative analysis. Multiple factors per variable group. Performance value calculated from multiple indicators. Above-average performance, therefore your startup in the selection for interviews.

Goal: Verify results of quantitative analysis and understand underlying mechanisms.
Setting: Recording OK? Semi-structured interview.

Topic 1: Startup Team

Tell me briefly about your background!
What is the constellation with the other founders?
Have you / any of you founded or worked in a startup before?

Topic 2: Life Cycle

Tell me about the history of your startup, addressing things that went well, things that went not so well, and major challenges!

Topic 3: Success Factors

Why did it go well/badly or why was the challenge met/not met?
Address areas of financial resources, network team capabilities & knowledge, and external factors. Which factors had a positive influence, which a negative influence?

➔ Address areas of FinancialResources, Network&Partnerships, and TeamCapabilities&Knowledge. Which factors had a positive influence, which a negative influence?
➔ What role did external factors (market, regulation, etc.) play?

Show detailed conceptual model with all variables and address areas of Financial Resources, Network&Partnerships and TeamCapabilities&Knowledge.

In summary: Looking back, what do you see as the most important success factors for your startup? What factors could have jeopardized your startup or the success of your startup?

In general: What factors do you think are most important for the success of energy and environmental startups in Switzerland?

Topic 4: Moderators

Show high-level conceptual model including moderators.

We also want to find out if the importance of the success factors depends on the variables TypeOfMainOffer, TechnologyIntensity and PhaseInTheLifeCycle. Briefly explain moderators and characteristics.

➔ Depending on the startup, address the corresponding dimensions of the moderators.

Topic 5: Performance/Success

What do you understand by success in a startup or on the basis of which criteria would you speak of a high startup performance?

End: Any questions? Interested in abstract?

Deutsch

Einführung ins Thema: Masterarbeit an der ZHAW mit Christina Marchand und Innovation Monitor;
Ziel: Erfolg von Schweizer Energie- & Umwelt-Startups auf bestimmte Erfolgsfaktoren herunterbrechen; basierend auf der Resource-based View; also greifbare & nicht greifbare Ressourcen und Capabilities als Erfolgsfaktoren; Datenbasis jährliche Innovation Monitor Umfragen.

➔ **Grobes Forschungsmodell mit 3 Variablengruppen zeigen.**

Quantitative Analyse. Mehrere Faktoren pro Variablengruppe. Performancewert aus mehreren Indikatoren berechnet. Überdurchschnittlich gut abgeschnitten, deshalb Ihr Startup in der Auswahl für Interviews.

Ziel: Ergebnisse der quantitativen Analyse überprüfen und dahinterliegende Mechanismen verstehen.
Setting: Interview aufzeichnen OK? Teilstrukturiertes Interview.

Topic 1: Startup Team

Erzählen Sie mir kurz von Ihrem Hintergrund!
Wie sieht die Konstellation mit den anderen Gründungsmitgliedern aus?
Haben Sie / eine(r) von euch davor schon gegründet oder in einem Startup gearbeitet?

Topic 2: Life Cycle

Erzählen Sie mir von der Geschichte Ihres Startups und gehen Sie dabei auf Dinge ein, welche gut gelaufen sind, welche schlecht gelaufen sind, und auf grössere Herausforderungen!

Topic 3: Erfolgsfaktoren

Weshalb ist es gut/schlecht gelaufen bzw. weshalb wurde die Herausforderung gemeistert/nicht gemeistert? Auf Bereiche Financial Resources, Network Team Capabilities & Knowledge, und externe Faktoren eingehen. Welche Faktoren hatten einen positiven Einfluss, welche einen negativen Einfluss?

➔ Auf Bereiche FinancialResources, Network&Partnerships und TeamCapabilities&Knowledge eingehen. Welche Faktoren hatten einen positiven Einfluss, welche einen negativen Einfluss?
➔ Welche Rolle spielten dabei externe Faktoren (Markt, Regulation etc.)?

Detailliertes Conceptual Model mit allen Variablen zeigen und auf Bereiche Financial Resources, Network&Partnerships und TeamCapabilities&Knowledge eingehen.

Zusammenfassend: Was sehen Sie rückblickend als die wichtigsten Erfolgsfaktoren für Ihr Startup an? Welche Faktoren hätten Ihr Startup bzw. den Erfolg Ihres Startups gefährden können?

Allgemein: Welche Faktoren denken Sie, sind für den Erfolg von Energie- und Umweltstartups in der Schweiz besonders wichtig?

Topic 4: Moderatoren

Grobes Conceptual Model inkl. Moderatoren zeigen.

Wir wollen auch herausfinden, ob die Wichtigkeit der Erfolgsfaktoren von den Variablen TypeOfMainOffer, TechnologyIntensity und PhaseInThe LifeCycle abhängt. Kurz Moderatoren und Ausprägungen erklären.

➔ Je nach Startup auf die entsprechenden Ausprägungen der Moderatoren eingehen.

Topic 5: Performance/Erfolg

Was verstehen Sie unter Erfolg bei einem Startup bzw. auf Basis welcher Kriterien würden Sie von einer hohen Startup Performance sprechen?

Abschluss: Noch Fragen? Abstract erhalten?

Appendix 9 Transcriptions of Interviews with Startups

Interview Cortexia

Datum: 21.04.2022, Zeit: 15:00-15:45

Teilnehmer: Andreas von Kaenel, Alexander Wagner

Leitfragen & Themen:

Kurze Einführung ins Thema inklusive grobem Forschungsmodell.

Topic 1: Startup Team

Erzählen Sie mir kurz von Ihrem Hintergrund!
Wie sieht die Konstellation mit den anderen Gründungsmitgliedern aus?
Haben Sie / eine(r) von euch davor schon gegründet oder in einem Startup gearbeitet?

Zu meiner Person: Ich habe die ETH von Lausanne gemacht. Dann habe ich Karriere innerhalb der Industrie in Frankreich, Schweiz und Deutschland gemacht. Bis zur letzten Stelle bei der Meyer Burger Gruppe (Produktionsanlagen für Solaranlagen). Ende 2015 habe ich aufgehört, bin da mit der Strategin der Gruppe nicht mehr einverstanden gewesen und habe eine neue Herausforderung gesucht. Dann habe ich Andre Droux getroffen. Er hatte ein Engineeringbüro, welches die Gemeinden in der Westschweiz zum Flottenmanagement beraten hat. Er hat mir von seiner Idee erzählt über die Messung der Stadtreinigung. Ich fand das gut und wir haben mal zusammengearbeitet und geschaut, ob es ein Marktinteresse gibt. Wir haben die Gemeinden in Deutschland, Frankreich und der Schweiz gefragt. Wir haben gesehen, es gibt ein grosses Interesse. Dann haben wir schlussendlich ein KTI-Projekt aufgebaut und erhalten und die Firma gegründet. So ist es entstanden.

Am Anfang waren wir 2 Gründer. Dann haben wir angefangen mit ersten Marktkontakten, Konzeptaufbau und Produktaufbau. Auch mit ganz enger Zusammenarbeit mit ETH Lausanne, Fachhochschule Neuchatel und Stadt Zürich. Dann mussten wir als Startup natürlich Geld suchen und da hatte ich einen Freund von mir getroffen und er ist interessiert gewesen, auch dem Gründerteam beizutreten. Dann waren wir zu Dritt. Die Firma wurde dann Ende 2016 gegründet. Erster Umsatz 2018 mit Prototypen. Wir hatten noch nicht viele, konnten aber schon etwas verkaufen. Erste Investoren 2019. Dann hatten wir eine ganz schwierige Periode mit COVID und Investorensuche bis wir endlich Ende 2021 alle Investoren an Board hatten. In der Zwischenzeit ist es natürlich extrem schwierig gewesen für uns Gründer und der 1. Gründer Andrex Droux ist ausgestiegen weil es zu viel für ihn war. Er ist zuerst nur operativ ausgestiegen, später aber auch mit seinen Aktien, die wir dann zurückkaufen mussten.

Topic 2: Life Cycle

Erzählen Sie mir von der Geschichte Ihres Startups und gehen Sie dabei auf Dinge ein, welche gut gelaufen sind, welche schlecht gelaufen sind, und auf grössere Herausforderungen!

Gemeinsame Validierung: Ist Marktinteresse vorhanden? -> Ja, grosses Interesse in Deutschland, Frankreich und Schweiz. -> Cortexia gegründet.

Anfangs nur 2 Gründer (ich und André). Wir machten Konzeptaufbau, Produktaufbau, Zusammenarbeit mit ETH Lausanne, Stadt Zürich.

Danach folgte die Suche nach Geld. -> Freund brachte Kapital und wurde 3. Gründer.

1. Umsatz 2018. Erste Investoren 2019.

Schlecht: Schwierige Periode mit COVID und Investorensuche.

Gut: 2021 alle Investoren an Board.

Schlecht: 1. Gründer (André Droux) ist 2021 ausgestiegen.

Herausforderung: Ramp-Up und Scale-Up

Topic 3: Erfolgsfaktoren:

Weshalb ist es gut/schlecht gelaufen bzw. weshalb wurde die Herausforderung gemeistert/nicht gemeistert?
Auf Bereiche Financial Resources, Network Team Capabilities & Knowledge, und externe Faktoren eingehen.
Welche Faktoren hatten einen positiven Einfluss, welche einen negativen Einfluss?

Schlecht: Schwierige Periode mit COVID und Investorensuche:

1. Wir sind ein Startup im Bereich Cleantech und ein Teil von unseren Kunden sind Gemeinden, also öffentliche Kunden. Und das gefällt den Investoren gar nicht. Und zwar mit Recht, weil das Kunden sind für die die Zeit nicht so kritisch ist. Wir haben verschiedene Städte, die hätten schon vor 2 Jahren bestellen sollen, aber verschieben immer wieder. Für die ist es nicht so wichtig, für ein Startup ist es aber matchentscheidend, ob die Aufträge kommen oder nicht. Also das haben die Investoren gar nicht gern. Generell für Startups im Cleantech-Bereich, Smart-City und Startups mit öffentlichen Kunden ist es sehr schwierig an Geld zu kommen. Ich will nicht für alle sprechen, aber bei uns war es so.

2. Einstellung von Gründern: Sie sehen, ich bin nicht mehr so jung, auch die anderen Gründer waren nicht mehr so jung. Ich bin eher KMU-minded, bin eher ein Entrepreneur, ich habe es gerne etwas aufzubauen. Investoren fragen aber immer als erstes direkt nach der Exit-Strategie. Da hat man noch gar nicht vom Unternehmen geredet, da muss man schon erklären wie man es verkaufen will. Das ist kein Unternehmen mehr, es muss immer mal 3 mal 5 sein, ich finde das nicht schlecht oder gut, das ist die Definition von einem Startup. Wir sind aber von der Kultur her eher im Bereich eines KMUs als eines Startups. Und ich denke, das ist nicht weil der Gründer auf seinem Sitz hocken will und nichts abgeben will, nein ich würde gerne sogar alles abgeben, wenn es im Interesse von der Firma gewesen wäre. Aber wir haben nicht so diese Startup-Einstellung, sondern eher Einstellung zum Aufbau einer Firma mit dem Ziel die Umwelt zu verbessern und auch wirtschaftlichen Gewinn haben, aber nicht in dem Stil Umsatz mal 3 in 2 Jahren.

Gut: 2021 alle Investoren an Board:

Warum hatten wir Erfolg? Wir hatten 3 mal fast abgeschlossen, 2019 mit einem Kapital-Fond von Belgien. Das hat dann aber nicht geklappt. Dann im März 2020 hatten wir ein Family Office gefunden, welches investieren wollte. Dann kam COVID und sie wollten sich auf ihre bestehenden Projekte fokussieren. Hat also auch nicht geklappt Kapital aufzunehmen. Das war Plan A.

Plan B: Investoren aus der Nicht-Finanz-Industrie, sondern Unternehmen aus der Industrie. Wir haben gedacht, mit unserer Kultur und unserer Einstellung versuchen wir es mal mit Unternehmen. Wir haben dann mit einer französischen Gruppe Kontakt gehabt, die wollten uns sogar kaufen, dann kam aber COVID und es hat alles aufgehört. Also 3 mal fast und das 4. Mal war mit einem deutschen Familienunternehmen mit mehr als 20 Mrd. Euro Umsatz und dort hat die Kultur sehr gut gepasst, also das Zwischenmenschliche und das Ganze. Name des Unternehmens ist Remondis. Der Erfolgsfaktor war Hartnäckigkeit. Es ist extrem schwierig. Wir hatten 10 Mitarbeiter, die haben natürlich Familie und so. Wir hatten ein schönes Projekt und ein super Team, alle haben mitgemacht, sie wussten dass wir vielleicht nicht in so einer einfachen Situation sind, aber am Schluss ist es gut gekommen.

Also wir hatten einen ersten Prototyp bei KTI-Projekt entwickelt und haben dann den 2. Prototyp auch beim KTI-Projekt fertig gehabt. Aber das war noch sehr gross und nicht sehr zuverlässig. Dann haben wir mit einer Schweizer Firma kooperiert für die Industrialisierung. Und ich denke, dort waren wir einer von den ersten. Die Firma ist mit dieser Technologie eingestiegen, mit der sogenannten Cortexia-Box, war wichtige, dass die auch in einem nassen, verschmutzten Umfeld arbeiten kann. Das ganze Ki-Wissen kam von der ETH. Die Kooperation mit der ETH war extrem wichtig! Ein Professor ist auch im Advisory Board. Wir haben da ein sehr gutes Verhältnis und die Zusammenarbeit läuft sehr gut. Für die Entwicklung haben wir anfangs auch jemanden von der FH Neuchatel als Projektleiter eingestellt, welcher die Entwicklung der innovativen Produkte gemacht hat. Was auch immer sehr schwierig ist, ist die Industrialisierung, also RampUp und ScaleUp. Es muss also ein Produkt sein, dass man in grösserem Massstab produzieren kann. Der Projektleiter ist dann gegangen weil er eine Thesis machen wollte. Dann kam ein neuer Projektleiter und der hatte seine Kompetenzen im Bereich Teamaufbau und Industrialisierung. Es ist hochkompliziert was wir machen, aber wir haben das mit externen Partnern gemacht. Cortexia-Box mit Swiss-Logic. Die KI-Sachen mit der EPFL, aber auch mit NVIDIA. Dann haben wir die ganze Kommunikation in ganz enger Zusammenarbeit mit Swisscom gemacht (unser System kann über Sim-Karten überall kommunizieren, funktioniert auch auf anderen Kontinenten). Die ganze Datenvisualisierung haben wir mit einer anderen Firma gemacht. Wir konnten intern ein kleines Team bleiben und mit externen Bausteinen arbeiten, das war sehr wichtig, damit die Lösung dann zuverlässig läuft. Also Netzwerke sind wirklich sehr wichtig! Sie können nicht alles selber erfinden, vor allem nicht wenn man noch klein ist.

Wir hatten von Anfang an entschieden, dass wir nicht intern produzieren, wir werden die beschaffen und das ist gut so, weil das ist nicht unsere Kompetenz. Unsere Kompetenz ist das Vertreiben, die Software draufspielen und die Qualität für die Kunden weiter zu verbessern, aber nicht die Produktion.

Als Schweizer Firma sind wir vom Accelerator French IoT ausgewählt worden. Von den Gründern hatte keiner Erfahrung mit Startups. Ich hatte Erfahrung mit ScaleUp, also von kleinen Unternehmen zu grösseren Unternehmen aufbauen. Mit French IoT hatten wir alles gelernt, wie man Investoren sucht, das war wichtig. Die Visibility durch den Accelerator war auch hilfreich. Das ganze Paket für Startups.

Es war von Anfang an klar, dass wir international sein müssen, weil unsere Zielgruppe Städte mit mehr als 100.000 Einwohnern sind. Da gibt es in der Schweiz eigentlich nur 4 Städte. Deshalb waren International Activities wichtig, weil in der Schweiz nicht genügend grosse Städte vorhanden sind, das gibt auch einen fehlenden Anreiz (wirtschaftlich und Impact) für Investoren. Unser Geschäftsmodell war von Anfang an auf Internationalisierung ausgelegt.

Bis 2019 hat sich die Geschäftsleitung keinen Lohn bezahlt. Und dann hatte ich einen Projektleiter für das ganze KTI-Projekt plus einen für den ganzen Kundenservice und so. Also wir waren ein ganz kleines Team von bezahlten Leuten. Dann hatten wir die ersten Umsätze und dann haben wir einen Business Angel gewinnen können und das hat uns geholfen für eine gewisse Zeit. Weil in der Schweiz gibt es sehr wenige Förderungen, nur Innosuisse und BAFU (dieses muss man aber zurückbezahlen, aber immerhin fliesst das Geld direkt zum Unternehmen), diese waren aber matchentscheidend für uns, sonst wären wir schon weg. Diese sind schwierig zu bekommen, schlussendlich haben wir sie aber doch bekommen. Aus meiner Sicht ist es in Deutschland und Frankreich wesentlich einfacher an Geld zu kommen als in der Schweiz! Das ist wohl so die Einstellung in der Schweiz. Aber ich habe das Gefühl, in den Städten passiert doch einiges, vor allem im Bereich Energie und Transport. Die Städte haben sicher eine wichtige Rolle im Kampf gegen den Klimawandel. Die Städte haben aber eigentlich keine Freiheit für innovative Projekte, weil sie ein Budget haben und da stark unter Druck stehen und wenn sie etwas machen wollen gibt es immer eine Ausschreibung, die Zusammenarbeit mit den Städten ist also sehr schwierig. Man bräuchte im Stadt-Budget z.B. 1 Prozent für den Klimawandel. Das sollte dann keine Förderung sein, sondern Umsatz für die Startups. Das wäre eine Art natürliche Selektion, das heisst die Startups die gut sind und etwas bringen, hätten mehr Projekte. Das gibt den Startups die mit den Städten arbeiten, die Chance, Umsatz zu generieren. Aber die Städte vertrauen oft kleinen Startups nicht, weil vielleicht sind sie nächstes Jahr nicht mehr da.

Ich würde es begrüssen, wenn es anstatt Förderungen, für Startups im Bereich Smart-City, Energiewandel und Cleantech-Bereich, einen Rahmen gäbe, um die Zusammenarbeit zwischen Städten und Startups zu fördern.

Ich habe seit vielen Jahren Unternehmen geleitet und z.B. in den Solarbereich kam ich, bevor es wirklich eine grosse Wachstumsindustrie war, als das war schon auch entrepreneurial, aber das war nicht typische Startuperfahrung, das hatte niemand von uns. Startuperfahrung ist das ganze mit dem Problem mit dem Equity dahinter. Zum Thema Umsatz: Ich glaube wir sind hier bisschen speziell, weil wir viel früher Umsatz hatten als Equity. Also im Vertrieb, Marketing, Produktmanagement, Produktentwicklung und so hatten wir wirklich gute Leute. Unser CTO, der ist nicht Mitgründer, er war einer der ersten Angestellten und Mitinhaber, er hatte schon Erfahrung mit mehreren Startups.

Vielleicht noch zum Team: Was für mich wirklich matchentscheidend ist, ist die Kultur. Wie ist die entstanden? Der CTO ist ein trainierter Agile-Master. Er hat in seinem Team die Leute aufgebaut. Viele Leute sprechen von Agile, aber wenn man das wirklich nach Textbook macht, dann bleibt man sehr nah am Ball dran. Man ist sehr flexibel, aber die Leute haben keine Zeit sich zu verzetteln. Den Ansatz hatten wir für die Entwicklung, aber auch für die Geschäftsleitung. Wir hatten einen Operational-Plan erstellt, wo wir die Prioritäten und die Committement für die Projekte jeden Monat neue anschauen und neu planen, um wirklich sicher zu sein, dass wir auf der richtigen Priorität arbeiten. Also jeder in der Firma weiss, welche Aufgaben zu seiner Priorität gehören. > gleicher Ansatz wurde für die Geschäftsleitung verwendet.

Bis November 2021 hatten wir keinen PHD im Team, aber wir hatten immer eine enge Zusammenarbeit mit der ETH Lausanne.

Für uns war es extrem schwierig zu Equity zu kommen. Auch wenn wir immer gute Feedbacks hatten, dass die Leute es sehr spannend und interessant finden usw., aber am Schluss konnten wir einfach nicht zum Abschluss kommen. Wir hatten natürlich viele andere Startups getroffen und das war auch da generelle Feedback, dass Startups im Bereich Energie und Smartcity nur sehr schwierig an Investments kommen. Ich habe da keine Statistik dazu, aber für uns war es sehr schwierig.

Detailliertes Conceptual Model mit allen Variablen zeigen und auf Bereiche Financial Resources, Network und Team Capabilities & Knowledge eingehen.

Zusammenfassend – Was sehen Sie rückblickend als die wichtigsten Erfolgsfaktoren für Ihr Startup an? Welche Faktoren hätten Ihr Startup bzw. den Erfolg Ihres Startups gefährden können?

Also die Partnerships waren extrem wichtig. Wir haben das Produkt gemeinsam mit den Kunden entwickelt und das machen wir auch für neue Anwendungsfälle weiter. Das ist wichtig, weil Ingenieure entwickeln oft Zeug, welches für sie selbst schön ist, aber nicht für den Kunden! Als kleine Anekdote: Ein Verantwortlicher von der Stadt Zürich meinte, es wäre wirklich cool wenn dieses Produkt existieren würde, aber ich glaube nicht, dass es möglich ist. Da haben wir dann gesagt, den brauchen wir an Board. Weil mit ihm konnten wir dann etwas entwickeln, was wirklich den Bedürfnissen der Stadt entspricht. Sonst hätten wir entwickelt, wo wir denken, das könnte nützlich sein, aber das wäre nicht zum Markt gekommen weil es nicht gepasst hätte. Durch die Zusammenarbeit hatten wir sehr früh ein Produkt, das wirklich zum Markt passt.

Der Accelerator war eigentlich nicht wirklich wichtig, aber French Iot war ganz gut für unser Netzwerk. Industriepartnerships waren sehr wichtig mit Microsoft, NVIDIA, Swisslogic usw..

Wir sind kein Spin-Off von einer Universität. Es war eher das Bedürfnis vom Markt, weswegen wir zur Universität gehen mussten, um die Technologie zu holen, es war also eher eine Partnerschaft mit der Universität.

Topic 4: Moderatoren

Grobes Conceptual Model inkl. Moderatoren zeigen.

Wir wollen auch herausfinden, ob die Wichtigkeit der Erfolgsfaktoren von den Variablen TypeOfMainOffer, TechnologyIntensity und PhaseInThe LifeCycle abhängt. Kurz Variablen und Ausprägungen erklären.

Also die Technologie haben wir nicht alleine entwickelt, sondern in Zusammenarbeit mit der EPFL und mit der FH Neuchatel. Das war für die EPFL das erste Projekt mit CNN, also Deep Learning. Für uns war das Machine Learning zu kompliziert und dann hat das die Uni mit CNN gemacht und dann ist es gut gelaufen.

Technologie-intensive Startups: Entweder muss man selbst eine sehr hohe technologische Kompetenz haben, oder mit Technologieexperten wie z.B. Tech-Unternehmen oder Universitäten zusammenarbeiten.

Software: Softwarestartups können wahrscheinlich schneller pivoten, wenn man sieht, dass es für das Produkt keinen Markt gibt, aber bei uns war das nicht wirklich der Fall.

Service: Mir fällt nichts dazu ein.

Topic 5: Performance/Erfolg:

Was verstehen Sie unter Erfolg bei einem Startup bzw. auf Basis welcher Kriterien würden Sie von einer hohen Startup Performance sprechen?

Also ich denke, für mich ist die Standarddefinition für eine Startups der Aktienpreis, also die Kapitalerhöhung. Also wenn man als Gründer eine Aktie für 1 Franken hat und dann kommt die erste Runde und dann sind es 10 und dann 100 Franken. Genau wie bei der Einleitung gesagt, hat uns das weniger betroffen. Für mich war wichtig, etwas Neues aufzubauen, was wirklich einen Impact hat. Das spürt man bei uns auch in der Kultur. Die Leute haben wirklich Freude bei uns zu arbeiten, hauptsächlich aus 2 Gründern: Technologie-Excellence und Umwelt-Impact. Das macht wirklich Freude! Das hatte ich schon im Solarbereich. Das sind Leute die wirklich engagiert, interessiert und motiviert sind. Das sind nicht nur Worte, also bei uns steht nicht auf der Tür geschrieben, dass wir ein Cleantech-Unternehmen sind, sondern das ist in der Kultur fest eingebunden.

Für mich ist Erfolg auf finanzieller Seite mehr Umsatz und mehr Mitarbeiter, ganz klar. Das heisst für mich nachhaltiger Erfolg. Wir könnten auch sagen, wir bleiben klein. Aber meine Einstellung ist, ich entwickle gerne die Sachen, aber wenn man einmal die Grenzen erreicht und sagt, ok jetzt müssen wir das konsolidieren usw., dann braucht es vielleicht eine andere Art von Person.

Abschluss: Noch Fragen? Abstract erhalten?

Wunsch bezüglich Startup-Umfeld in der Schweiz: einfacher an Förderungen zu kommen. Keine Fragen mehr. Ja, würde Abstract gerne erhalten.

Interview Loriot

Datum: 26.04.2022, Zeit: 9:30 – 10:15

Teilnehmer: Julian Studer, Alexander Wagner

Leitfragen & Themen:

Kurze Einführung ins Thema inklusive grobem Forschungsmodell.

Topic 1: Startup Team

Erzählen Sie mir kurz von Ihrem Hintergrund!
Wie sieht die Konstellation mit den anderen Gründungsmitgliedern aus?
Haben Sie / eine(r) von euch davor schon gegründet oder in einem Startup gearbeitet?

Gegründet hat noch keiner von uns. Wir haben zu zweit gestartet. Der andere ist aber nach 2 Jahren nicht mehr dabei. Ich bin jetzt Geschäftsführer, Founder und CEO von der Firma. Fachlich bin ich tätig in Business Strategie und Finanzen. Wir sind zwar eine Softwarefirma, aber ich mache nichts mit Software, bin also kein Programmierer.

Geschäftspartner welcher auch Gründungspartner war, kam von der technischen Seite, war vorher bei IBM und hat die Technologie mitentwickelt, die Loriot dann auch verwendet hat. Er hat diese gemeinsam mit dem Team, also mit den Leuten die wir angestellt haben, weiterentwickelt. Der Geschäftspartner ist nach 2 Jahren ausgestiegen, der Rest des Anfangsteams ist aber eigentlich immer noch in gleicher Form vorhanden. Einer von den frühen Mitarbeitern ist jetzt CTO, managet also das ganze technische Team. Sind aber alles interne Leute, also es wurden keine externen Leute für den technischen Part genutzt.

Studer: 2 Jahre auf Finanzbranche UBS Genf, Investmentseite, nach Finanzkrise weg vom Bankenwesen. Tendenziell ein Draufgänger, viel Mut, Job bei der Bank hat genervt, Startup ist cool aber auch schwierig, wusste, dass es sehr riskant ist, aber wollte die Herausforderung selber etwas aufzubauen! Markt war sehr attraktiv, wenig Konkurrenz! Viele externe positive Zeichen!

Funktion bei der Bank: Investment für Superreiche (Privatvermögen > 50M). Investments aber eher konservativ, langfristige Anleihen usw., eher nicht in Richtung Venture Capital. Nur sehr wenig in Private Equity, ausser von Russen die oft sehr aggressive Strategien verfolgen.

Topic 2: Life Cycle

Erzählen Sie mir von der Geschichte Ihres Startups und gehen Sie dabei auf Dinge ein, welche gut gelaufen sind, welche schlecht gelaufen sind, und auf grössere Herausforderungen!

Retrospektiv wichtig: Startup sauber aufbauen von Anfang an mit Anwälten, Notaren etc. Zu Beginn kaum Cash, kaum Liquidität zum Investieren. -> oft auf der Sparbremse (z.B. ABS (Aktionärbindungsvertrag) verpasst), Aktienverteilung genau regeln (Partner ist abgehauen und hatte 50% Aktien -> nicht geregelt was in so einem Fall passiert). -> Richtige Verträge machen! Denke das passiert relativ oft, weil man weiss, dass die meisten Startups nicht überleben, deshalb denkt man «Komm wir fangen mal an und dann schauen wir weiter.» und man verzichtet darauf alles von Anfang an sauber aufzubauen mit Anwälten, Verträgen etc., weil das ist extrem kostspielig. Das war eine der grössten Herausforderungen und das würde ich Jungunternehmen anraten, dies von Anfang an ordentlich zu machen, das Geld dafür in die Hand zu nehmen, um potenzielle Gefahren in der Zukunft zu eliminieren.

Gut: im richtigen Sektor eingestiegen, + richtiges Timing ist auch ein wichtiger Faktor, + gutes Produkt + Glück, dass wir von Anfang an gute Kunden hatten (z.B. Stadt ZRH -> brachte Cash, damit konnte man das Team aufbauen) + Location in ZRH hat geholfen -> dadurch Hilfe von Startup-Organisationen (Venture Labs, Innosuisse, Swiss Global Enterprise etc.), viele gratis Sessions wo man viel lernen kann. Dadurch viele Leute getroffen, diese wiederum haben geholfen um Mitarbeiter zu finden und Kapital zu finden.

Richtiges Team für die Gründung ist extrem wichtig! Das ist das absolute A und O! Falsche Leute -> Macht alles kaputt, egal wie erfolgreich die Firma schon ist, auch wenn Produkt und Markt super sind. Ich habe es schon mehrmals gesehen im Markt bei Kollegen die auch Startups haben und es Probleme zwischen den Founders gab, ich habe es auch selbst erlebt, das kann wirklich kritisch sein und bis zum Ende der Firma führen. Deshalb ist das Verhältnis der Founder bzw. des Geschäftsmanagements sehr wichtig.

Finanzielle Situation war anfangs nicht sonderlich gut, Kapital von AG Gründung (50.000) -> damit konnte man anfangs natürlich etwas anfangen. Anfangs kein Gehalt ausgezahlt, später erst ganz wenig. Je nach dem wie die Deals reinkamen gab es immer wieder mal bisschen Cash und etwas mehr Luft. Cash ist das was die Firma braucht um zu überleben. Waren aber nicht super liquide. Das ist das Problem von den meisten Startups, dass sie anfangs selbst bisschen etwas investieren und dann hoffen, dass sie innerhalb von 3 bis 6 Monaten irgendwie auf einen grünen Zweig kommen.

Frühes Darlehen von Kontakt von Julian hat sehr geholfen (war eine komplizierte Form von Darlehen, wurde teilweise zurückgezahlt, teilweise in Aktien umgewandelt, die Zinsen waren so um die 2 bis 3 Prozent). -> Konnten dadurch 3 oder 4 Leute einstellen. Hohes Wachstum der Firma (hauptsächlich bezogen auf Einnahmen) und tiefe Kosten haben geholfen schnell profitabel zu sein und das Darlehen schnell zurückzuzahlen. Das macht natürlich alles einfacher wenn man schon früh Einnahmen generieren kann. Zieht wiederum Investoren an und wir haben erst vor 2 Wochen bekanntgegeben, dass wir eine grosse CSA-Runde geschlossen haben.

Topic 3: Erfolgsfaktoren:

Weshalb ist es gut/schlecht gelaufen bzw. weshalb wurde die Herausforderung gemeistert/nicht gemeistert?
Auf Bereiche Financial Resources, Network Team Capabilities & Knowledge, und externe Faktoren eingehen.
Welche Faktoren hatten einen positiven Einfluss, welche einen negativen Einfluss?

Alle 3 Faktoren sind sehr wichtig, ohne Finanzen überlebt die Firma nicht. Finanzen sind wie ein Runway für ein Flugzeug, wenn die Startbahn zu kurz ist kann man nicht mehr starten. Es ist wirklich wichtig, dass man seine Finanzen brutal im Griff hat, dass man sie richtig investiert. Frühes Darlehen von Kontakt von Julian war ein grosses Glück. Und es sind schnell Deals reingekommen wo wir Cash generieren konnten, zum Überleben von der Firma.

Networking ist extrem wichtig! -> Wenn man Business machen will ist Networking alles, weil man in Communities drin ist, gute Kontakte zu Firmen hat, die dann später helfen. Networking bringt Cash und Finanzen! Ich würde sagen, die Finanzen sind abhängig vom Network, ohne Network gibt es keine Finanzen. Ich würde das Network sogar vor die Finanzen stellen, weil wenn man keine Kontakte hat, hat man meistens auch keine Finanzen. Als erste Priorität würde ich das Network setzen, weil das bringt Business, Darlehen, Geld.

Team Capabilities und Knowhow ist absolut wichtig für eine Firma, weil wenn man ein Produkt herstellt, muss man Leute haben, die wissen wie man auf dem Markt auftreten muss. -> Produkt muss zum Markt passen und richtige Qualität haben, damit man es dann auch verkaufen kann und dem Kunden etwas bringt.

Aber eigentlich sind alle Punkte (Gruppen von Variablen) gleichermassen wichtig, Business kann nur überleben und funktioniert nur wenn alle 3 Bereiche zusammenspielen.

Vorteil, dass IBM die erste Lösung entwickelt hat, die jetzt auch Loriot hat. War primitiv, war aber die Basis für Loriot (eigentlich fast wie ein Industrie-Spin-Off) -> IBM hatte das Projekt 2015 eingestellt, aber wir haben die Idee herausgenommen und diese weiterentwickelt. Wir hatten eigentlich schon einen Prototyp, mit dem wir direkt auf den Markt gehen konnten und diesen eigentlich direkt verkaufen konnten. Kaum Entwicklungszeit notwendig! Das macht natürlich alles viel leichter, wenn man nicht erst vorher ein Jahr oder noch mehr an Entwicklungszeit überbrücken muss und auf Pump lebt, sondern direkt mit Business starten kann. Das Cash am Konto durch die ersten Verkäufe macht es auch gleich einfacher.

Detailliertes Conceptual Model mit allen Variablen zeigen und auf Bereiche Financial Resources, Network und Team Capabilities & Knowledge eingehen.

Allgemein: Welche Faktoren denken Sie, sind für den Erfolg von Energie- und Umweltstartups in der Schweiz besonders wichtig?

Was ich sehr schätze ist die Hilfe in Zürich/Schweiz durch staatliche Institutionen (Innosuisse, Swiss Global Enterprise) ist extrem hilfreich!!! Das machen sie wirklich gut hier in der Schweiz, wirklich smart! Die Strategie macht absolut Sinn, ist zwar anfangs ein riesen Investment für den Staat und für die Kantöne, aber wenn das Startup dann wirklich mal läuft, dann schafft es langfristig Arbeitsplätze, Umsätze, und am Schluss zahlen die erfolgreichen Startups auch viele Steuern und geben so wieder etwas zurück. Wir haben viel Hilfe bekommen, von diesen Organisationen.

Auch vom RAV. RAV hat 80% des Lohns während den ersten 3 Monaten als Gründer bezahlt. Das ist zwar nicht sehr lang und auch nicht sehr viel, aber als Startup Gründer schätzt man das natürlich sehr und es senkt die Hürden etwas.

Sonder-Steuerlösungen mit Kantonen waren easy möglich um nicht bei neuen hohen Bewertungen plötzlich extreme Steuern zahlen zu müssen (z.B. nach Finanzierung auf 100M bewertet -> wenn Gründer einen grossen Teil der Aktien besitzt, müsste er plötzlich Vermögenssteuern bezahlen, die deutlich höher sind als sein Gehalt). Deshalb Sonderlösungen wichtig, um für die Steuern eine andere Bewertung des Startups vorzunehmen, würde sonst jedem Startup mit hohem Investment den Kopf abreissen.

Startup-Community in der Schweiz ist super, allgemein wenn man im internationalen Business tätig ist, ist die Schweiz ein super Standort, auch wegen Steuern zum Beispiel. Die Schweiz wird im internationalen Umfeld im super gesehen.

Topic 4: Moderatoren

Grobes Conceptual Model inkl. Moderatoren zeigen.

Wir wollen auch herausfinden, ob die Wichtigkeit der Erfolgsfaktoren von den Variablen TypeOfMainOffer, TechnologyIntensity und PhaseInThe LifeCycle abhängt. Kurz Variablen und Ausprägungen erklären.

Software:

Sehe uns eher in der Mitte bis vielleicht sogar eher auf der ganz technologischen Seite. Markt verfolgen ist sehr wichtig, um neue Technologien und Anschluss nicht zu verpassen, vor allem in so einem schnellen Markt (Internet, IoT, Computer etc.). Man muss immer up-to-date sein. Kann ein Killer sein wenn man sagt wir bleiben da wo wir jetzt sind und machen nichts anders. Zum Beispiel Codac, haben komplett den Anschluss verpasst! -> deshalb ist R&D extrem wichtig! Wir haben intern jemanden der sich sehr gut auskennt, der sich Trends ansieht und diese genau verfolgt, um relevante Technologieentwicklungen und Chancen zu erkennen. Da sind wir wirklich ziemlich dran. Vor allem auch um schneller zu sein als die Konkurrenz.

Hardware wäre zu komplex und riskant, wir wollen den Fokus auf die Softwarelösung nicht verlieren. Deshalb lagern wir die Entwicklung und Produktion der Hardware komplett aus, es gibt viele Firmen die das machen. Wir sind sehr stark bei der Software und das ist auch wichtig für uns, dass wir den Fokus nicht verlieren und in unserem Bereich einer von den besten sind.

Topic 5: Performance/Erfolg:

Was verstehen Sie unter Erfolg bei einem Startup bzw. auf Basis welcher Kriterien würden Sie von einer hohen Startup Performance sprechen?

Jeder der gründet hat schon Erfolg! Weil viele haben gute Ideen, aber nicht die Eier den Schritt zu gehen! Das braucht wirklich Mut. Ich habe Respekt vor jedem, der das macht. Man weiss es ist nicht einfach und jeder der es versucht sage ich mal ist schon ein Erfolg, auch wenn das Startup nach 2 Jahren geschlossen wird.

Wenn das Startup überlebt, vor allem das erste jahr ist kritiksch, und noch wichtig sind die magic 5 years! -> dann hat man schon einen Namen am Markt. Und wenn man das geschafft hat ist man eigentlich schon eine solide Firma. Das ist auch einer der Gründe warum wir die CSA-Runde schliessen könnten.

Team + Commitment war extrem wichtig, absolut zentral! Ohne die richtigen Leute schafft man es nicht! Vor allem Motivation und Mindset der Leute (80% vom Einstellungsgrund von Personen), Loyalität, gutes Verhältnis im Team, machen auch privat etwas! Haben Leute aus der ganzen Welt (Spanien, Ungarn, Schweiz etc.). Kann nur wiederholt werden, dass das Team extrem wichtig ist! Knowhow kann man auch nachher noch aufbauen, aber fehlende Motivation oder wenn es vom Mindset nicht passt ist viel schwieriger nachzubessern. Ich weiss, dass ich bei meinen Leuten sogar um 5 am Nachmittag noch anrufen kann wenn etwas ist und die machen mit. Die richtigen Leute sind das, was eine Firma zum Erfolg bringen wird.

International Activities hatten positive und negative Effekte, ich sehe aber eher die positiven Effekte, weil es z.B. in Spanien viel einfacher ist Business zu machen wenn man auch selber in Spanien Leute hat. Das gleiche gilt auch für Osteuropa. Idealerweise hat man überall eigene Leute, aber wir haben oft den Ansatz mit lokelen Partnern zu arbeiten (z.B. in Ecuador, Mexico etc.), welche helfen Kunden anzusprechen, aber eigene Mitarbeiter vor Ort sind trotzdem noch besser. Einer der wichtigsten Faktoren diesbezüglich ist das Gehalt. Der Markt ist so krass ausgetrocknet von Microsoft, Facebook, IBM, Google etc. -> die Uniabsolventen gehen unter 130.000 bis 150.000 nicht arbeiten. Das sieht natürlich in Spanien anders aus. Da kann ich 4 Leute einstellen vs wenn ich hier eine Person in ZRH einstellen würde. Nur mit Leuten in ZRH hätte das Startup keine Chance gehabt und wir wären nie so schnell gewachsen weil die Gehälter viel zu hoch sind! Aber natürlich waren kulturelle Differenzen und Mentalitäten eine Herausforderung. Spannend: in Spanien sind alle eher etwas gechillter, aber offener und direkter, in Ungarn hingegen haben die Mitarbeiter eine extrem hohe Arbeitsmoral und denken mega mit, arbeiten fast wie Roboter, haben aber ein wesentlich steileres Verständnis von Hierarchie («du musst strenger sein, du bist ja der Chef»). Deshalb schau ich, dass die Leute sich auch immer mal wieder treffen, mal gemeinsam ein Bier saufen, so kommt das gut.

Abschluss: Noch Fragen? Abstract erhalten?

Wunsch: Finanzierung erleichtern, z.B. Pool von vermögenden Privatpersonen, muss ja nicht gratis sein, aber Leute mit Erfahrungen, die dann im Advisory Board sitzen können, als eine Art Mentoring, gegen einen kleinen Teil von Equity. Senior bringt normalerweise einen wesentlich grösseren Wert als man Equity abgibt! -> die 10% die man abgibt sind Peanuts! -> Gründer müssen es lernen, dass es sinnvoll ist etwas Equity abzugeben aber dafür einen guten Mentor an Board zu haben. Mentoren sind auch in herausfordernden Situationen sehr hilfreich, zum Beispiel damals als bei uns der Geschäftspartner ausgestiegen ist und 50% der Aktien mitgenommen hat.

Der Wert der Community in der Schweiz und im Grossraum Zürich kann gar nicht genug betont werden, das hat extrem geholfen, ohne diese Hilfe wäre ich nicht mehr da. Deshalb möchte ich auch gern selbst meine Erfahrungen die ich gemacht habe, an junge Unternehmer weitergeben.

Interview Smart-me

Datum: 27.04.2022, Zeit: 13:30 – 14:10

Teilnehmer: David Eberli, Alexander Wagner

Leitfragen & Themen:

Kurze Einführung ins Thema inklusive grobem Forschungsmodell.

Topic 1: Startup Team

Erzählen Sie mir kurz von Ihrem Hintergrund!
Wie sieht die Konstellation mit den anderen Gründungsmitgliedern aus?
Haben Sie / eine(r) von euch davor schon gegründet oder in einem Startup gearbeitet?

Angefangen gemeinsam mit meinem Vater. Ich habe als Hitnergrund Softwareentwickler, er ist Elektroniker. Wir haben beide davor schon Firmen gegründet. Er früher auch in einem ähnlichen Bereich und ich in meinen Jugendjahren mit etwas völlig anderem, mehr in Richtung Comupterhardwareverkauf. Funktion im Unternehmen: Ich bin Geschäftsleiter und leite die ganze Entwicklung, mein Vater ist inzwischen nur noch sporadisch dabei. Er ist eigentlich in Pension.

Das Unternehmen von meinem Vater war auch ein Zählerhersteller, also auch Elektronikentwickler und Hersteller.

Topic 2: Life Cycle

Erzählen Sie mir von der Geschichte Ihres Startups und gehen Sie dabei auf Dinge ein, welche gut gelaufen sind, welche schlecht gelaufen sind, und auf grössere Herausforderungen!

Angefangen hat es ursprünglich mit einer Kickstarterkampagne, wir haben ein Energiemessgerät mit WLAN (Smart-Plug) entwickelt, aber zu einer Zeit wo es das noch nicht auf dem Markt gegeben hat. Anfangs nur nebenbei, ich hatte damals als Freelancer in der Softwareentwicklung gearbeitet aber in einer anderen Firma. Wir haben das also nebenbei gemacht. Mein Vater hat die Hardware gemacht, ich die Software. -> Plan eigene Firma zu machen und ein eigenes Produkt zu machen. -> Kickstarterkampagne, um zu schauen, ob das überhaupt jemand will -> war verhältnismässig erfolgreich. Konnten ca. 500 Geräte verkaufen und konnten mit dem Geld die Produktion finanziert und danach die Firma gegründet. Dann hat es sich weiterentwickelt und wir haben einige Startuppreise gewonnen, das hat euch etwas geholfen, vor allem für die Bekanntheit. Dann haben wir den ersten Mitarbeiter im Verkauf eingestellt, das war das was uns so bisschen gefehlt hat. Dann nachher haben wir weitere Produkte entwickelt, aber weg vom privaten Markt mit dem Smart-Plug sondern eher zu professioneller Energiemessung und Monitoringsystem und haben so unsere Plattform Schritt für Schritt ausgebaut.

Erster grosser Meilenstein: Erster eigener 3-Phasezähler mit Zertifizierung, durfte also auch zum Verrechnen eingesetzt werden. Also nicht nur Monitoring sondern man hat dann auch die Möglichkeit die Daten zum Verrechnen zu verwenden. Das kam sehr gut an auf dem Markt ein Zähler mit echten Daten mit WLAN. Seitdem sind wir eigentlich stetig gewachsen, mehr Leute, neue Produkte entwickelt und jetzt sind wir hier ca. 7 Jahre später.

Es ist aber natürlich nicht immer alles super einfach gelaufen.

Eine der grössten Herausforderungen: Finanzielle Mittel bekommen! Wir haben eine Zeit lang sehr sehr knapp gelebt, auch kein Gehalt ausbezahlt. Wir haben uns irgendwie so durchgewurschtelt. Wir hatten 2 Finanzierungsrunden gemacht, aber beide waren sehr harzig. Es war immer eine sehr lange Zeit vom Entscheid eine Finanzierung zu suchen bis wir dann effektiv eine Finanzierung hatten. Wir haben sehr viele Gespräche geführt mit vielen verschiedenen möglichen Investoren. Ein paar haben uns abgesagt, ein paar haben wir abgesagt. In der 1. Finanzierungsrunde hatten wir schlussendlich nur private Leute. Die 2. Finanzierungsrunde war ähnlich, aber wir haben mehr Geld gebraucht um schneller zu wachsen. Da haben sich dann 2 Privatleute und einige Mitarbeiter beteiligt und haben auf den Lohn verzichtet. Wir haben also eigentlich nie wirklich grosse Finanzierungsrunden gemacht, sondern sehr schnell probiert möglichst von dem Geld zu leben, das wir verdienen. Aber die ersten 4 Jahre waren sehr hart.

Topic 3: Erfolgsfaktoren:

Weshalb ist es gut/schlecht gelaufen bzw. weshalb wurde die Herausforderung gemeistert/nicht gemeistert?
Auf Bereiche Financial Resources, Network Team Capabilities & Knowledge, und externe Faktoren eingehen.
Welche Faktoren hatten einen positiven Einfluss, welche einen negativen Einfluss?

Wo wir aber Glück hatten: Wir hatten relativ bald Partnerschaften gehabt aus der Energieversorgung die mit uns zusammengearbeitet haben, war aber anfangs eher ein Marketingzweck als dass es Umsatz gebracht hätte. Deren Tipps waren so naja, aber es hat schlussendlich geholfen, danach weitere Partner zu finden, weil wir sagen konnten wir arbeiten mit denen zusammen. Das hat auch geholfen eine Finanzierung zu bekommen, z.B. auch durch den Technologiefond, und da hat das sicher auch geholfen. In beiden Finanzierungsrunden haben wir eigentlich einen Teil Eigenkapital bringen müssen von Investoren und der Rest wurde dann vom Technologiefond finanziert bzw. via Bürgschaft und Darlehen.

Wir hatten natürlich immer schon das Produkt und auch erste Verkäufe, welche wir aufzeigen konnten. Am Anfang hald noch nicht im grossen Umfang. Was uns entgegengekommen ist, ist die liberale Gesetzesänderungen (davor gab es nur Nischenanwendungen für unser Produkt). Erst nach der Änderung hat man unser Produkt erst einsetzen können. Es hat sich vorher schon abgezeichnet, dass das passieren wird, aber die

Änderung war natürlich noch nicht 100% sicher. Wir mussten da natürlich immer bei unseren zukünftigen Investoren argumentieren, dass der Markt danach viel grösser sein wird als er vorher war. Das ist dann auch passiert.

Wir waren eigentlich nicht bei einem klassischen Accelerator. Wir hatten ein paar Coachings von Innosuisse. Aber bei ein paar Wettbewerben mit Coachings haben wir mitgemacht. Die Coachings waren aber nicht sonderlich hilfreich, hätten aber vielleicht mit anderen Coaches etwas gebracht. Das waren aber hauptsächlich BWL-Menschen, welchen wir unser Business erklären mussten und das war dann immer relativ zäh.

Die Quellen der finanziellen Ressourcen sind definitiv sehr wichtig! Vor allem am Anfang hat man es in der Schweiz wenn man nicht aus der Biotech oder Blockchain Branche ist eher schwierig, man hat es hart eine Finanzierung zu bekommen. Vor allem in der Frühphase. Ich glaube es ist einfach wenn man schon etwas weiter ist und erste Umsätze vorweisen kann, aber am Anfang ist es sehr schwierig.

Wir hatten keine Erfahrungen mit Finanzierungen, haben das alles zum ersten Mal gemacht. Also jemand mit Finanzerfahrung wäre sicher hilfreich gewesen. Jemand mit Marketingerfahrung wäre auch hilfreich gewesen. Aber schlussendlich haben wir das technische und das Verkaufsding relativ gut abgedeckt. Wir hatten also das Produkt und jemanden, der es verkauft, was am Anfang relativ wichtig ist.

Detailliertes Conceptual Model mit allen Variablen zeigen und auf Bereiche Financial Resources, Network und Team Capabilities & Knowledge eingehen.

Allgemein: Welche Faktoren denken Sie, sind für den Erfolg von Energie- und Umweltstartups in der Schweiz besonders wichtig?

Am wichtigsten sind aus meiner Sicht die Industry Partnerships, also dass man relativ bald mal Partner oder Kunden aus der Industrie hat.

Aus finanzieller Sicht ist Early Turnover natürlich gut, kommt aber auch auf das Produkt an. Es gibt natürlich gewisse die anfangs länger brauchen bis man mal etwas vom Markt hat. Ist aber aus meiner Sicht wichtig bald mal mit etwas auf den Markt gehen, auch wenn es noch nicht ganz fertig ist. Patente finde ich gar nicht wichtig. Das ist natürlich wichtig, das Produkt muss bereit für den Markt sein, es muss noch nicht perfekt sein, aber es muss ein Problem lösen.

Und natürlich klar; Technology Experience ist natürlich sehr wichtig, da muss im Team oder im Gründerteam jemand dabei sein der was von der Technologie versteht, weil wir uns in einem technologischen Bereich bewegen.

Man kann aber vieles auch mit der Zeit noch lernen, weil wir hatten am Anfang natürlich noch viele Dinge gar nicht gewusst. Man muss in einem Startup hald alles machen, auch wenn man es vorher noch nie gemacht hat. Anfangs ist es dann hald weniger gut, aber man lernt es mit der Zeit.

Topic 4: Moderatoren

Grobes Conceptual Model inkl. Moderatoren zeigen.

Wir wollen auch herausfinden, ob die Wichtigkeit der Erfolgsfaktoren von den Variablen TypeOfMainOffer, TechnologyIntensity und PhaseInThe LifeCycle abhängt. Kurz Variablen und Ausprägungen erklären.

Wir sind eigentlich eine Technologiefirma und entwickeln Hardware und Software. Wir versuchen aber schlussendlich eine Komplettlösung zu verkaufen die aus den Sachen besteht. Bei der Technologie wurde sehr viel selbst entwickelt, die komplette Hardware + Software + Cloud-Lösung. Wir sind aber eigentlich der Technologielieferant und unsere Partner verkaufen dann die Dienstleistung, also die Partner gehen dann auf die Endkunden zu und verkaufen einen Service mit unserem Produkt.

Technologie-intensive Startups: Umso technologieintensiver, desto wichtiger ist das Kapital, weil es länger geht bis man Umsatz machen kann. Weil man anfangs natürlich länger entwickeln muss. Darum ist der Zugang zu Kapital wichtig. Natürlich ist auch technologisches Verständnis dafür sehr wichtig. Und falls man das nicht hat Partnerschaften mit Uni, ETH etc.

Produkt: Partnerschaften schlussendlich. Ja, also nicht unbedingt mit Unis, sondern mehr mit Industrieunternehmen und ähnlichem.

Software: Softwareunternehmen sind ähnlich wie klassische Unternehmen, weil man irgendwas entwickeln muss. Aus meiner Sicht ist es hier wichtig früh Kunden zu haben und auf die hört, was die gerne hätten. Bei Hardware ist die Entwicklungszeit meistens länger, ist also schwieriger schnell einen Prototyp zu entwickeln weil der gewisse Anforderungen erfüllen muss. Bei Software kann man das eher machen.

Topic 5: Performance/Erfolg:

Was verstehen Sie unter Erfolg bei einem Startup bzw. auf Basis welcher Kriterien würden Sie von einer hohen Startup Performance sprechen?

Kommt auf das Alter des Startups drauf an. Jetzt würden wir eher finanzielle Faktoren ansehen, also selbsttragend ja oder nein. Am Anfang sind andere Faktoren wichtiger: kann man neue Kunden gewinnen, wie schnell gewinnt man neue Kunden, wie viele neue Kunden gewinnt man, langfristige Kundenbindung aufbauen.

Langfristig ist sicher das Team wichtig. Die Zufriedenheit z.B., aber die ist sicher schwierig von aussen zu messen.

Ich denke schlussendlich muss das Produkt irgendein Problem lösen und von Leuten eingesetzt werden, umso mehr umso besser.

Ich bin eher pro Wachstum, als pro Profitabilität, es ist aber eine Zeitfrage, irgendwann muss man hald profitabel werden. Vor allem in der Schweiz, die eher konservativ ist in diesem Bereich und der Zugang zu Kapital schwieriger ist, hier sollte man doch in 5 Jahren profitabel sein. Wenn man eine wirklich zukunftsreiche Technologie hat und die Leute daran glauben kann man natürlich mehr ins Wachstum investieren wenn

man ein finanzielles Polster hat. Dann kann man ein paar Jahre länger negative Zahlen haben. Aber aus meiner Sicht muss irgendwann die Wende kommen.

Mitarbeiterwachstum alleine finde ich sagt nicht viel aus. Hier müsste man einen weiteren Zusammenhang sehen. Aus meiner Sicht ist es wichtiger Mitarbeiter länger zu halten als einfach viele Mitarbeiter einzustellen.

Survival ist sicher auch schon ein Erfolg, aber es kommt natürlich darauf an, wenn ein Startup 10 Jahre einfach nur am herumhängen ist und keine Umsatzsteigerungen und kein Wachstum hat und immer noch nicht profitabel ist dann muss man sich mal überlegen etwas zu ändern. Aber ein paar Jahre ist das sicher okay.

Abschluss: Noch Fragen? Abstract erhalten?

Keine Fragen, Abstract ja gerne.

Interview eCarUp

Datum: 29.04.2022, Zeit: 16:00 bis 16:40

Teilnehmer: Fabian Trinkler, Alexander Wagner

Leitfragen & Themen:

Kurze Einführung ins Thema inklusive grobem Forschungsmodell.

Topic 1: Startup Team

Erzählen Sie mir kurz von Ihrem Hintergrund!
Wie sieht die Konstellation mit den anderen Gründungsmitgliedern aus?
Haben Sie / eine(r) von euch davor schon gegründet oder in einem Startup gearbeitet?

Wir sind eine Tochter / Spin-Off von der Smart me AG. Ich habe dort angefangen zu arbeiten. Smart-me wurde vorher schon David und seinem Vater gegründet. Daraus ist eCarUp geboren und ich habe die Projektleitung dort übernommen, weil es war zuerst ein Produkt von Smart-me, aber man dachte dann man braucht mehr Power und mehr Kapital und so wurde es in eine eigene Firma überführt. Für mich war es die erste Gründung, für David aber eigentlich die zweite. Aber ich bin in dem Sinn kein klassischer Gründer, weil ich ja als Angestellter von Smart-me gekommen bin.

Das Gründungsteam waren die Kernmitarbeiter von Smart-me. David hatte den technologischen Lead, ich hatte die operative Gesechäftsführung übernommen, also Aufbau vom Unternehmen. Bzw. waren die anderen Mitarbeiter neben Smart-me auch mit dem Aufbau von eCarUp beschäftigt. Nachher hatte es gewisse Leute gegeben die zu eCarUp gekommen sind und gewisse die von Smart-me zum Kernteam gekommen sind, haben aber eigentlich immer alle in einem Doppelmandat für beide Firmen gearbeitet, alle hatten aber immer einen Schwerpunkt. Mein Schwerpunkt war sicher eCarUp. David hat den Schwerpunkt bei Smart-me, macht aber auch noch ein paar Aufgaben für eCarUp.

Topic 2: Life Cycle

Erzählen Sie mir von der Geschichte Ihres Startups und gehen Sie dabei auf Dinge ein, welche gut gelaufen sind, welche schlecht gelaufen sind, und auf grössere Herausforderungen!

Gründung kam von der Idee eines AirBnB für Ladestationen. Das war die erste Marketingidee. Aber wie jedes Technologiestartup haben wir dann aber eine ganze Evolution von Ideen und Anforderungen durchlaufen. Und haben aber jetzt natürlich einen anderen Anspruch als wir angefangen haben. Wir machen jetzt eigentlich ein E-Mobilitäts-Backend zur Verwaltung von Ladestationen.

Besonders gut gelaufen: Unser Team, das ist besonders wichtig. Das gilt für die Leute die von Anfang an dabei sind. Es ist mit einer Ausnahme noch niemand ausgestiegen. Das gilt aber auch für die, die nachher dazugewonnen wurden. Die sind auch alle noch dabei und waren eigentlich alles Volltreffer. Durch das konnten wir aus den begrenzten Ressourcen eines Startups relativ viel herausgeholt, im Vergleich zur Konkurrenz die deutlich mehr Ressourcen und Leute haben. Trotzdem konnten wir uns positionieren und etablieren. Wir waren sehr effizient und anfangs sehr umtriebig weil die Leute extrem motiviert sind.

Ein wichtiger Punkt: Wir entwickeln unsere Plattform selbst, das unterscheidet uns stark von andern. Wir haben eigene Entwicklungskapazitäten, natürlich weil auch David selber ein Softwareentwickler ist. Dadurch sind wir viel weniger abhängig von äusseren Einflüssen. Haben unsere Technologie selbst in der Hand und können bestimmen was abgeht, und können dadurch selbst unseren Fortschritt oder unseren Werdegang selber beeinflussen. Hat aber natürlich den Nachteil, dass man durch Kapazitätsprobleme nie alles machen kann. Sind oft schwierige Diskussionen wenn Kunden und Partner sehr umfangreiche Erwartungen und Wünsche haben. Die Herausforderung ist, dass man das dann aufs der Verkaufsseite gut managen kann. Dass die Erwartungshaltung vom Markt auch so ist, dass man sie dann erfüllen kann. Das war eine Evolution, wenn man frisch ist, ist man bereit auch zusätzliche Funktionen auf der Plattform zu versprechen und umzusetzen wenn das grosse Kunden fordern. Aber jetzt sind wir selbstbewusster und sagen wir machen es so wie wir das gut finden und die Kunden müssen mit dem leben was sie bekommen. Natürlich bedeutet das aber nicht, dass wir aufgehört haben zuzuhören und wenn viele Kunden etwas wollen, dann setzen wir das natürlich auch um.

Schlecht: Unsere ersten Businesspläne waren brutal überoptimistisch! Es ist ja ein Energietool und da haben wir Dinge vorgerechnet, die im Nachhinein komplett falsch waren, da lachen wir jetzt drüber. Es hat ziemlich lange gedauert, bis wir unseren Platz gefunden haben, wo wir Geld verdienen können. Wir wurden aber auch einfach am Anfang von der Marktdynamik getragen worden. Wir waren der Neueintritt, mussten uns erstmal zurecht finden, ein Netzwerk aufbauen, wussten noch nicht in welche Richtung es geht. Die Strategiediskussionen sind jetzt im 5. Jahr aber abgeschlossen. Das ist zwar etwas spät, war aber auch kein Killer, war aber nicht optimal. Diese Wellenbewegungen gehören aber zu Startups dazu. Auch wir hatten das, haben Produkte oder Features entwickelt die der Markt nicht wollte.

Herausforderung: Kommunikation auf dem Markt, also dass man es schafft als innovatives Startup wahrgenommen zu werden, dass man es aber trotzdem schafft am Markt eine Erwartungshaltung zu etablieren, dass man nicht alle Wünsche erfüllen kann. Sondern, dass man mit den Kunden redet und den Platz findet, wo man auch viele Kunden gewinnen kann. Das so verpacken, dass die Partner Spass haben, aber dass es auch intern im Unternehmen aufgeht, ohne die Entwickler zu überlasten. Wir hatten die Tendenz, dass wir sie überlastet haben und dann gab es Fehler und Bugs und das führt dann zu einer Teufelsspirale.

Positiv: Du musst dir natürlich am Anfang einen Ruf erarbeiten. Es hat niemand auf eCarUp gewartet, wo das Thema E-Mobilität natürlich schon sehr stark war. Man muss hartnäckig sein, die ersten 2 Jahre frisst man Dreck. Aber wir waren eine hartnäckige Organisation, die nachgehakt hat, die Vorträge gehalten hat, die an Messen war, die im Tesla-Club Vorträge gehalten hat, wir haben alles gemacht. Das muss man hald am Anfang auch machen, man muss präsent sein.

Bei der Gründung ist direkt Energie-Thun eingestiegen. Das ist für mich fast zu einfach gewesen. Wir mussten schon verhandeln (ca. ¾ Jahr) und so, aber sie waren von Anfang an sehr begeistert und die Finanzierungsrunde war sehr unkompliziert. Die 2. Finanzierungsrunde Ende 2020 war deutlich komplizierter. War vollständig im Corona-Jahr, das war natürlich nicht das beste Investitionsumfeld. Wir haben da recht gekämpft, um genug zusammenzubekommen. 2 bis 3 Privatpersonen sind eingestiegen und Energie-Thun hat auch nochmal investiert. Wir haben auch noch mit anderen Investoren verhandelt was dann nicht erfolgreich war, das wäre aber für die Plattform auch gut gewesen noch mehr Geld zu bekommen, um unsere Plattform noch schneller zu entwickeln.

Topic 3: Erfolgsfaktoren:

Weshalb ist es gut/schlecht gelaufen bzw. weshalb wurde die Herausforderung gemeistert/nicht gemeistert? Auf Bereiche Financial Resources, Network Team Capabilities & Knowledge, und externe Faktoren eingehen. Welche Faktoren hatten einen positiven Einfluss, welche einen negativen Einfluss?

Es braucht natürlich alle 3 Faktoren, es braucht alles. Aber ohne die finanziellen Ressourcen geht es natürlich nicht.

Bei den Capabilities hatten wir natürlich eine Sondersituation, weil die Smart-me Marketing-Leute direkt bei uns auch etwas gemacht haben. Das haben wir zwar teilweise auch finanziell abgegolten aber es ist natürlich viel einfacher gewesen wenn man intern jemanden hat der zum Team gehört, wenn man das Marketing/Verkauf nicht extern zukaufen muss. Da waren wir sicher in einer privilegierten Person.

Das Netzwerk möchte ich auch noch hervorheben. Die 2 Privatpersonen die eingestiegen sind haben wir über unsere Arbeit vorher kennengelernt. Ein grosser Teil vom Gründersein ist natürlich das Aufbauen und Pflegen von Netzwerken, vor allem mit Leuten in Kontakt sein die schon Erfahrungen haben und auch finanziell andere Möglichkeiten haben (oder in ihrem eigenen Netzwerk).

Mehr Kapital ist natürlich immer schön. Mehr Kapital verleitet aber auch zu einer hohen Burnrate. Weil man will das Geld ja nicht rumliegen lassen, sondern will es investieren. Dann hat man mehr Leute, was natürlich ein Kostenfaktor ist und dann muss man auch schneller Turnover machen. Eigentlich ist es für uns gut gelaufen so wie es war. Aber wir haben nicht von Anfang an geplant, 2 Finanzierungsrunden zu machen. Aber wir hatten dann teilweise Cash verbrannt und brauchten dann nochmal eine Finanzierung, weil sonst hätten wir voll auf Sparflamme fahren müssen und das wollten wir nicht.

Die Hardware entwickelt hauptsächlich Smart-me. eCarUp ist sehr Software-lastig. Wir sind eigentlich ein Software-Team. Unsere Apps, Cloud-Plattform, Ladestationen etc. sind alles selber programmiert.

Detailliertes Conceptual Model mit allen Variablen zeigen und auf Bereiche Financial Resources, Network und Team Capabilities & Knowledge eingehen.

Zusammenfassend – Was sehen Sie rückblickend als die wichtigsten Erfolgsfaktoren für Ihr Startup an? Welche Faktoren hätten Ihr Startup bzw. den Erfolg Ihres Startups gefährden können?

Also bei Financial Ressources sind sicher Total Capital Raised und Early Turnover besonders wichtig.

Das Industry Spin-Off hat uns natürlich geholfen, Industry Partnership finde ich aber auch sehr wichtig.

Bei Team Capabilities sind die wichtigen aus meiner Sicht Entrepreneurial Experience, Tech, Marketing & Sales Experience, und ich würde sagen Market Readiness. Technology Experience wäre für mich aber das wichtigste. Wir sind ein Tech-Startup und wir müssen wissen was ist der State-of-the-Art und wie kann man den verbessern. Dafür braucht man Techniker. Sales Leute bringen auch nichts wenn das Produkt scheisse ist.

Allgemein: Welche Faktoren denken Sie, sind für den Erfolg von Energie- und Umweltstartups in der Schweiz besonders wichtig?

Einer von den entscheidenden Faktoren: Man braucht einfach die Macher-Mentalität, nicht nur darüber reden sondern machen und es probieren, das ist mir das wichtigste. Unsere Leute kommen aus den verschiedensten Hintergründen und es gibt viel Selbstselektion, aber man kann natürlich nicht mit Leuten arbeiten, die beim Kanton angestellt sind. Man braucht natürlich Leute die auch Risiken eingehen. Und man muss sich auch selber ernst nehmen, auch wenn die Produkte die man anfangs verkauft eigentlich ein Witz sind. Ein Startup ist immer mit einem gewissen Risiko zum Scheitern verbunden. Es braucht natürlich da die gewisse Readiness das Risiko einzugehen.

Externe Faktoren sind natürlich sehr wichtig. Ganz am Anfang 2017 hatten wir noch viele Gespräche geführt, ob sich die Elektromobilität wirklich durchsetzt. Das ist jetzt natürlich vorbei. Als Technologie-Startup in einen Markt einzutreten, der schon sehr umkämpft ist, ist natürlich viel schwieriger, als in einen Wachstumsmarkt der noch neue innovative Lösungen braucht. Es ist natürlich nicht unmöglich, Smart-me hat nämlich das Gegenteil gemacht. Ein dynamischer Markt kann aber auch gefährlich werden, es gibt die Gefahr, dass die Grossen mitmachen, es ist dynamisch, man muss wirklich immer am Ball bleiben. Es gibt Vor- und Nachteile. Ich spüre aber jetzt schon, dass in der ganzen DACH-Region Elektromobilität stark gefördert wird und das hilft sehr. Ich meine wäre die Elektromobilität gescheitert, dann gäbe es eCarUp nicht mehr. Bestes Beispiel ist aber Smart-me, die sehr von dem Gesetz von 2018 mit dem Zusammenschluss von Eigenverbrauch profitiert haben. Wäre das nicht passiert, weiss ich nicht, ob das so positiv verlaufen ist.

Topic 4: Moderatoren

Grobes Conceptual Model inkl. Moderatoren zeigen.

Wir wollen auch herausfinden, ob die Wichtigkeit der Erfolgsfaktoren von den Variablen TypeOfMainOffer, TechnologyIntensity und PhaseInThe LifeCycle abhängt. Kurz Variablen und Ausprägungen erklären.

Wir gehören eigentlich hauptsächlich zu Software, aber machen auch Hardware.

Wir hatten von Anfang an als wir gegründet haben, die App fertig gehabt, wir konnten also von Anfang an Produkte verkaufen. Anfangs waren wir trotzdem noch langsam, aber jetzt wachsen wir und es wird immer schneller.

Software:

Unsere Softwareentwickler die langfristig gut bei uns arbeiten. Und die Software verkaufen und das Partnermanagement aufbauen ist sehr wichtig. Wir müssen mit denen 4 - 5 mal reden, dann müssen wir die Schnittstellen zu ihnen machen, dann haben sie technische Fragen, dann macht man mal einen Pilot, das geht also alles relativ lang. Deshalb ist das Partnermanagement wichtig. Es braucht die Software-Leute, die die Funktionen liefern und die Plattform stabil halten, insbesondere weil wir Geld abrechnen. Und die Leute an der Front müssen das irgendwie clever in die Partnerships verpacken.

Aktuell sind wir eigentlich gar nicht auf Kapital angewiesen. Wenn jemand investieren möchte, prüfen wir das natürlich, aber wir sind nicht auf Investorensuche. Aber eigentlich sind wir für die Skalierung nicht auf Geld angewiesen, es wird sich zeigen, ob wir das schaffen. Es sieht jetzt mit den neuen Softwarefunktionen nicht so schlecht aus.

Topic 5: Performance/Erfolg:

Was verstehen Sie unter Erfolg bei einem Startup bzw. auf Basis welcher Kriterien würden Sie von einer hohen Startup Performance sprechen?

Ich meine, am Ende vom Tag muss man irgendwann Geld verdienen. Das muss das Ziel sein, das erwarten auch die Investoren, die wollen irgendwann ihr Geld, irgendwann muss man Cash bringen, sonst bringt die ganze Übung nicht.

Es ist aber die Frage, ob der Break-even das richtige Messinstrument ist, oder ob man in so einem dynamischen Markt lieber mal ein paar Jahre reinbuttert, um danach in einer guten Marktposition zu sein. Da gehen die Meinungen auch innerhalb von unserem Unternehmen und bei unseren Aktionären auseinander.

Aber man muss auch an die Mitarbeiter denken, die wollen auch mehr Lohn, die wollen Teil einer Erfolgsstory sein, man muss eine Perspektive bieten. Es muss vorwärts gehen und man muss an das Ziel hinarbeiten, irgendwann profitabel zu werden. Das ist immer ein zentraler Punkt im Hintergrund.

Growth oder Profitabilität ist natürlich ein Thema, kommt einfach darauf an wie man seine Ziele steckt. Aber Profitabilität ist für mich sicher sekundär, zuerst muss man es mal schaffen sich zu etablieren, durch seine Services und durch das Team festlegen und eine solide Basis bauen wo man dann gar nicht mehr unbedingt ein richtiges Startup ist und schon eher in Richtung KMU geht. Dann muss man sich überlegen ob man das Kapital eher ins Wachstum investiert oder geht man eher Richtung Profitabilität. So einen Entscheid kann ich aber natürlich nicht alleine treffen, da sprechen auch die Aktionäre mit. Wir tendieren eher zum Wachstum und investieren unser Geld wieder in neue Produkte oder Projekte, aber das kann natürlich auch nicht endlos sein.

Überleben ist natürlich essentiell, wenn es die Firma nicht mehr gibt bringt das alles nichts.

Die Profitabilität sollte aber natürlich langfristig das grundliegende Ziel sein wo man daran arbeitet.

Abschluss: Noch Fragen? Abstract erhalten?

Keine Fragen, Abstract ja bitte.

Interview MyCamper

Datum: 02.05.2022, Zeit: 14:00 – 14:40

Teilnehmer: Michele Matt, Alexander Wagner

Leitfragen & Themen:

Kurze Einführung ins Thema inklusive grobem Forschungsmodell.

Topic 1: Startup Team

Erzählen Sie mir kurz von Ihrem Hintergrund!
Wie sieht die Konstellation mit den anderen Gründungsmitgliedern aus?
Haben Sie / eine(r) von euch davor schon gegründet oder in einem Startup gearbeitet?

Also mein Background ist, ich habe auch einen Master in International Management, bin dann eher in den Finanzsektor eingestiegen, habe einen Career Start bei der CS gemacht. Vor allem im Unternehmenskundenbereich. Bin dort noch bisschen geblieben mit einer Festanstellung in Zürich. Bin dann kurz für eins Jahr in die Unternehmensberatungsbranche. Habe dann aber gleichzeitig MyCamper gegründet. Das hat sich dann aber ein wenig gebissen, die langen Tage und selber etwas nebendran probieren. Bin dann wieder zur CS zurück in Basel mit einer 80% Stelle im Management Support. Habe also dort den Management Support von der Region geleitet. Das war vorher und auch neben MyCamper. Haben das ja 2015 gegründet und die ersten 3 Jahre war es nur ein Nebenjob, erst im 2018 haben wir es Vollzeit gemacht und unsere Jobs gekündigt, parallel mit der ersten Finanzierungsrunde.

Ich habe die Funktion als CEO und habe Stefan und Mirjam als Mitgründer mit an Board. Stefan leitet das Marketing-Team und das Produkt-Team (erst seit 1,5 Jahren). Mirjam leitet den ganzen Kundensupport und daily Business, von der Funktion her also eher COO.

Weitere Key-People, da haben wir einige: Unser CTO, Kontakt-Marketing wo wir auch Fokus darauf legen (das leitet Jasmin), CFO haben wir auch zentral vor Ort und er hat das ganze HR bei sich. Es gibt diverse Funktionen die sehr wichtig sind für uns. Unser CTO ist erst im Herbst 2020 dazugekommen.

Webseite und so weiter haben wir anfangs extern mit einer Schweizer Agentur entwickeln lassen. Dann auch die Version 2.0 extern erneuern lassen. Und im 2019 haben wir das dann inhouse gemacht mit unserem ersten CTO und Freelancern. CTO hat dann aber gewechselt. Jetzt haben wir die Entwickler aber hauptsächlich in Bosnien. Ob man die Techniker inhouse hat oder extern einkauft, kommt auf die Bedürfnisse drauf an und in welchem Stadium man ist. Also vom Life Cycle her war es anfangs eine mega flexible und praktische Lösung mit denen eher auf Projektbasis zu arbeiten, weil man sehr schnell und flexibel auf Ressourcen zugreifen kann und diese nicht langfristig inhouse aufbauen muss. Jetzt wo wir eine gewisse Stabilität und Maintenance-Arbeit haben macht es aber total Sinn, dass wir es inhouse haben und nicht über eine Agentur, weil so ist das Mitdenken, Committment und Wissen wohin die Reise geht, ist natürlich bei internen Leuten mehr der Fall als bei externen, das spüren wir auch.

Unser CFO hat schon 2 Startups gegründet. Er hatte also schon Erfahrung, ist aber erst letzten Herbst zu uns gekommen. Sonst aber niemand von uns. Ich komme aber aus einer Unternehmerfamilie, das hat meine Denkweise natürlich geprägt, aber davor habe ich noch nicht gegründet. Vielleicht wäre es bei den Finanzierungsrunden hilfreich gewesen wenn schon mal jemand von den Gründern gegründet hat, weil dann die Glaubwürdigkeit höher ist. Aber genau kann ich es nicht sagen. Aber vielleicht kamen manche Absagen aus diesem Grund.

Topic 2: Life Cycle

Erzählen Sie mir von der Geschichte Ihres Startups und gehen Sie dabei auf Dinge ein, welche gut gelaufen sind, welche schlecht gelaufen sind, und auf grössere Herausforderungen!

Am Anfang wo ich die Idee hatte, habe ich relativ schnell gemerkt, hey shit, das ist mega breit. Ich war am AGBs schreiben, Datenschutzreglement, Buchhaltung, Marketing sollte man machen. Es war irgendwie vom Themenfeld so breit, dass ich gemerkt habe, ich bin nicht in allem gut und muss ein Team aufbauen. Das ist dann eigentlich gut gelaufen. Dort bin ich auf die Startup-Academy in Basel zugegangen, das ist ein Förderverein, dort habe ich Mirjam kennengelernt und sie ist anfangs eigentlich als Praktikantin dazugekommen, wurde dann aber zur Co-Founderin. Ich glaube das war ein guter Move, um gemeinsam die Ups und Downs abfedern können, als so alleine, was ja nicht so gern gesehen wird wenn jemand ein einsamer Gründer ist, vor allem auch bei den Investoren. Das ist gut gewesen.

Was mega schwierig war am Anfang: eine Versicherungslösung aufbauen. Da haben wir über eine Jahr gebraucht, um eine gute Versicherungslösung aufzubauen. Wir sind am Anfang ohne Lösung gestartet, das war sicher eine grosse Hürde, um Vermieter auf die Plattform zu bekommen, weil die dann ihre Versicherungspolicen anpassen mussten, wodurch diese teurer wurden und die Leute nicht mehr wussten, ob sie mit der Vermietung Geld verdienen können. Das war eine ziemliche Hürde. Da haben wir es dann aber geschafft, mit der Allianz und mit der Europäischen Reiseversicherung eine Lösung aufzubauen. Von dem her war das dann gut, kam aber einfach sehr spät, ca. ein Jahr nachdem wir gestartet sind.

Rückblickend würde ich es anders machen, wahrscheinlich schneller Vollzeit machen anstatt ca. 3 Jahre nur so Hobby-mässig.

Was auch ein fuck up war bei uns: wir haben es als GmbH gestartet. Dann ist da eine Mitgründerin/Investorin als Mitstammanteilseignerin dazugekommen. Sie war dann aber relativ schnell nicht mehr aktiv. Wir hatten aber nicht genau geregelt, wie das aussieht wenn jemand aussteigt. Das ist bei einer AG über die Aktionärsbindungsverträge wesentlich sauberer geregelt, was passiert mit den Liquidity Events. Das hatten wir nicht und das hat zu ziemlichen Diskussionen geführt. Wir konnten am Schluss eine Lösung finden, die für beide stimmt, aber das hat viel Zeit,

Energie und Emotionen gekostet, den Fokus genommen. Wenn es um Anteile geht, gibt das dann mega schnell emotionale und aufgeladene Situationen. Das würde ich komplett anders machen und von Anfang an sauber machen. Das war ein grosses Learning.

Dann noch Tech inhouse haben. Also jemanden im Gründerteam haben, wo Tech macht, das wäre auch etwas was ich definitiv machen würde.

Finanzierungsrunden sind auch nicht immer so geradlinig abgelaufen. Zum Teil haben wir im letzten Moment potentielle Investoren verloren. Vielleicht hätte man da noch aktiver kommunizieren können und noch näher dran sein können, um es zu merken, wenn Stolperstein in den Weg kommen. Aber einmal haben wir auch Investoren verloren wegen Corona, also wegen der allgemeinen Lage. Da waren wir ziemlich machtlos, da wurde irgendwie sowieso einfach alles auf Covid geschoben.

Die Anstellung des ersten CTOs war jetzt nicht ein richtiger fuck up, aber es war ein mega Learning für uns. Es hat eigentlich mega gepasst, haben wir geglaubt, von den technischen Skills. Aber was wir vernachlässigt haben und uns auch nicht so bewusst waren bei der Anstellung, waren seine Management-Skills, Teamaufbau-Skills. Das war am Schluss der Grund warum wir uns wieder getrennt haben. Er hatte selber glaube gut programmieren können und hatte das alles im Griff, aber so Teamaufbau das hat nicht funktionieren wollen. Und das war sicher ein Learning für uns.

Topic 3: Erfolgsfaktoren:

Weshalb ist es gut/schlecht gelaufen bzw. weshalb wurde die Herausforderung gemeistert/nicht gemeistert? Auf Bereiche Financial Resources, Network Team Capabilities & Knowledge, und externe Faktoren eingehen. Welche Faktoren hatten einen positiven Einfluss, welche einen negativen Einfluss?

Die Investoren waren vor allem Business Angels. Wir haben zwar ein paar Corporates an Board oder ein paar noch professionellere, die meisten sind aber Privatpersonen, also Business Angels. Business Angels sind eigentlich schon sehr cool, weil die meisten sind sehr erfahrene Unternehmer, die ein Netzwerk mitbringen und die Knowhow einbringen und eine gewisse Flexibilität einbringen, die vielleicht bei Corporates nicht der Fall ist. Andererseits ist man bei Business Angels bei der finanziellen Power irgendwann mal bisschen limitiert. Wenn man VCs an Board hat machen die dann in der Folgerunde wahrscheinlich locker mit, wo ein Business Angel dann sagt nein das ist mir jetzt zu viel, da mache ich nicht mit.

Das Team ist mega wichtig, wirklich super zentral! Das Team ist ziemlich das Zentralste, also die wichtigste Ressource! Es steht und fällt mit den Leuten, definitiv!

Noch zum Thema Ausland: Wir haben selber noch in Schweden gestartet. Haben dann dort ein Team von 2 Leuten aufgebaut. Das war aber gar nicht mal wegen ihnen nicht so erfolgreich, sondern auch wegen Gründen von uns, z.B. weil die letzte Runde nicht so gross ausgefallen ist wie geplant. Wir wollten eigentlich 2 Mio. aufnehmen, haben aber nur 1.1 Mio. geraised weil wir wegen Corona den Lead-Investor verloren haben. Das hatte sicher auch Einfluss weil wir dann weniger Ressourcen zur Verfügung hatten. Nebenher natürlich auch noch Corona. Schlussendlich haben wir uns nach bisschen mehr als einem Jahr dazu entschieden, dass wir unsere Assets bei einem lokalen Player in Schweden einbringen und einfach als Aktionär mit einer Call-Option an Board sind, sodass wir sie nächstes Jahr übernehmen könnten. Wir haben also die eigene Aktivität dort bisschen eingestellt, sind jetzt mit einer Partner-Sharing Plattform dort oben unterwegs. Rückblickend war das glaube ich gut, dass wir den Move gemacht haben, dass wir da nicht konkurrenzieren, sondern dass wir zusammengelegt haben, aber wir hätten wahrscheinlich noch das ein oder andere besser machen können. Z.B. vom Remote-Setup bin ich nicht so überzeugt, ob ich das nochmals so machen würde, oder ob man nicht lieber einen mega Reiseliebhaber vor Ort in Basel hat der oft in Stockholm ist und herumreist. So spürt man die Leute einfach besser als wenn es einfach nur remote ist, vor allem auch während Corona wo man nicht reisen durfte, da ist das schon schwierig die Leute so rein digital zu führen, das Vertrauen zu haben und wissen, dass die Vollgas geben. Auch die andere Kultur, das war nicht immer ganz einfach.

In Bosnien haben wir die Programmierer. Dort machen wir jetzt wo es wieder möglich ist auch einen regeren Austausch. Letztens war das ganze Team bei uns in der Schweiz und wir haben einen 2-tägigen Team-Event gemacht, da waren sie eine ganze Woche bei uns. Und unser CTO fliegt eigentlich 1 bis mindestens 2 mal pro Quartal runter, wo er dann 3 Tage bis zu einer Woche vor Ort ist. Letzte Woche war er auch unten und dann waren unsere zwei Produktmanager auch dabei. Das ist wirklich wichtig, um eine Verbindung herzustellen und den Austausch zu fördern. Der Grund für die bosnischen Programmierer war ganz einfach finanziell, weil wir es uns nicht leisten konnten, Schweizer Entwickler anzustellen.

Corona hatte sicher einen grossen Einfluss. Vor Corona ist die Camping-Industrie auch schon am boomen gewesen, also hatte auch vor Corona ca. 10 bis 15 % Wachstum pro Jahr. Corona gab da sicher nochmal einen Boost. Corona war für uns aber nicht nur positiv, sondern teilweise auch negativ. Das eine war sicher die Finanzierungsrunde die nicht ganz geklappt hat so wie wir das ursprünglich geplant hatten. Dann gab es auch viele Stornos, vor allem während dem ersten Lockdown, wo dann gar nicht mehr klar war wie das alles ausgehen und weitergehen wird. Dann der Ukrainekrieg, den haben wir auch gespürt, nicht nur wir, sondern durchs Band ganz Europa, also auch unsere nordischen Partner. Das Suchvolumen nach «Camper mieten» etc. ist nach dem Kriegsausbruch um über 50 % eingebrochen. Und das ist eigentlich atypisch, weil sonst im Frühling steigt es von Woche zu Woche an und auch die Nachfrage. Da hatten wir jetzt aber den starken Einbruch. Jetzt merken wir wieder, dass es langsam anzieht, aber es hat eine Zeit gebraucht. Das ist sicher ein externer Faktor gewesen.

Wir merken auch noch das Wetter. Nicht so stark, wie man es vielleicht glauben würde, aber so vor allem bei Spontanbuchungen spüren wir es, z.B. im verregneten letzten Juni, so im Vergleich zum Vorjahr, wo wir schöneres Wetter hatten.

Was bei uns auch eine Thematik ist, ist das mit dem Geld, also wie der Geldfluss läuft. Das haben zum Teil die Banken nicht so gern, weil wir nicht der wirtschaftlich Berechtigte vom Geld sind, sondern der Vermieter, der es nachher weiterüberweist. Das ist zum Teil bisschen ein Graubereich. Da mussten wir uns z.B. bei der FINMA registrieren und sind dort so eine Art Inkassobüro, weil wir Inkasso für unsere Vermieter machen dürfen, also im Namen von einer Drittpartei Geld einfordern. Das sind zum Teil Geschichten, die immer wieder zu Diskussionen führen können. Auch bei Payment-Provider, die dann fragen wie funktioniert jetzt euer Businessmodell genau. Dort gab es keine grossen Änderungen in der Vergangenheit, aber falls es da Änderungen geben sollte, wäre das auch kein Problem, weil da gibt es Marktplatzlösungen wie z.B. Strive, also dass sie das Geld zurückhalten und dass wir das gar nicht bekommen und dass sie die Verteilung vornehmen. Da gäbe es Lösungen, aber wir haben es im Moment nicht auf dem Setup.

Aus Versicherungsoptik hat es teilweise Änderung gegeben. Also dass z.B. die eine oder andere Versicherungsgesellschaft das Sharing-Modell einschliesst oder plötzlich ausschliesst, aber das ist eher auf Firmen-Basis und weniger auf Gesamtversicherungsmarkt.

Detailliertes Conceptual Model mit allen Variablen zeigen und auf Bereiche Financial Resources, Network und Team Capabilities & Knowledge eingehen.

Zusammenfassend – Was sehen Sie rückblickend als die wichtigsten Erfolgsfaktoren für Ihr Startup an? Welche Faktoren hätten Ihr Startup bzw. den Erfolg Ihres Startups gefährden können?

Governmental Financial Support hatten wir keinen, ausser mal kurz einen Corona-Kredit aufgenommen, den haben wir aber nicht gebraucht. Und Kurzarbeit, weil während Corona nichts mehr gelaufen ist.

Total Capital raised ist für uns sicher zentral gewesen, vor allem um den Step zu machen das Vollzeit zu machen. Early Turnover, also nicht Revenue, sondern Turnover, also dass wir schon Geld eingenommen haben und mit dem Geld arbeiten konnten, das ist sicher auch zentral gewesen. Das hat uns geholfen.

Startup Trainings und Coachings hatten wir schon auch und das hat uns sicher auch vieles gebracht. So die Reflexionssessions wo wir gechallenged wurden. Unter Network hätte ich das als einzig Zentrales genommen.

Und beim Team hätte ich gesagt ist Entrepreneurial Experience wichtig, aber eigentlich gar nicht Experience sondern eher Mindset hätte ich gesagt. Also wir hatten zum Teil nicht die Experience mitgebracht, sondern mehr das Mindset. Und Technology Experience war für uns sicher auch zentral. Und Marketing auch. Also Marketing, Technology und Entrepreneurial Mindset, das wären so die wichtigen.

Doch die Zusammenarbeit mit der Versicherungsgesellschaft ist sicher auch ein Key für uns und das hätte ich sicher unter Industry Partnership genommen, das ist sicher ein Key für uns.

Ich glaube, wenn man unter den Investoren VCs oder Business Angels hat, die haben natürlich zum Teil ein mega Netzwerk und die können dich da dann weiterverbinden und verknüpfen und dich auch coachen, also ein Stück weit auch Knowhow vermitteln. Allenfalls helfen die Industry Partners mit Industry Knowhow. Wir hatten z.B. auch vieles im Versicherungswesen lernen müssen oder von ihnen mitgeteilt bekommen wie das funktioniert. Also der Knowhow Exchange den man von den Industry Partners bekommt ist bestimmt wichtig. Aber sonst sehe ich keine grossen Abhängigkeiten.

Topic 4: Moderatoren

Grobes Conceptual Model inkl. Moderatoren zeigen.

Wir wollen auch herausfinden, ob die Wichtigkeit der Erfolgsfaktoren von den Variablen TypeOfMainOffer, TechnologyIntensity und PhaseInThe LifeCycle abhängt. Kurz Variablen und Ausprägungen erklären.

Software:

Wahrscheinlich Technology Experience ist wahrscheinlich eines der wichtigsten plus letztendlich Marketing & Sales Experience, weil schlussendlich kannst du eben ein tolles Produkt entwickeln, wenn es keiner will oder du es nicht auf den Markt rausbekommst, dann bringt es auch nichts. Da sind wahrscheinlich die zwei wichtigsten, sogar noch vor Total Capital raised, weil so allgemein heruntergebrochen glaube ich, dass es auch viele Softwarestartups gibt, die gar nicht so viel Kapital brauchen zum Entwickeln.

Ich sehe es mega wichtig, dass man bald mal ein Produkt hat, mit dem man auf den Markt gehen kann. Also so wie der Ansatz lebt man eigentlich mega so das Lean Development Thema, das ist auch mega wichtig. Nicht, dass man irgendwie 2 Jahre im Kämmerlein etwas macht und nachher will es niemand, deshalb muss man früh rausgehen und testen.

Topic 5: Performance/Erfolg:

Was verstehen Sie unter Erfolg bei einem Startup bzw. auf Basis welcher Kriterien würden Sie von einer hohen Startup Performance sprechen?

Ich glaube bei einem Startup, wo schon sehr viel auf Wachstum abzielt, glaube ich schon mal per se Wachstum, also alles wo so auf Wachstum abzielt. Und dort ist mir eigentlich die Mitarbeiterzahl egal, weil du kannst ein erfolgreiches Startup mit 12 Leuten aufbauen, aber auch mit 200. Also das hängt bisschen vom Typ von der Firma ab, die man baut. Dort mehr so auf Erfolgskennzahlen, also dass man Umsatz steigern kann usw. Und was uns in unserem Fall mega wichtig ist, ist die Profitabilität, weil nur dann ist man eigentlich nachhaltig als Firma, wenn man wirklich eine schwarze Null schreiben kann. Sonst hat man eigentlich den Proof noch nicht gebracht, dass die Firma auf eigenen Beinen stehen kann. Das ist zum Teil in der Startupwelt nicht unbedingt Key Focus, eher oft so Wachstum möglichst schnell und egal was es kostet. Wir fahren da zum Teil den bisschen schweizerischen Approach. Jetzt ist z.B. das Jahr wo wir den Proof erbringen möchten, dass wir profitabel werden können.

Die Mitarbeiterzufriedenheit und dass die gerne zur Arbeit kommen, dass die Spass haben, dass ist definitiv sehr wichtig, voll. Wenns den Leuten Spass macht, wenn sie Freude haben, wenn sie am Morgen gern kommen, dann hat das bestimmt einen mega Impact auf die Performance als wenn es dich ankotzt. Letztendlich sind wir alles auch nur Menschen und wenn man etwas nicht gern macht oder nicht gern mit den Leuten zusammenarbeitet, dann wird man weniger mit denen arbeiten und weniger Zeit in das investieren.

Abschluss: Noch Fragen? Abstract erhalten?

Kann ich die Management Summary nach der Arbeit bekommen? Die würde ich gern durchlesen.

Interview Misurio

Datum: 06.05.2022, Zeit: 10:30 – 11:15

Teilnehmer: Karl Werlen, Alexander Wagner

Leitfragen & Themen:

Kurze Einführung ins Thema inklusive grobem Forschungsmodell.

Topic 1: Startup Team

Erzählen Sie mir kurz von Ihrem Hintergrund!
Wie sieht die Konstellation mit den anderen Gründungsmitgliedern aus?
Haben Sie / eine(r) von euch davor schon gegründet oder in einem Startup gearbeitet?

Ich mache die Geschäftsführung. Ich war vorgängig in einem Unternehmen, das ich mit einem Kollegen zusammen gegründet habe. Im Bereich Zyklus-Engineering, da hatte wir eine sehr breite Palette gehabt. Wir haben nachher entschieden die Teile Optimierung, Energiebereich und in dem Sinn Optimierung von Flexibilität im Verkaufen im Bezug auf die Energiewende und CO2, dass wir wirklich den Teil ausgliedern und eine eigene Entwicklung machen.

Topic 2: Life Cycle

Erzählen Sie mir von der Geschichte Ihres Startups und gehen Sie dabei auf Dinge ein, welche gut gelaufen sind, welche schlecht gelaufen sind, und auf grössere Herausforderungen!

Für die Gründung haben wir nachher Partner gefunden, die sich auch finanziell beteiligt haben. Die Leute die ursprünglich die Firma gegründet haben, haben wir ausgezahlt und wir sind jetzt mit neuen Partnern unterwegs. In der Gründungsrunde waren es 3 Privatpersonen, unter anderem ich selber, plus eine Firma (ein Energieversorger). Neutralität war aber ein Problem und das ist der Grund, weshalb wir uns von dem Energieversorger getrennt haben. Und die 2 Privaten sind jetzt auch nicht mehr dabei, aber mittlerweile sind wir 7 private Aktionäre. Mittlerweile ist das alles in einer Gruppe konsolidiert, wo Misurio ein Teil davon ist. Und wir haben jetzt so eine Firma gegründet, die heisst Swiss Software Group, und die ist ein Verbund von Firmen wie Misurio, die geschäften komplementärer im Bezug auf Knowhow, Resourcen oder den bestehenden Markt zu erschliessen. Wir haben schon Kompetenzen im Energiebereich, die man auch in Richtung Industrie und Fertigung brauchen kann und umgekehrt die Kompetenzen die sie haben können wir in unserem Markt und mit unserem Produkt anwenden. Und die Swiss Software Group hat 7 Aktionäre, wir suchen aber im Moment weitere Verbündete, und Misurio ist eine 100% Tochter.

Topic 3: Erfolgsfaktoren:

Weshalb ist es gut/schlecht gelaufen bzw. weshalb wurde die Herausforderung gemeistert/nicht gemeistert?
Auf Bereiche Financial Resources, Network Team Capabilities & Knowledge, und externe Faktoren eingehen.
Welche Faktoren hatten einen positiven Einfluss, welche einen negativen Einfluss?

In der Schweiz ein Softwareprodukt entwickeln ist eine extreme Herausforderung weil wir hald sehr hohe Kosten haben. Softwareentwicklung wird oft recht unterschätzt. Man braucht oft recht viel Kapital, mehr als man auf den ersten Blick meint. Und trotzdem sind nachher Softwareprodukte die von kleinen Firmen entwickelt werden wesentlich wesentlich wesentlich günstiger als Softwareprojekte z.B. in der Verwaltung, weil die haben ja meisten Budget Faktor 10 oder 100 grösser, als das Budget von einer Firma. Andererseits sind die Herausforderungen für kleine Firmen ebenso gross, d.h. es muss skalierbar sein, es muss wartbar sein, es muss robust sein, es muss sicher sein. Und das eigentlich neben den tollen Ideen von Startups mit z.B. so einem Algorhythmus, und so einen Algorhythmus kann man im Rahmen von einem Studienprojekt innerhalb von ein paar Wochen etwas Geniales demonstrieren, aber nachher das auf 100% zu bringen und die ganzen Qualitätsanforderungen (Wartbarkeit, Robustheit, Sicherheit etc.) das ist nachher wirklich die grosse Herausforderung. Und darum braucht es einfach Kapital, es braucht Leute die Geduld haben und bereit sind, die Risiken einzugehen, weil in der Regel braucht es einen langen Atem bis die Produkte dann am Markt sind, bis dann Erträge kommen, bis man dann die Hockey-Stick-Business-Pläne umsetzen kann, die ja meistens nie so umgesetzt werden können wie sie präsentiert werden, das weiss ja jeder.

Und wir haben einerseits das Geld selber erwirtschaftet durch Engineering, Integrations und Projektbezug, gleichzeitig wollten wir aber Produkte entwickeln und für diese Produkte hat es Kapital gebraucht. Und das verbrennt man recht schnell. Ist also immer ein Trade-Off zwischen selber Geld verdienen, um die Betriebskosten in dem Projekt zu decken, oder soll man wirklich ins Produkt reingehen und das Projekt vernachlässigen. Aber beides geht nicht, weil man zu wenige Resourcen hat. Also entweder verdient man Geld mit den Projekten aber dann geht das Produkt nicht vorwärts, oder man widmet sich den Produkten aber dann ist man sofort in einem finanziellen Engpass. Das ist eine Herausforderung und das ist der Konflikt in dem man ständig ist.

Wir haben auch externes Kapital aufgenommen. Mit den Gründungsmitgliedern haben wir schon etwas Kapital bekommen, das war 2008. Und 2011 haben wir nochmal eine Finanzierungsrunde gemacht, in der noch eine paar Leute dazugekommen sind und noch etwas Kapital bereitgestellt haben. Mit dem konnten wir dann weiterentwickeln. Das waren auch Privatpersonen. Das waren schon so Venture Leute die in Firmen investieren. Die haben so eine Equity-Firma, die in Firmen investieren. Aber die Firma macht fast eher so Fundraising, also evaluieren und dann ihren Partnern vorschlagen, aber das eigentliche Investment passiert nachher über die Privatpersonen, nicht über die Equity-Firma. Aber das sind Investoren, die das professionell machen.

Zum Netzwerk: Das war sehr wichtig, wir sind gut vernetzt! Einerseits auf der Seite des Marktes, andererseits auf der Seite Forschung, Universitäten, Fachhochschulen usw. Wir haben in dem Sinn auch internationale Aktivitäten. Eine Zeit lang konnten wir da auch viel Business

machen, vor allem mit Deutschland, das ist gut gelaufen, aber wir haben es nachher aufgegeben weil als Schweizer hat man da einerseits einen guten Ruf und konnte gute Kontakte schaffen, aber auf der anderen Seite ist man schnell zu teuer. Was da wichtig ist, aber das wussten wir zu diesem Zeitpunkt noch nicht, es ist wichtig gute Referenzprojekte zu haben, sonst hat man keine Chance.

So Incubatoren oder Wirtschaftsförderungen: Wir sind ja im Wallis situiert, aber wir haben nicht nur im Wallis gute Unterstützung bekommen von verschiedenen Institutionen, damals KTI, Innosuisse, Wirtschaftsförderung Kanton Wallis, wir haben Forschungsprojekte gemacht mit dem BFE. Wir hatten da also verschiedene Quellen, das war eigentlich vor allem in finanzieller Art. Vielleicht wichtig in dem Zusammenhang: Wir hatten uns dadurch gut vernetzen können mit Fachhochschulen und Universitäten, wobei ich selber auch an der ETH noch Assistent war und da internationale Forschungsprojekte hatte.

Mit dem Netzwerk war ich in der Lage Fachhochschulen zu helfen, dass die in dem Netzwerk teilnehmen können und im Gegenzug haben sie bisschen für uns geforscht. Man muss aber sagen, dass es eigentlich mit Forschungsinstitutionen eher so Grundlagenforschung ist, also bisschen ausprobieren, testen, Proof-of-Concepts machen, aber das Zeug das da entwickelt wird ist einfach nicht industrialisierbar. Also das ist wirklich nur ein kleiner kleiner Teil. Die Leute in so Institutionen sind super, aber denen fehlt hald die praktische Erfahrung und der Bezug zur Realität. Teilweise haben wir aber in der Firma fast mehr Knowhow und Expertise und teilweise ist der Knowhow-Transfer fast eher Richtung Forschungsinstitut gegangen, nicht umgekehrt. Aber so für gewissen Aufgaben ist so eine Zusammenarbeit sicher eine gute Sache.

Wir hatten teilweise mit den Forschungsinstitutionen abgemacht, dass wir die Leute stärker ins Projekt einbinden und sie dann auch nachher eventuell anstellen. Aber das ist nicht immer ganz einfach, weil unsere Projekte haben hald schon eine gewisse Komplexität und die Leute von den Universitäten hatten hald schon eine gewisse Erfahrung in der Forschung und haben sich dann eigentlich in der Forschung fast wohler gefühlt und sind lieber dort geblieben. Natürlich auch weniger Risiko, ein sicherer Zahltag usw. Also der Übergang in so eine kleine Firma als Nussschale im Ozean, das haben sich dann doch viele von denen nicht zugetraut. Einige haben das sehr attraktiv und interessant gefunden, aber letztendlich blieben sie dann lieber in einer staatlichen Institution mit weniger Risiko.

Als wir 2012 die Investoren an Board geholt haben, haben wir gesagt, die Energiepreise und die Volatilität vom Markt steigt aufgrund von mehr Photovoltaik und erneuerbaren Energien, weil Sonne und Wind nicht dann Strom produziert wenn er konsumiert wird. Man braucht da also einen Lastausgleich, also ein super Umfeld um unsere Kompetenzen einzusetzen. Unser Pitch damals war: Die Energiepreise und Volatilität werden steigen. Es ist aber genau das Gegenteil passiert. Jetzt seit Ende 2021 hat es aber plötzlich gekehrt, die Energiepreise gehen durch die Decke und die Volatilität steigt. Also jetzt sind wir in der Situation mit den Rahmenbedingungen die wir immer erhofft und erwartet haben. Da haben natürlich die Investoren schon immer gesagt in der Zwischenzeit, das ist ja schon nicht so wie ihr das immer gesagt hattet. Das ist so das Marktumfeld das wichtig ist.

Das zweite sind so die regulatorischen Rahmenbedingungen. Die sind in der Schweiz für eine Firma wie wir sind leider sehr schlecht. Die Schweiz hat keinen wirklich offenen Strommarkt, das einzige Land sonst ist glaube ich Nordkorea. Und das zerstört einfach Business-Cases. Unser Knowhow wäre perfekt geeignet für Modelle für Quartierlösungen oder so Peer-Gruppen die untereinander Lösungen für die Stromversorgung finden wollen. Die Schweiz versucht natürlich mit Workarounds Instrumente zu schaffen, sodass es doch möglich ist. Aber für ein Unternehmen, das Lösungen dafür anbietet, ist es dann einfach nicht skalierbar in andere Länder, weil man nur die Schweizer Lösung für diesen winzigen Markt hat. Das macht es sehr schwierig wirtschaftlich zu bestehen.

Detailliertes Conceptual Model mit allen Variablen zeigen und auf Bereiche Financial Resources, Network und Team Capabilities & Knowledge eingehen.

Zusammenfassend – Was sehen Sie rückblickend als die wichtigsten Erfolgsfaktoren für Ihr Startup an? Welche Faktoren hätten Ihr Startup bzw. den Erfolg Ihres Startups gefährden können?

Also die finanziellen Ressourcen, die sind das Wichtigste! Early Turnover ist da sehr wichtig. Aber die Gefahr ist, dass man meistens am Anfang gute Startprojekte hat, aber nachher der Durchhaltewillen das dann weiter durchzuhalten ist wichtig. Da hilft dann auch eher das Total Capital Raised.

Beim Netzwerk sind das wichtigste die industriellen Partnerschaften. Nahe am Markt sein, nahe am Kunden sein, da geht die Post ab. Die Incubatoren usw. sind auch oft ganz gut, aber wirklich ernst ist das industrielle Umfeld.

Die Market Readiness ist sicher extrem wichtig! Man muss wirklich verstehen was der Markt verlangt, was er will und dass die Produkte da wirklich passend sind. Man hat hald oft die Tendenz, dass man die eigenen Produkte schön findet, aber wichtig ist, dass der Markt bereit ist dafür zu bezahlen, das ist das Wichtigste. Marketing & Sales Experience ist da auch wichtig, da muss man auch geschickt sein. Industry Experience hilft auch weil wir sind hald B2B. Das technische ist auch alles anspruchsvoll und wichtig und so, aber am Ende ist es eben das Geschäftliche, weil das die Marktseite entscheidet, nicht dass man am Ende Sachen hat die niemand will. Die Sachen in der Schweiz sind oft bisschen overengineered, inklusive dem was wir machen.

Topic 4: Moderatoren

Grobes Conceptual Model inkl. Moderatoren zeigen.

Wir wollen auch herausfinden, ob die Wichtigkeit der Erfolgsfaktoren von den Variablen TypeOfMainOffer, TechnologyIntensity und PhaseInThe LifeCycle abhängt. Kurz Variablen und Ausprägungen erklären.

Bei uns ist das schon sehr stark technologisch. Wir gehen teilweise schon fast Richtung Grundlagenforschung, wenn wir da so mathematische Algorhythmen entwickeln. Da gibt es keine Standardlösungen. Es gibt zwar Bausätze, aber so wie die Probleme bei uns gestaltet sind, funktionieren die Standardlösungen gar nicht und da muss man wirklich Insights mit reinnehmen und Literatur studieren, um am Ende Produkte anbieten zu können die dann funktionieren. Man aber trotzdem aufpassen, sich am Markt zu orientieren. Wir differenzieren uns zwar über die Technologie-Intensität, aber die Produkte die schlussendlich auf den Markt kommen sind oft trotzdem wieder Vereinfachung von dem was wir eigentlich können.

Technologie-intensive Startups: Der Bezug zum Markt und zur Industrie sind besonders wichtig. Das ist ja die Kunst, schöne Technologien von so Elfenbeinturm-Firmen die noch wissenschaftliche Papers usw schreiben, aber die Realität sieht einfach anders aus und es ist wichtig, dass man etwas bereitstellen kann was wirklich umsetzbar ist und einen realen Nutzen hat, das ist einfach schwierig. Deshalb ist der Bezug zur Praxis so wichtig. Was will der Kunde, was will der Markt?

Topic 5: Performance/Erfolg:

Was verstehen Sie unter Erfolg bei einem Startup bzw. auf Basis welcher Kriterien würden Sie von einer hohen Startup Performance sprechen?

Startup ist eigentlich eine riesen Herausforderung zu überleben, das ist eine immense Challenge. Es ist einfach ein auf und ab. Die Kunst ist hald, dass man zur richtigen Zeit am richtigen Ort ist und irgendwann ist der Punkt erreicht wo es dann richtig durch die Decke geht. Aber da sind wir nicht. Wir haben einfach mal überlebt. Wir sind jetzt so bisschen zwischen stabilen Phasen und durchaus schwierigen Phasen, und in diesen Phasen muss man dann hald wieder Finanzierungsmittel finden, um die Phase zu überbrücken. Und einfach dranbleiben, dranbleiben, dranbleiben und die Produkte immer so anzupassen, dass man wirklich ein Marktbedürfnis erfüllt. Man muss wirklich agil und flexibel bleiben.

Eigentlich will ich nie Leute entlassen, aber es gibt natürlich immer etwas Fluktuation, wo einer zu einem anderen Unternehmen geht.

Es ist nicht ganz einfach zu überleben, aber man probiert sich ein Basisgeschäft aufzubauen mit vielen wiederkehrenden Umsätzen, sodass man einen sicheren Teil hat. Und von dieser Basis aus muss man dann einen Punkt finden wie man das wirklich gut skaliert.

Ich habe auch einige Kollegen, da wurde das Startup dann von anderen Firmen übernommen. Uns gibt es noch, wir sind stabil und gut aufgestellt, aber ist jetzt nicht so, dass wir da durch die Decke gegangen sind. Aber vielleicht gelingt es uns noch. Wir haben noch einige Projekte am Laufen, wo wir denken, dass das Potenzial da ist.

Wir haben so eine Art Werte definiert, die wir in unserer Firma haben. Die heissen: Spass haben an der Arbeit, das machen was uns interessiert, erfolgreich sein (also der finanzielle Aspekt), und etwas Sinnvolles machen. Mit «etwas sinnvolles» machen sind wir aber nicht unbedingt fixiert auf Energiewende, wir sehen eine Deindustrialisierung in der Schweiz und wir wollen da unseren Beitrag leisten, um die Abwanderung vom Energiegeschäft zu verhindern. Und da finde ich einfach spielt die Digitalisierung eine absolute Schlüsselrolle. Wir versuchen da einen Beitrag zu leisten. Ich glaube aber Spass haben ist Voraussetzung um erfolgreich zu sein. Man darf nicht einfach nur geldorientiert sein, sondern man muss etwas machen wo man am Ende sagt, ja das ist eine gute Sache, das ist etwas Wertvolles für alle.

Abschluss: Noch Fragen? Abstract erhalten?

Abstract: Ja gerne. Wünsche: Die Förderinstrumente in der Schweiz gehen sehr oft in die Fachhochschulen oder allgemein in die Bildung. Es ist aber fast nicht möglich, dass Firmen wie wir direkt wirtschaftlich unterstützt werden. Wir müssen immer Eigenleistung erbringen und Cash-Beiträge, das macht es für uns extrem schwierig und wär hätten uns oft gewünscht, wenn über Budget gesprochen wird, dass wir da einen Teil direkt brauchen könnten. Das ist so der einzige Punkt.

Interview Sedo Engineering

Datum: 13.05.2022, Zeit: 10:00 – 10:45

Teilnehmer: Werner Volkaert, Alexander Wagner

Leitfragen & Themen:

Kurze Einführung ins Thema inklusive grobem Forschungsmodell.

Topic 1: Startup Team

Erzählen Sie mir kurz von Ihrem Hintergrund!
Wie sieht die Konstellation mit den anderen Gründungsmitgliedern aus?
Haben Sie / eine(r) von euch davor schon gegründet oder in einem Startup gearbeitet?

Also ich bin seit 2 Jahren Geschäftsführer von Sedo Engineering, das war vorher der Herr Gübeli. Ich selber komme eigentlich aus der selben Gruppe. Sedo Engineering gehört Löpfer, was wiederum der Sadio Gruppe gehört. Ich bin auch Geschäftsführer von Sedo Treepoint, das ist die in Deutschland ansässige Firma. Da machen wir Automatisierung im Textilbereich, Textilveredelung. Also das passt schon mit der Indigo-Maschine, nur dass wir in Deutschland keine Maschinenbauer sind, sondern eigentlich Prozessoptimierung machen an den Maschinen. Wir machen aber auch SPS-Programmierung der Indigo-Maschinen, das ist auch Prozessoptimierung die wir machen. Also ich bin relativ kurz für Sedo Engineering tätig, verfolge es aber schon von Anfang an, weil der Herr Gübeli zu der Zeit schon Verkaufsleiter von Sedo Trepoint war, deshalb die sehr enge Verflechtung. In Deutschland bin ich der alleinige Geschäftsführer, es gibt aber natürlich noch einen Verwaltungsrat.

Topic 2: Life Cycle

Erzählen Sie mir von der Geschichte Ihres Startups und gehen Sie dabei auf Dinge ein, welche gut gelaufen sind, welche schlecht gelaufen sind, und auf grössere Herausforderungen!

Der Dr. Kretenauer hatte schon Gründungserfahrung. Er ist der Erfinder der Indigo-Maschine und hat da auch seine Doktorarbeit 2007 damit gemacht, hat auch ein Patent dafür erhalten. Also er ist so der Gründer und Erfinder der Maschine, hat aber einen Partner gesucht, um die Maschine industriereif zu machen. Das war ein Laborkonzept, also eine Pilotanlage, worauf man nicht produzieren konnte und dann ging es noch 7 bis 8 Jahre bis die Maschine soweit war, dass sie für die Produktion freigegeben werden konnte. Das war in Italien, da haben wir die erste produktive Pilotanlage gehabt.

Es ist aber nicht so, dass es einen Gründer als Inhaber gegeben hat, das war immer Teil von Löpfer. Also Sedo Engineering ist Teil der Gruppe. Der Shareholder ist Löpfer. Es ist also innerhalb der Gruppe eine Firma gegründet worden.

Also die grösste Herausforderung war das Konzept der Maschine zu einer Serienreifen Maschine zu bringen, die auch in der Produktion weltweit funktioniert. Nicht die erste Maschine z.B. die läuft schon seit vielen Jahren in Italien, aber das ist wie eine Laborumgebung im Vergleich zu Produktionsanlagen in Bangladesch oder in Pakistan. Was wichtig ist, damit die auch längere Zeit funktioniert: Die muss ja für den Kunden gewinnbringend eingesetzt werden. Es ist zwar schön wenn das für die Umwelt gut ist, aber wenn es mehr Geld kostet ist es leider nicht mehr interessant, das ist die Realität. Enttäuschend, ist aber so. Damit die Maschine über mehrere Jahre ohne Probleme funktioniert, ist eine Voraussetzung, dass die mit destilliertem Wasser arbeiten. Die Qualität vom Wasser muss also stimmen. Das ist in Italien der Fall, ist aber nicht unbedingt der Fall in anderen Ländern. Da war die Herausforderung darauf zu reagieren. Z.B. mit extra Waschzyklen, extra Filtern, extra Sensoren. Die Maschinen mussten also auch in der Produktionsumgebung von Pakistan, Bangladesch usw. funktionieren. Die Maschine braucht eine jährliche Wartung. Sie muss aber auch das Jahr überstehen. Auch das war eine Herausforderung und dass sie auch qualitativ funktioniert, dass nicht ständig etwas kaputtgeht. Also, dass die Maschine einfach funktioniert in Serienfertigung beim Kunden.

Topic 3: Erfolgsfaktoren:

Weshalb ist es gut/schlecht gelaufen bzw. weshalb wurde die Herausforderung gemeistert/nicht gemeistert?
Auf Bereiche Financial Resources, Network Team Capabilities & Knowledge, und externe Faktoren eingehen.
Welche Faktoren hatten einen positiven Einfluss, welche einen negativen Einfluss?

Das allerwichtigste sind die finanziellen Ressourcen. Ohne die Hilfe vom Konzern wäre es nicht möglich gewesen. Es sind ja Jahre vergangen, ohne dass die Maschine serienreif war. Da musste sehr viel Geld und Zeit investiert werden in diese Entwicklung und da sind Millionen reingeflossen. Das hätte natürlich Sedo Engineering an sich als Startup nicht überlebt. Wir dachten schonmal die Maschine sei fertig, es hat sich dann aber doch nochmal über 2 bis 3 Jahre gezogen bis man die verkaufen konnte. Das hat Zeit, Geld und Nerven gekostet, aber ohne Geld wäre es nicht gegangen. Das war die wichtigste Resource!

Das zweite war das Knowhow. Das war da mit Dr. Kretenauer, der war Mitarbeiter damals von Sedo Engineering und das war eine kleine Gruppe aus 4 bis 5 Personen die das entwickelt haben.

Also das Kapital und das Knowhow von den Mitarbeitern. Und das Durchsetzungsvermögen. Der damalige Geschäftsführer, der Herr Gübeli, der war ja auch Verkaufsleiter bei Sedo Treepoint. Wenn er sich nicht so eingesetzt hätte und das verkauft hätte, er war ja da immer voll dahintergestanden und hat daran geglaubt, wenn er da nicht so dahinter gewesen wäre, dann hätte auch der Shareholder auch nicht mehr mitgezogen. Das ist also dann dieses Herzblut, das dann auch dazukommt.

Corporate Spin-Off: Es war ein Vorteil, dass die Gruppe daran geglaubt hat und investiert hat. Das ist auch jetzt immer noch so. Also wir gehören jetzt der Firma Vandeviele in Belgien, das ist eine inhabergeführte Gruppe, also das ist am Ende eine Person die sagt ich mache es oder ich

mache es nicht. Das war jetzt wieder der Fall, wir mussten ja die Coronajahre überstehen. Wir hatten 2 Jahre nichts verkauft. Unsere Märkte sind vor allem in Asian, da ging nix, das hätten wir also ohne Kapitalerhöhung nicht geschafft! Das ist unser grösster Vorteil, dass wir uns auf Verkauf und Optimierung der Maschine fokussieren können. Die Finanzen sind natürlich mein Part, aber es ist in Summe einfacher.

Die Maschine hat eine grosse Zukunft. Wir haben dieses Jahr wieder angefangen auszuliefern. Das läuft gut, wir sind sehr zufrieden. Aber diese Durststrecke ohne Kapitalunterstützung von der Gruppe wäre nicht möglich gewesen. Mit externen Investoren ist es schwieriger. Aber wir haben keine externen Investoren.

Detailliertes Conceptual Model mit allen Variablen zeigen und auf Bereiche Financial Resources, Network und Team Capabilities & Knowledge eingehen.

Zusammenfassend – Was sehen Sie rückblickend als die wichtigsten Erfolgsfaktoren für Ihr Startup an? Welche Faktoren hätten Ihr Startup bzw. den Erfolg Ihres Startups gefährden können?

Also finanziell war der wichtigste Faktor die Quelle der Resourcen vom Inhaber Gruppe, das kommt das Geld her. Jetzt sind wir aber wieder selbstständig, weil der Verkauf anläuft.

Es geht uns aber nicht um Umsatz dieses Jahr, es geht hauptsächlich darum, dass sich das Orderbook füllt, aber der Umsatz ist initial nicht so wichtig. Natürlich soll sich das irgendwann lohnen, aber der Inhaber hat eine Vision, er will Wachstum haben. Es waren ja nicht nur wir die Probleme wegen Covid hatten, auch viele andere Firmen, das weiss der. Er ist kein Investor, in Belgien sagen wir er ist ein Entrepreneur.

Letztendlich sind wir ein Spin-Off von einem anderen Unternehmen. Das ist es eigentlich, was hilft.

Für den Verkauf sind internationale Aktivitäten für uns das A und O. Wir haben mittlerweile 15 Maschinen verkauft, das ist für manche Firmen nicht viel, für uns schon. Das war hauptsächlich nach Pakistan, da haben wir die meisten. Natürlich China, das geht jetzt auch weiter mit Partnerships. Da hilft uns die Gruppe mit Vandemiele, die haben dort Büros und Produktion. Über die können wir Aftersales-Service geben, also die kümmern sich komplett um den Verkauf in China. Also da ist wieder das Netzwerk in der Gruppe sehr wichtig. Wir werden keine Maschine in die Schweiz verkaufen, auch nicht in Europe, das ist nicht das Ziel, das Ziel ist Asien allgemein. Indien, China, vielleicht noch Türkei, aber das ist dann doch schon eher bisschen Europa. Entwickelt wurde alles in der Schweiz entwickelt, da ist das Knowhow der Maschine, da wird auch die elektrochemische Zelle gefertigt. Die Maschine an sich, der mechanische Teil, der wird dann in Italien gefertigt.

Intellectual Property Protection ist natürlich sehr wichtig. Wir haben einige Patente. Ob das jetzt was bringt oder nicht das werden wir sehen. Aber es ist schon sehr wichtig, weil jeder kann die Maschine kopieren, das wissen wir. Aber es gibt doch gewisses Knowhow was wir uns angeeignet haben, wo wir wissen, dass es ohne nicht funktioniert, weil das haben wir hinter uns. Das bedeutet, man kann die Maschine öffnen, aber kann sie trotzdem nicht einfach kopieren, weil wir z.B. mit dem Kohlenstoff spezielle Behandlungen machen und die sind natürlich geheim. Deshalb ist das wichtig, dass das Knowhow auch weiterhin in der Schweiz bleibt.

Market Readiness ist natürlich wichtig. Wenn man die Maschine auf den Markt bringt muss sie auch fertig sein. Man denkt immer, man ist so weit, aber dann ist man es doch noch nicht. Wir hatten etwas Glück mit Corona, wir konnten die Situation nutzen, um Probleme zu lösen wie z.B. die Kinderkrankheiten der Maschine. Da konnten wir auch die Kinderkrankheiten der 15 Maschinen beheben, die schon auf dem Markt sind. Also das war sehr wichtig. Also wir haben die Situation genützt und sind jetzt so weit, um eine höhere Produktion anzufangen.

Es war ein sehr kleines Team, also 4 bis 5 Personen, mehr nicht. Das ist immer noch das gleiche Team, das hat sich nicht geändert. Warum? Wie gesagt, die Produktion ist in Italien, das ist der reine mechanische Teil. Da muss natürlich enorm viel gemacht werden und das ist eine Firma in Italien mit der Sedo Treepoint zusammenarbeitet, so ist das alles ein bisschen im Kommen. Wir haben die gleichen Agenten. Also der Kern bleibt der gleiche, aber administratives wird über Löpfer geregelt, also Einkauf, Auftragsabwicklung, Marketing usw. Wenn wir das nicht hätten ja dann müssten wir mindesten 3 bis 4 mal so gross sein, ohne die Produktion miteinzubeziehen. Wir wollen zwar noch wachsen, aber vorläufig machen wir es mit diesem kleinen Kern. Im Prinzip ist es noch immer dieses Founding Team, aber wir suchen jetzt natürlich Ingenieure, um die Maschinen in Betrieb zu nehmen, SPS programmieren, die Maschinen zu warten. Weil das kann dieses Team jetzt nicht mehr alleine machen.

Topic 4: Moderatoren

Grobes Conceptual Model inkl. Moderatoren zeigen.

Wir wollen auch herausfinden, ob die Wichtigkeit der Erfolgsfaktoren von den Variablen TypeOfMainOffer, TechnologyIntensity und PhaseInThe LifeCycle abhängt. Kurz Variablen und Ausprägungen erklären.

Wir sind jetzt an einem Punkt angelangt, wo wir selbstständig sind, da wir ja jetzt Maschinen verkaufen. Daher ist jetzt die wichtigste Resource für uns die Market Readiness. Wir können jetzt die Maschine verkaufen und wissen, dass sie funktioniert. Wir müssen nicht mehr überall hin, die wird in Betrieb genommen durch externe Agenten und das funktioniert. Natürlich ist es keine plug and play Lösung, aber es funktioniert jetzt schon sehr einfach.

Wir sind jetzt definitiv schon in der Wachstumsphase. Eigentlich schon vor Corona, aber dann kam Corona. Deshalb suchen wir jetzt auch neue Mitarbeiter. Wir haben dieses Jahr das Ziel, 6 Maschinen zu verkaufen. Das ist viel für uns, weil wir noch eine kleine Firma sind. Es geht nicht nur darum die Maschine zu verkaufen, sondern auch den Service zu gewährleisten. Nächstes Jahr dann 8 Maschinen, dann 10 usw. also das sind immer so 25-30% Wachstum das wir in den nächsten 3 bis 4 Jahren anstreben. Das ist aber alles noch ohne China. Das hatten wir anfangs vernachlässigt weil wir den falschen Partner hatten. Aber jetzt mit Vandemiele sind nochmal 4 bis 5 Leute nur in China, die sich nur darum kümmern, also wird das Wachstum vor allem im Personal und im Umsatz sein in den nächsten Jahren.

Finanzielle Resourcen sind jetzt weniger wichtig, um das Wachstum zu finanzieren, weil die Maschine fertig entwickelt ist. Aber wir wollen natürlich noch weiterentwickeln. Im Moment produziert die Maschine eine Tonne Indigo pro Tag. Wir haben aber jetzt die nächsten Ausbaustufen wo wir auf 1,5 Tonnen gehen. Das ist schon fertig entwickelt, das können wir verkaufen, ohne dass wir da viel investieren müssen.

Das ist aus Erfahrungen die wir haben, teilweise auch aus Zufällen, wodurch das besser wurde. Das ist wichtig, dass wir dann den finanziellen Aspekt vergessen können.

Wir werden dann auch auf eine Produktion in China übergehen. Das ist schon geplant. Und das muss man auch vorbereiten, das ist nicht von heute auf morgen. Aber wir brauchen für diese Produktion kein Kapital, wir nutzen die Resourcen von Vandemiele. Wenn wir selbst eine Produktion in China aufbauen würden, wäre das natürlich sehr geldintensiv. Das haben wir als Add-on weil Vandemiele ist ein Maschinenbauer. Die übernehmen die Produktion als Agent, so wie das hald jetzt in Italien ist. Also wir sind jetzt richtig in der Wachstumsphase.

Topic 5: Performance/Erfolg:

Was verstehen Sie unter Erfolg bei einem Startup bzw. auf Basis welcher Kriterien würden Sie von einer hohen Startup Performance sprechen?

Also für mich ist Erfolg, wenn man ein gutes Produkt gewinnbringend verkaufen kann wo alle etwas davon haben. Das ist hald wieder so Marketing, dieser Win-Win. Ich mag das eigentlich nicht so. Aber wie gesagt, in dem Fall ist es wirklich so, Performance ist ein Produkt zu verkaufen, das für die Umwelt was bringt und das auch für den Geldbeutel was bringt. Beides muss leider Hand-in-Hand gehen. Und soweit sind wir jetzt, das ist jetzt greifbar. Der Inhaber verdient Geld wenn er unsere Maschine kauft und für die Umwelt ist es auch gut. Das ist wichtig.

Es ist eine ausgereift Maschine, diese Market Readiness, dass ist letztendlich dann für uns der Erfolg. Natürlich, dass man das mit Gewinn verkaufen muss, das ist klar. Aber wir im Startup sind alles Ingenieure, die kümmern sich weniger um die Kosten, das war früher das Problem, aber da achte ich jetzt auch mehr auf die Kosten, obwohl ich selbst auch Ingenieur bin. Das man so ein Produkt gewinnbringend verkaufen kann das ist schon eine Leistung, das ist nicht selbstverständlich und da sind wir schon alle stolz drauf.

Der Erfolg für mich ist auch, dass alle Mitarbeiter mit Herz und Seele dahinterstehen. Da kann ein Kunde nachts ein Problem haben und die gehen ans Handy und lösen das Problem. Das mag nach aussen kein Erfolg sein, für mich ist es aber ein Erfolg, weil ohne diesen Einsatz hätten wir das nicht erreicht wo wir jetzt sind.

Wir versuchen immer zuerst ein Umsatzwachstum zu haben und dann ab einem gewissen Level wieder neue Leute einzustellen. Weil wenn man zuerst Leute einstellt und dann kommt das Umsatzwachstum nicht wie erwartet, dann hat man ein Problem. Also man muss sich das Wachstum auch leisten können.

Wichtig ist auch die Cross-Margin von der Maschine. Das ist ein sehr wichtiger Punkt. Wir wollen diese noch um weitere 7-8% erhöhen durch weitere Ausbaustufen. Das ist natürlich ein riesen Erfolg, finanziell.

Weil es gibt auch gewisse Risiken, die wir nicht beeinflussen können. Viele Sachen, unabhängig von Krieg oder Corona, da kommen dann auch noch andere Sachen zusammen, aktuell natürlich Supply Chain, ein riesen Thema, alles wird teurer usw. Wir müssen zusehen, auch wenn Edelstahl doppelt oder dreimal so teuer wird, dass wir das dem Kunden noch zu einem guten Preis verkaufen können. ROI muss innerhalb von 3 Jahren vorhanden sein. Punkt. Durch die Erhöhung der Kapazität von 1 auf 1,5 Tonnen, können wir die höheren Preise bei Edelstahl kompensieren. Auch die Transportpreise sind natürlich viel höher geworden.

Externe Einflüsse hat es schon immer gegeben, auch wenn es nicht immer so in den Nachrichten war. Das ist schon länger bekannt, dann muss man eben gewisse Sachen schon früher bestellen. Das ist hald nicht gut für die Bilanz und so, aber was bringt es, wenn ich ein gutes Produkt habe, aber nicht lieferfähig bin? Dann habe ich auch keinen Umsatz. Grössere Firmen wie z.B. Automobilhersteller können das ohne Probleme überbrücken, aber wir als Startup, auch mit einer grossen Gruppe dahinter die unterstützt, wir wollen diese Abhängigkeit von der Gruppe nicht mehr haben, da müssen wir auch lieferfähig sein. Das gehört auch dazu.

Abschluss: Noch Fragen? Abstract erhalten?

Abstract: Ja gerne. Noch Fragen: Nein. Aber wenn sie noch etwas brauchen, können Sie sich gerne melden.