MBA Digital Transformation & Change Management

ACADEMY FOR CONTINUING EDUCATION

Success factors of corporate business incubation with a focus on the microelectronics industry

A Master's Thesis submitted for the degree of
“Master of Business Administration”

supervised by
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Vienna, 20.08.2023

Affidavit

I, **DI BIRGIT EBERHARD**, hereby declare

1. that I am the sole author of the present Master's Thesis, "SUCCESS FACTORS OF CORPORATE BUSINESS INCUBATION WITH A FOCUS ON THE MICROELECTRONICS INDUSTRY", 143 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted this Master's Thesis as an examination paper in any form in Austria or abroad.

Vienna, 20.08.2023

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Signature

Abstract

In the dynamic market environment like the microelectronic industry, radical and continuous incremental innovations are necessary to establish an overall long-term success of the core organisation. Larger companies are often experiencing difficulties to support new businesses, especially when they are dealing with radical innovations. Structural ambidexterity is one approach to separate the explorative focus areas like R&D and business development from the exploitative focus areas like operations management. However, after the successful establishment of a new business and/or technology, it can be incredibly challenging to manage the integration into the operating business or even establish a new business unit.

This master thesis is aimed to identify potential success factors that are advised to consider for such integration endeavours. Four cases of AT&S history that have dealt with an integration were selected. Interviews were conducted with involved AT&S employees to gather insights and individual experiences. A qualitative research methodology was applied to analyse the success factors out of the historic projects that have been conducted by AT&S. The results were compared and complemented with similar findings from the literature on similar endeavours.

In total 53 important factors were identified that were summarized in an overall success factors model. The dimensions of the success factors model were structured in ordinary and dynamic capabilities. The top management commitment, dedicated project teams, the innovative technology and the problem-solving capability of AT&S, as well as the close collaborations with the leading customers, were named as the most crucial factors.

The results of the thesis provide an overview on the success factors for an integration endeavour that AT&S, as well as other companies can consider in future similar undertakings. Moreover, additional recommendations were given on how to facilitate new ventures of sustainable technology and/or business model innovations in companies. Lastly, also a recommendation was made, to link the technology innovation cycle of AT&S, referred as stage gate process with a new venture creation cycle.

Zusammenfassung

Im dynamischen Marktumfeld der Mikroelektronikindustrie sind radikale und kontinuierlich-inkrementelle Innovationen erforderlich, um einen langfristigen Gesamterfolg der Kernorganisation zu etablieren. Speziell größere Unternehmen haben häufig Schwierigkeiten neue Geschäftsmöglichkeiten zu unterstützen, insbesondere wenn es sich um radikale Innovationen handelt. Hier bietet die strukturelle Ambidextrie einen Ansatz, um die explorativen Schwerpunktbereiche wie Forschung und Entwicklung und Business Development von den produktiven Funktionen wie Operations Management zu trennen. Mit der erfolgreichen Etablierung eines neuen Geschäfts und/oder einer neuen Technologie kommt die Herausforderung, die Integration in das operative Geschäft zu bewältigen oder sogar eine neue Geschäftseinheit aufzubauen.

Ziel der Masterarbeit war es, potenzielle Erfolgsfaktoren zu identifizieren, die bei solchen Integrationsbemühungen berücksichtigt werden sollen. Hierfür wurden aus der Historie von AT&S vier Fälle ausgewählt, die sich mit einer Integration neuer Geschäftsmodellen befassten. Um Erkenntnisse und individuelle Erfahrungen zu sammeln, wurden Interviews mit beteiligten Mitarbeitern von AT&S geführt. Zur Analyse der Erfolgsfaktoren dieser Projekte wurde eine qualitative Forschungsmethodik angewendet. Die Ergebnisse wurden mit Erkenntnissen aus der Literatur zu ähnlichen Vorhaben verglichen und ergänzt.

Insgesamt konnten 53 wichtige Faktoren identifiziert werden, die in einem Gesamterfolgsfaktorenmodell zusammengefasst werden. Die Dimensionen des Erfolgsfaktorenmodells werden in fundamentale und dynamische Fähigkeiten gegliedert. Als die wichtigsten Faktoren werden das Engagement des Top-Managements, engagierte Projektteams, die innovative Technologie- und Problemlösungskompetenz von AT&S, sowie die enge Zusammenarbeit mit den führenden Kunden hervorgehoben.

Die Ergebnisse der Arbeit geben zunächst einen Überblick über die Erfolgsfaktoren eines Integrationsvorhabens, die AT&S sowie andere Unternehmen bei ähnlichen Vorhaben berücksichtigen können. Weiters werden ergänzende Ansätze geliefert, wie generell Technologie- und/oder Geschäftsmodellinnovationen in Unternehmen nachhaltig gefördert werden können. Abschließend wurde auch empfohlen, den Technologie-Innovationszyklus von AT&S, den sogenannten Stage-Gate-Prozess, mit einem neuen Geschäfts-Innovationszyklus zu verknüpfen.

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BU	Business unit
CAGR	Compound annual growth rate
HVM	High volume manufacturing
IC	Integrated circuit
IPCEI	Important project of common European interest
KPI	Key performance indicator
NPV	Net present value
NRE	No recurring expenses
PCB	Printed circuit board
RFQ	Request for quotation
R&D	Research and development
SWOT	Strengths, weaknesses, opportunities, and threats
TAM	Total addressable market

1 Introduction

In the following section, the motivation, problem statement, as well as the planned research question, sub-questions and aims are specified. Additionally, the reference framework and the methodological approach are explained.

1.1 Motivation

In May 2018, the European Commission announced that around 1.75b € are released for European companies to invest in research, development, and production facilities to advance the production of microelectronics in Europe. The new established projects under the IPCEI (Important Projects of Common European Interest) program are aimed to be completed by 2024, involving five different technological areas like energy efficient chips, power semiconductors, smart sensors, advanced optical equipment, and compound materials. This funding along with several other programs by individual states, institutions and companies are aimed to strengthen the competitiveness of European companies in the microelectronic industry and locate more production facilities from China to Europe[1]. Infineon Austria, NXP Semiconductors Austria, as well as AT&S are Austrian companies participating in the IPCEI program along with several German, Italian, French (and British) companies that are active in the microelectronic industry[2]. Many of these companies have announced huge investments in any European production side, like Infineon with 2.4b €[3]; GlobalFoundries and STMicroelectronics with 5.7b $[4] and AT&S with around 0.5b € from 2021 onwards[5]. Moreover, Intel Cooperation announced in March 2022 that they plan to invest 33b $ in Europe, building up a huge semiconductor fabrication and research centres in Europe[6].

In addition, several US companies, including big IT firms like Apple, Amazon, Volvo are planning to move out manufacturing and sourcing out of China since the past few years[7]. Apart from geopolitical reasons, the increasing funding of the European Union is one reason that US companies in the microelectronic industry are strengthening their presence in R&D and want to manufacture and source in Europe[8].

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[1] cf. European Commission, 2018

[2] cf. IPCEI

[3] cf. Reuters, 2021

[4] cf. Reuters, 2022

[5] cf. Market Screener, 2021

[6] cf. Intel Newsroom, 2022

[7] cf. New York Post, 2022

[8] cf. Market Realist, 2021

In 2022, the general market for the microelectronics industry was around 300b $[9] to 400b $[10] and is predicted to grow by 4% to 5% CAGR until 2028. Components like resistors, capacitors, transistors, inductors, microcontrollers are applied by various industries for communication in smart watches, smart phones, in computing, in laptops or even highly efficient servers and data centres[11]. Global market trends in the area of digitalization like internet of things, smart manufacturing, cloud computing, artificial intelligence, big data, as well as the electrification[12] in the automotive market are the main contributors to the increase of the microelectronics market[13].

The supply chain in the microelectronic market is quite complex as processes from the chip design, chip manufacturing, packaging and testing of the modules and the final assembly in the electrical devices are done mostly by many different vendors all around the globe. In the past few decades, most companies like AT&S AG focussed on the specialization of a specific service, like manufacturing of the printed circuit boards (PCB). Each supply chain partner focussed on one service and all partners are working very closely together[14].

AT&S AG has been concentrating in the last decades on the manufacturing of PCB where mainly module assemblers and manufacturers send their design to AT&S and AT&S does the manufacturing of the customized PCB. However, in order to establish a long-term competitiveness, AT&S is aiming to broaden the services into the “chip assembly” referred as “AT&S packaging” in Figure 1 (e.g. chip assembly into the PCB or substrate) and testing of packages. Furthermore, the manufacturing of substrates that are used as interposer for highly efficient computing platforms also belong to the service portfolios.

AT&S's packaging and testing services, in particular, are new and have only been developed with a small number of customers. With AT&S PCB packaging, many performance advantages for power applications can be achieved and therefore, there is a high potential market for profitable business that AT&S can exploit. As a result, AT&S management is making a strong strategic push to expand those business models with new customers and to investigate additional related business models such as design services and simulations for semiconductor packaging.

[9] cf. GlobalNewswire, 2022

[10] cf. VantageMarket, 2022

[11] cf. VantageMarket, 2022

[12] cf. Yole, 2023, p. 7

[13] cf. WorldEconomicForum, 2021

[14] cf. Fritze, 2022

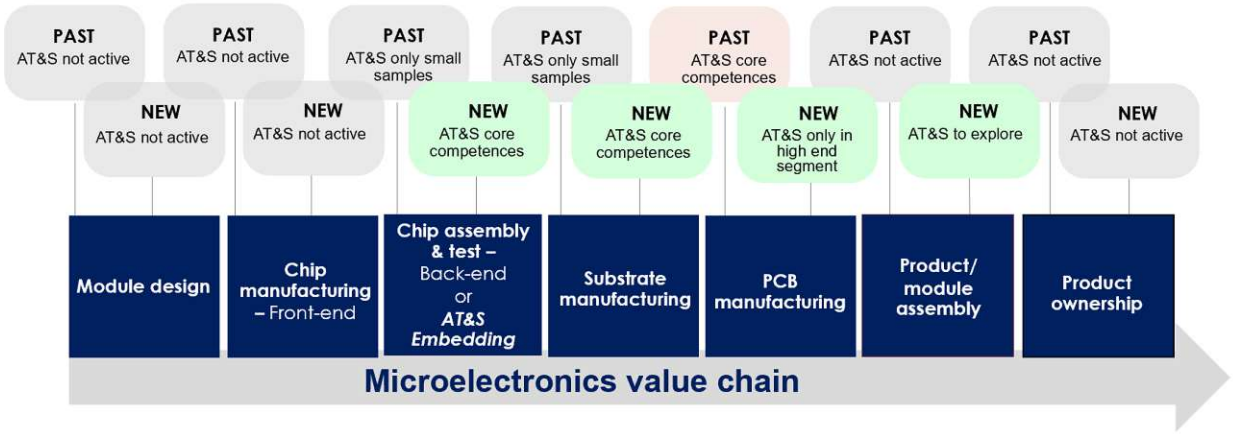

Figure 1: Microelectronics value chain[15]

For AT&S, new business models require higher quality standards, well trained and experience product engineers, application engineers and of course an upgrade of the current available know how around microelectronics. Previously, only PCB standards were implemented; however, as raw semiconductors become smaller and more sensitive to mechanical handling, semiconductor standards are now implemented.

To help the team at AT&S internally to scale that business and to explore new market opportunities, internal structures need to be adjusted. A new organization was formed on October 1, 2022, and become officially active by the start of the new fiscal year on April 1, 2023. Internally, AT&S has set-up a department called “Business incubation management” in one existing business unit. That department will mainly focus on the future development of the PCB packaging business. The business incubation team will guide new business opportunities for PCB packaging, beginning with new customer acquisitions, and continuing through RFQ-phases, development projects until the handover into a high-volume manufacturing business.

1.2 Research problem

With the last thirty years institutions named “business incubators” became increasingly famous, especially in the United States. Also, in course of the last thirty to forty years, higher education institutes founded school-affiliated business incubators to support the entrepreneurial activities of their students[16]. As a result, start-ups could have been established, grown, and their overall success established with the assistance of business incubators.. Since then, business incubators became an integral part of our modern entrepreneurial ecosystem[17]. Business incubators supported start-ups with a range of measures and services[18]. In addition, an internal (referred as corporate) incubator could help large companies for instance to support to grow

[15] based on AT&S AG, 2021, p. 28

[16] cf. Nash Riggins, 2017

[17] cf. Hausberg & Korreck, 2018, p. 151

[18] cf. eFinanceManagement.com

new business models. Big companies often experience difficulties to support internal (radical) innovation. In dynamic market environments such as the microelectronic industry, radical innovation however can contribute to a sustainable and not only short-time competitiveness [19]. For organisations like AT&S, it is recommended to pursue a structural ambidexterity through the creation of exploratory and exploitative focus areas. Therefore, the exploration teams can support new business models, whereas the exploration teams can work on the management of existing business units that generate the present required cash flows[20]. However, after the successful establishment of a new venture, it is often difficult and challenging to manage the integration from an explorative environment to the parent organisation or even existing business units that are driven by a high level of exploitation mentality[21].

Especially in the German speaking area, only a few studies on business incubation has been conducted, with a focus on cooperative business incubation and the integration of a newly established venture in the parent organization. More studies are available for related fields like open innovation[22], how to promote dynamic capabilities in the organisation, structural ambidexterity etc. These studies all aim to investigate how companies can successfully prepare their processes, structures, leadership styles, organisational set-up in order to support new businesses to grow within a company. But the integration process, especially with a focus on the microelectronic industry has not been studied yet in detail.

The most difficult aspect of business incubation is assisting an individual company in establishing the appropriate structures, processes, and organisational structures for example. Further, the pathway from an own exploration unit and then the integration into the existing business is difficult to manage and can also fail[23]. An own institution internally in the company that is focussing just on the promotion of new business models, as business incubation management, can be a first step. However, there are additional tasks involved in establishing an ambidextrous organisation and then integrating a successful new business into an existing organisation. Cross-functional teams with cross-functional collaborations, change of mindsets, leadership support, reporting structures, marketing approaches, and for more other areas need to be established and successfully managed. Detailed success areas and challenges are aimed to be investigated in the following thesis.

[19] cf. Hausberg & Korreck, 2018, p. 160

[20] cf. Keller et al., 2022, p. 4

[21] cf. O'Reilly &Tuschmann, 2013, pp. 6-8

[22] cf. Hausberg & Korreck, 2018, p. 172

[23] cf. Keller et al., 2022, p. 4

1.3 Research question and aims

Based on the information, the following research question has been defined in Table 1:

Research question
What are relevant success factors of corporate business incubation, with a focus on the integration of new venture into the parent organization?

Table 1: Research question

In detail, the following sub-questions will be answered in course of the thesis:

- What measures can a company apply to support the integration of new business ventures into the core organisation?
- Which steps should a company consider while managing the integration process?
- What should be the set-up of cross-functional teams that are dealing with integration process?
- What are the difficulties and risks in “mature” organisation for the integration of new businesses?
- What guidance can be given to companies like AT&S operating in the dynamic microelectronic industry?

Aims

The aim of the research applied in this thesis is to collect relevant information on the success factors of corporate business incubation. In detail, the experiments should answer the defined research questions. It should also provide recommendations to AT&S and companies in the microelectronics industry on relevant elements that can be considered in the integration process of new ventures.

1.4 Reference framework and methodological approach

In the following section, the reference framework in Figure 2 summarises the main chapters of the master thesis and gives insight in the methodological approach.

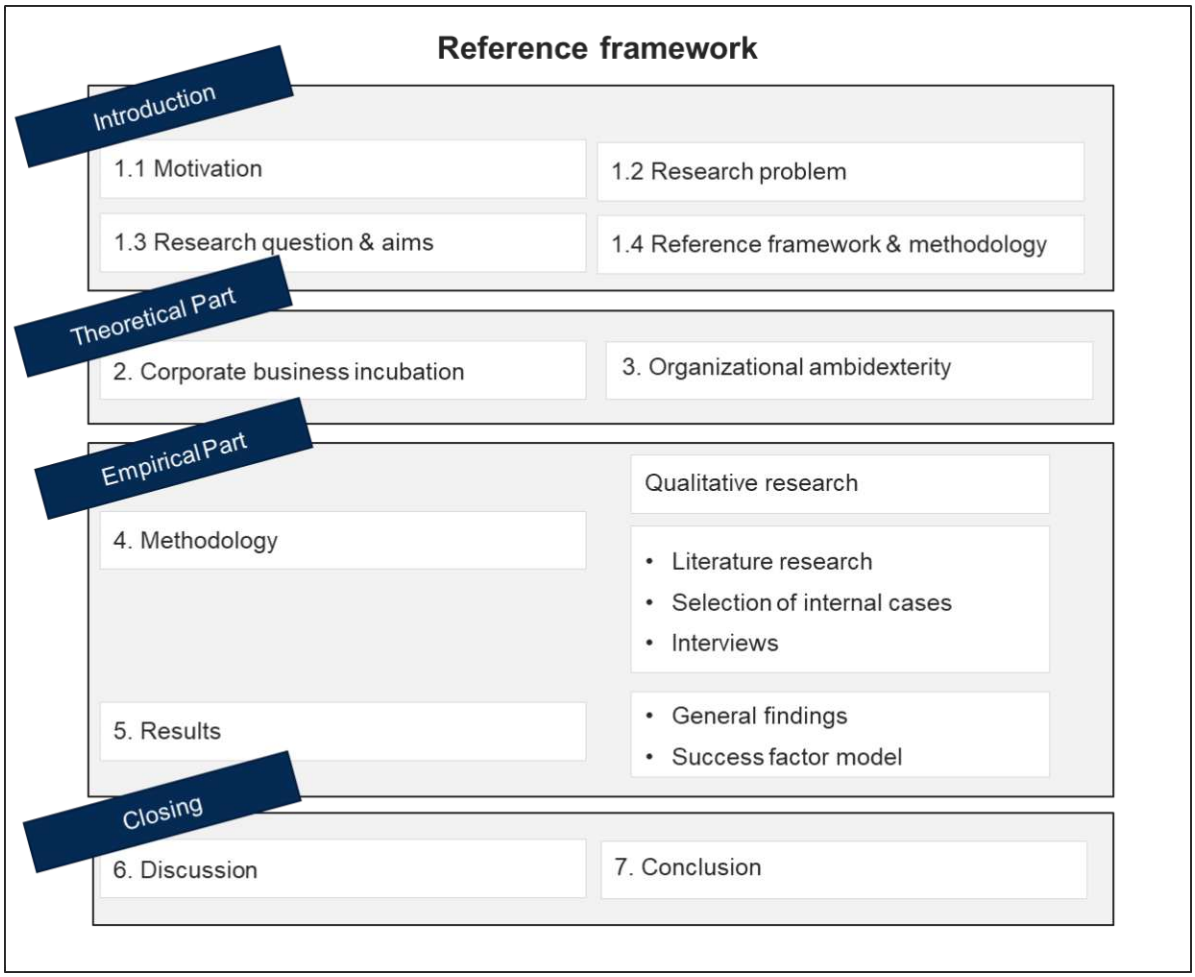

Figure 2: Reference framework

The introduction provides insight in the motivation, problem statement, as well as research question and aims of the master thesis. In the theoretical part the main findings of the literature research are summarized. In detail, the theoretical section addresses the topics of cooperative business incubation and organisational ambidexterity.

Furthermore, the methodological approach is outlined in the documentation of the empirical part. The author decided to use a qualitative research methodology since there has been little research in the field. The methodological approach is based on the framework of inductive research developed by Goia et al. (2012)[24]. By using the framework, the author aims to develop new concepts and theories about the success factors of the integration of new ventures in the core organization[25]. At the end, a statement related to the research question is provided. The master thesis is then completed with a summary and recommendations for future research in that field.

[24] cf. Nag et al., 2007, p. 1

[25] cf. Gioia et al., 2012, p. 26

2 Corporate business incubation

In this chapter, a definition of business incubation and corporate business incubation, spin-offs and advantages of business incubation support are mentioned. Additionally, the strategic direction of corporate business incubation, services, the main idea of open innovation, as well as challenges of today's business environment are highlighted.

2.1 Business incubation

First developments in the establishment of business incubators started around 1960 in the US, where business incubation programmes were created to support small start-ups to grow their business. The intention of the programs and founding institutions was to support start-ups in their new venture creation process. Additionally, the programmes were designed to offer start-ups with infrastructure, financial support, business administration support and far more to help the business grow into a successful company. Such business incubators then mainly acted as technology business incubators that offered the connection between new technical ideas, entrepreneurial expertise, financial capital, and network to supportive partners within and outside the supply chain[26]. A business incubation institution, for instance, can provide programs, activities, events to systematically filter out new business ideas and to support the emerging opportunities within their growth. In fact, business incubators can play a key role to guide new ventures to successfully commercialise new products, technologies, services, and business models[27].

Starting in the 1980s, higher education institutes founded school-affiliated business incubators to support the entrepreneurial activities of their students[28]. With the help of business incubators, start-ups were established, grown and their overall success ascertained. Since then, business incubators became an integral part of our modern entrepreneurial ecosystem[29]. Business incubators are active as private, or also as public institutions supporting new ventures with a range of measures and services like financial and basic operations management, marketing, advertisement, market research, network to influential people, reporting and far more[30]. Furthermore, corporate incubators have emerged that are aimed to support large companies with the development of new innovations[31].

[26] cf. Mian et al., 2016, pp. 1-2

[27] cf. Eshun, 2009, pp. 156-157

[28] cf. Nash, 2017

[29] cf. Hausberg & Korreck, 2018, p. 151

[30] cf. eFinanceManagement.com

[31] cf. Hausberg & Korreck, 2018, p. 160

2.2 Innovation capabilities

Continuous innovations are defined to be a key element of economic development. Dynamic environments as the microelectronic industry, for instance, is driving fast and continuous innovation in different areas such as[32]:

- New products
- New production methods
- New sources of supply
- New markets
- New ways of organizing

Such innovation activities drive the need for institutions and support functions that offer innovators the environment to try out new things.

The continuous work on new innovations needs to be part of the overall company strategy. It is not just about advancing existing capabilities, but more also about building new core capabilities and attract new markets. The below visualised graph in Figure 3 gives insight into a generic innovation portfolio. That portfolio summarises the development areas of “existing or new core competences” and “new or existing market”. Competence innovation is more radical and focusses on new innovation and competence development that are needed to compete in the existing market. Perhaps some new product features, special services, such as design, can be developed in that area. Improvements in the daily business focus more on that development of existing businesses and competences. Higher yields in the production or any process innovation that increase quality or output can be improvements in daily business. Market innovations, in contrast, represent activities to open new market with already existing competences. It can be a kind of market diversification to enter markets that have a profitable growth rate and a need for new technical solutions. Finally, there are business model innovations that target new markets and new competence developments. There can be also new markets with very high growth rates that have a need for new solutions. The markets are not yet highly competitive, and there is a high possibility of technological differentiation. However, with the current capabilities there is no chance to enter that market. Hence, the capabilities need to be updated based on the requirement level of any leading customers in that field[33].

[32] cf. Eshun, 2009, pp. 156-157

[33] cf. Augsten et al., 2017, pp. 53-58

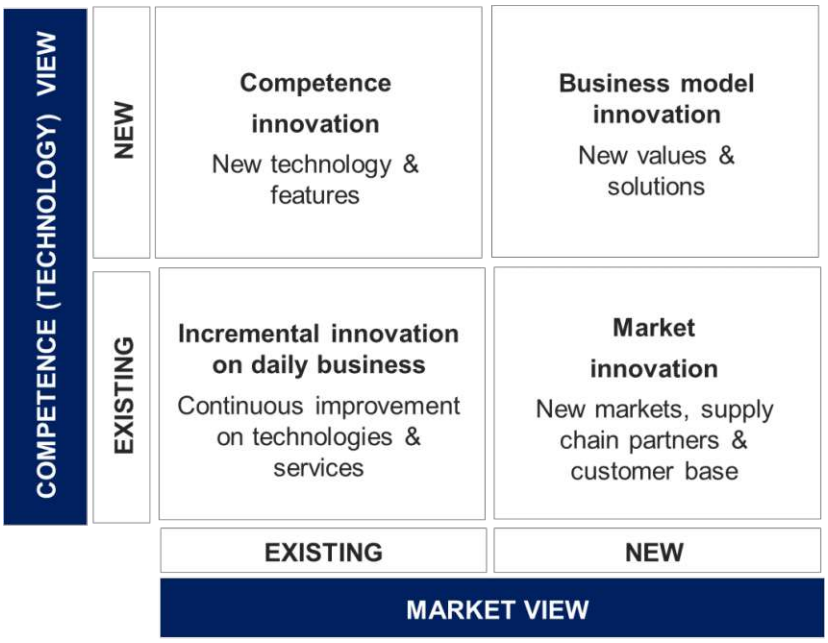

Figure 3: Generic innovation portfolio[34]

There are several different further differentiations of innovations beyond the generic overview shown in Figure 3. Based on the impact on the market and on the technology novelty, the innovations can be differentiated between architectural, incremental, disruptive, and radical. Among that there can be different fields of innovation, such as product innovation, services innovation, market innovation, process innovation, technology innovation, business model innovation, marketing innovation and organisation innovation. Technology innovation can be the development of new improved technology that can have new features, functionalities, or efficiency. Such a technology innovation however requires high amount of scientific, engineering, and technical know-how. It can also demand high amount of initial investment before any new prototype or series product with the new technology can be developed. In addition, business model innovation focusses on creating new business models with potentially different value propositions, cost, and revenue streams. Such a diversification also requires a good understanding of the targeted market and the needs of the targeted customer base[35].

It is argued, however, that in already established organisations with defined structures and responsibilities, innovation is difficult to stimulate. Entrepreneurs that drive new ideas and concepts are working in a creative environment whereas most managers are focussing rather to establish the highest possible productivity level by optimising processes. Therefore, dedicated responsibilities, organisational set-ups and processes are proposed to foster a continuous generation of innovations[36].

[34] cf. Augsten et al., 2017, p. 53

[35] cf. Dieffenbacher, 2023

[36] cf. Eshun, 2009, pp. 156-157

2.3 Incubation versus acceleration

Conan defined in 2013 a differentiation between the three organisations: incubators, angel investors and accelerators. Moreover, she highlighted that there can be also a hybrid model as shown in Table 2 with overlapping characteristics of incubators and accelerators. Business incubators provide support for new ventures for more than five years, whereas accelerators only provide short-term assistance. Angel investors, on the other hand, primarily provide investment support for an indefinite period of time. The mentorship is minimal and on special services orientated for incubators, whereas accelerators offer very comprised seminars and intense mentoring. Incubators if not corporate incubators select ventures support for long-term view whereas accelerators select a few most competitive ventures on short-term basis[37]. Therefore, incubators help to transform an idea into a business and the accelerator supports within a shorter period to grow the business. In addition, corporate incubators involve higher internal costs such as separate functions need to be financed internally by the parent organisation[38].

	Incubators	Corporate incubators	Angel Investors	Accelera-tors	Hybrid
Duration	1 to 5 years	1 to 5 years	Ongoing	3 to 6 months	3 months to 2 years
Cohorts	No	Company internal	No	Yes	No
Business model	Rent, non-profit	Internal costs	Investment	Investment, also non-profit	Investment, also non-profit
Selection	Non-competitive	Internal competition	Competitive, ongoing	Competitive, cyclical	Competitive, ongoing
Venture stage	Early or late	Early or late	Early	Early	Early
Education	Ad hoc, con-sulting	Training, coaching	None	Seminars	Various practices
Mentorship	Minimal, tactical	Close mentoring, guiding	As needed by investor	Intense, by self and others	Staff expert support, mentoring
Venture location	On-site	Function in the firm	Off-site	On-site	On-site

Table 2: Institutions supporting new ventures[39]

[37] cf. Cohan, 2013

[38] cf. Bundl

[39] based on Cohan, p. 20 and Hathaway, 2016

Figure 4, there are basically more methods available to support the new venture creation from a corporate company's perspective. Open innovation is implemented in an early stage of innovation with relatively low cost for a company compared to other methods[40]. Strategic partnerships can be established with different partners in the supply chain, like universities, suppliers, customers, etc. The costs are higher, and it covers the discovery, the start-up phase, and the scale up of a new venture[41]. Corporate incubators and accelerators require more direct expenses from the company. The institutions work in the late discovery phase, in the start-up and early scale up phase and accompany the integration of a new venture into the parent organisation or spin-offs. Corporate venture capital is another method, as well as the complete acquisition of a new venture that has already been established outside of the company and will be integrated in the acquiring company[42].

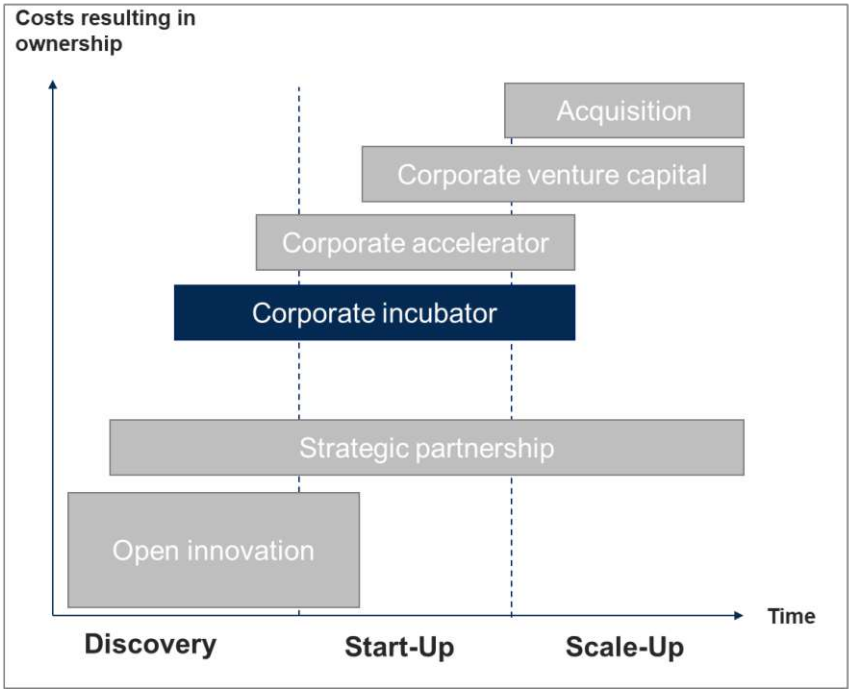

Figure 4: Corporate venturing landscape[43]

In the following thesis, the focus is laid on corporate incubators as internal institution that is supporting new ventures to grow and transfer the developed venture into the parent organisation.

[40] cf. Bogers et al., 2018, pp. 5-16

[41] cf. De Backer & Rinaudo, 2019

[42] cf. Bundl

[43] cf. Bundl

2.4 Corporate business incubators

Internal or external organisational units can represent corporate business incubators. Their main task is to drive knowledge on entrepreneurial tasks into the parent organisation that already consists of existing businesses units. Such business units may have developed a product, process, business model innovation and need a guided coaching to successfully grow a venture into a profitable business. Corporate business incubators have a continuous exchange of information with the business units and the involved persons driving new business ideas. For example, business incubators may provide advice on how to conduct certain activities in a particular manner. This also entails that within the business unit organisation required resources are provided to support this exploration activities. The interplay between the business incubator, business units, the parent organisation and in particular the organisational innovation system is essential[44].

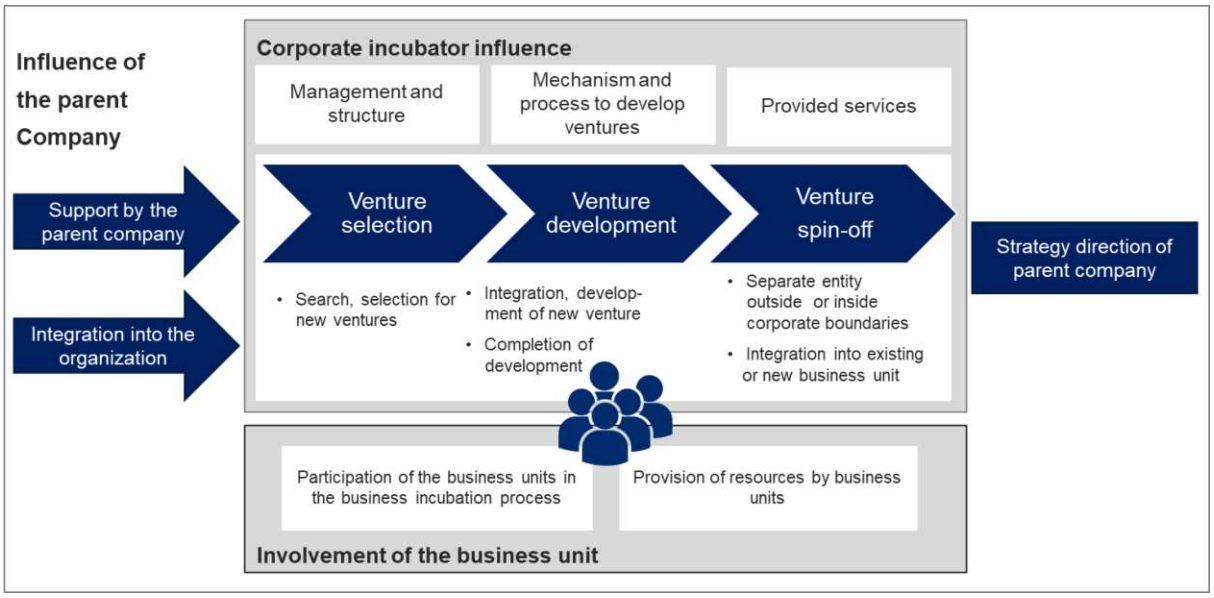

Figure 5: Business incubation framework[45]

Figure 5 summarizes the structure of how business incubators can be active and influence areas within the company. The graph was originally created by Kötting in 2022 in his article "Corporate incubators as knowledge brokers between business units and ventures". On the one hand, the support of the parent company has a high influence on the successful contribution to the new venture creation. On the other hand, the integration and collaboration design of the existing business units and the emerging new ventures are relevant. In addition, the activities should be aligned with the overall strategic direction of the parent company[46]. If the strategy of the parent company is solely focussed on the exploitation of the current business

[44] cf. Kötting, 2020, pp. 474-499

[45] based on Kötting, 2020, pp. 480-481

[46] cf. Proctor, 1997, pp. 143-145

or to sell the company anyway within a short time period, the management might not be highly supportive in the business incubation work and focusses on other priorities. Business incubation work would require a high level of exploration activities like market and technology scouting, innovation, and new business model development[47]. Furthermore, the parent company, as well as the business units are recommended to be open for entrepreneurial activities and to act in areas that are characterised by taking risks and uncertainty. Such areas might offer good potentials for even radical innovation in markets, products, technologies that do not exist even today[48].

Another approach is for business incubators within parent organisations to work on new business concepts and then define a dedicated steering committee to whom these ideas will be pitched. Such a steering committee can be created out of internal or external experts and involve participants from different departments. In such process, the most promising ideas are selected. Based on milestones, the development of the new ventures is reviewed and funding is released in order to develop a minimum viable product (MVP)[49].

The business incubation team need to be aligned on the management, structure and the mechanism or the process to develop new ventures. Such structures need to be clear and transparently communicated throughout the parent organisation and involved stakeholders. Furthermore, provided internal or external services like controlling, innovation tools, market data and coaching just to mention a few need to be established. A close monitoring with relevant stakeholders also aids in the development of new ventures. Mentoring and trainings, market research and planning, business case set-up, sponsoring, access to internal and external networks are further services that corporate incubators can offer to their internal stakeholders[50].

The main playground of corporate business incubators involves the new venture selection, the venture development, and the venture spin-off afterwards. New ventures are selected within the business units, research, and development (R&D) departments and other areas that can bring in ideas for innovations. Additionally, also external sourcing for new ventures is possible, even together with customers, suppliers, research partners or start-up. If a new venture is selected, the business is supported with various services and mentoring in order to establish a new venture that can be commercialised.

[47] cf. March, 1992, pp. 71-87

[48] cf. Eshun, 2009, pp. 156-157

[49] cf. Dreischmeier et al., 2021

[50] cf. Tannet Group, 2018

2.4.1 Strategic importance of corporate business incubation

Gothier and Chirita (2019) defined in their framework that the strategic direction of corporate incubation is to establish an organisational spirit with a company to facilitate an evolution of innovation routines. Such evolution of innovation routines also necessitates a culture of entrepreneurship[51] and incentive systems. This requires the establishment of learning mechanism to accumulate and communicate knowledge. Knowledge accumulation requires an interdisciplinary collaboration to experience different functions and processes and to understand the overall challenges a company faces. An interdisciplinary view of product development begins with the generation of ideas and ends with the industrialisation of a product for series supply. Additionally, the innovation capability plays a major role in the success of new venture creation. This involves resources, processes, and values. Most important resource are incubators that drive innovations, but also tangible resources like financial support. A standard process for new venture generation is also very important with pre-defined deliverables, milestones, and decision makers[52].

Furthermore, also the values within the parent organisation or business units have an impact on the innovation activities. Dynamic capabilities are recommended to be developed within a company facilitating the ability to screen new markets and business opportunities and to integrate and scale them within the company[53]. A strategic mindset of the company would also mean if the company is in general prepared to move away from the current well-known products, services and markets they are operating in. Further, it could also imply that the company is prepared to open up new segments and value propositions that the company is traditionally not offering.

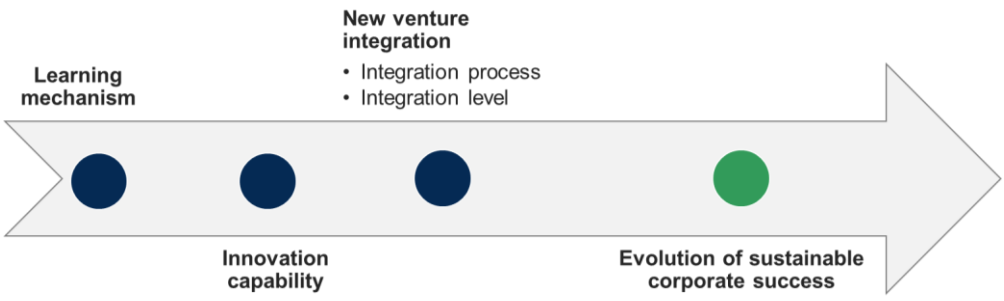

Figure 6: Evolution of innovation routines[54]

While the learning mechanism and the innovation capabilities support the generation of innovations within a company, there are also important aspects to consider regarding the integration of a new venture as shown in Figure 6. The level of integration into the parent organisation

[51] cf. Uittenbogaard et al., 2005, p. 263

[52] cf. Gonthier & Chirita, 2019, pp. 17-21

[53] cf. Teece et al., 1997, pp. 509-533

[54] based on Gonthier & Chirita, 2019, p.18

or the establishment of a new entity outside the parent organisation, as well as the process, play an important role. Therefore, also the successful integration of new ventures can finally contribute to an evolution of a sustainable corporate success[55].

Gothiers and Chirita (2019) recommend four main implications for the practise of business incubators in their research focussing on the role of corporate incubators[56]. These include:

- Recruit motivated entrepreneurial individuals as incubators.
- Organisation setting need to promote the collaboration between incubators and parent organisation.
- Incubation activities should be lead or supported by the company's management team.
- Incubators need to offer a signification accumulation of experience.

2.4.2 Types of corporate incubators

According to Becker and Gassmann (2006), corporate business incubator can follow four strategic directions as fast profit, leveraging, market and insourcing incubator. Fast profit incubators aim to establish a spin-off in a short period of time by developing a new technology and making profit out of it. There are also leveraging incubators that are targeting to integrate new businesses in the parent organisation and focus more on incremental innovations. Additionally, market incubators looking for new markets and creating spin-offs or establishment of new business units as new markets ask for different structure and market development activities. Furthermore, insourcing incubators are focussing on the external screening of new technologies, ideas and at the integration or acquisition of them into the parent organisation[57]. In the following sections, the focus will be more laid on the leveraging incubators that focus to integrate a new venture into the core organisation.

2.5 Spin-off

If the commercialisation is beneficial and for instance, a business case is created and approved by decision makers in the company, a plan is required for the integration of the new venture. Such a new venture can be referred as spin-off. A new independent company or even just an own business entity can be referred as a spin-off. A spin-off can consist of a new technology, new business model or service that is emerging out of the parent organisation and different to already existing businesses. Spin-offs are also known as start-ups[58]. In addition, spin-offs can

[55] cf. Carayannis et al., 1998, pp. 1-11

[56] cf. Gonthier & Chirita, 2019, p.18

[57] cf. Becker & Gassmann, 2006, pp. 476-478

[58] cf. Carayannis et al., 1998, pp. 1-11

be also differentiated between corporate spin-offs (from a parent company) and academic spin-offs (from a research institution like university)[59].

2.5.1 Venture spin-off

There are several discussions on what the right timing and organisation structure is to arrange a spin-off of an emerging venture. The emerging venture was before mentored by the business incubators and received special support to become a profitable independent business. Within the spin-off procedure, pre-defined milestones can be established, such as when a business case has been approved or a customer portfolio has been defined. The market and technology potentials and outlooks can also play a major role in this transition. It further leads to the following questions:

- Is the technology accepted and needed in the market?
- Are there problems in the market that can be solved with the new venture?
- Is the market growing and on which percentage level?
- Can the technology and/or service be profitably sold?
- Is there a profitable business case supporting the industrialisation of the technology?
- How is the competition in the market?

There are also risks involved. If the spin-off is happening too early, the venture might not survive on a long-term basis. Additionally, if the spin-off happens too late, the competitive intensity from other companies that address the same market might be very strong already. If the new venture is, for instance, a new radical innovation, it needs even to be separated from the parent company to grow further. If launched too late, even the entrepreneurs that have the knowledge of the new technology might leave the company as the parent company does not offer the freedom and environment to grow the new venture[60]. Based on the parent company's overall business strategy, it can be decided whether to establish a separate entity or integrate it into the parent organisation. A major factor in this decision is whether the new technology/service/business model is aligned with the company's core competences and adds strategic value to the core competences of the parent company[61].

2.5.2 Separate entity outside the organisation

The parent company can decide to create a separate entity outside the organisation to grow a new venture. There are also examples that entrepreneurs leave the parent company and take

[59] cf. Carayannis, 2013, p.23

[60] cf. Kötting, 2020, pp. 488-489

[61] cf. Ford et al., 2010

even other employees from the parent company with them to establish a new self-governed firm. It can be in the same industry or in an inter-industry set-up. It can be initiated by the parent company itself, as it does not fit to the firms' competences or initiated by an individual employee. It can be a way to ensure the future growth of a parent company, but generating cash with a sale that can be utilised to upgrade the core capabilities in the parent organisation. The advantages of such a separation can be that the firm is independent, however, in close interaction with the founding company to receive support for R&D activities, other support services like infrastructure and funding. Synergistic effects can remain unutilized with the founder company and resources can be shared. Management buyouts[62] can also fall under this structure[63]. New separate firms are mostly founded if the emerging venture is a completely new business model that requires a totally different mindset and even geographic location and work culture[64].

2.5.3 Spinning-in ventures

Spinning-in means to integrate the new venture into the parent organisation. For spinning-in ventures two different directions can be pursued:

1. **Separate entity (business unit) with the company's boundaries**

There is a risk that larger firms are becoming less innovative, than smaller firms and rather pursue incremental and less radical innovation. Further, at companies that have a long-established successful history, there might be attempts to defend the history and to put the needs of the existing markets and business units in the background. There might be less acceptance for new products for instance. New technologies, products and business models need a more advanced and complex support. Developing and ramping up a business, takes time and there is no profit seen at the beginning. In order to overcome such a challenge, a focussed business unit in the parent company can be created for the new venture. This means that a completely new business unit with all required functions from marketing, operations, controlling, business development can be established that operates quite independently from other business units[65]. A new business unit can operate like a scale-up factory, where specialised resources, talent and experts are hired in order to scale the entire new business quickly and successfully. A mixture of experienced and also external employees is advised. Furthermore, recruiting the generation of a start-up mindset in the team and empowering of champions that are driving the acceleration of the new business is relevant. A direct link to the senior decision makers like group board is also advised in order to enable fast decisions. Such approach is also proposed

[62] cf. Hammer et al., 2023, pp. 1-2

[63] cf. Fryges & Wright, 2014, pp. 245-259

[64] cf. Dreischmeier et al., 2021

[65] cf. Ford et al., 2010

if the company has identified a promising technology or idea that is beyond the organisations core focus. Such new ventures could focus on leveraging disruptive new technologies or even entering into a new industry[66]. There can be some organisational dependence on supportive functions, but for the core business there should be an independence what drives greater entrepreneurial spirit. Such flexibility is however also accompanied by a lot of administrative costs to manage the new business unit that a company need to afford. Especially in tough times in economic crisis, such additional costs might not be released by the parent firm[67].

2. Integration into the business unit

The integration of a new emerging venture in an existing business is the less risky option in terms of new financial funding. If the elements of the new technology, business or business model is close to the existing business, the new venture can benefit from the already established functions and areas like market access, know-how of the technology, quality standards and so on. Nevertheless, such an integration can face some challenges as well. All processes within the existing business unit are mostly targeted to the existing businesses that are mostly even managed within an "exploitation"[68] focus. Incumbent firms, for instance, have already developed knowledge capabilities that also generate a certain path dependency[69]. An integration of a new business or technology is mostly accompanied by changes of already well-established work approaches and processes. Moreover, a trade-off between the service and resource level of the new venture and existing business needs to be made. There might be even the case that the new venture is cannibalizing the existing business what could cause conflicts in the business unit teams. A high administrative effort and key-performance-indicator (KPI) burden may result from such an integration, where a business is evaluated based on an overall company-wide KPI structure. During the integration, the profitability might shrink temporarily and can increase in the future. If resources are cut due to lower profitability rates, such actions can have a negative impact on the transition process[70].

2.5.4 Preparation for spin-offs

As outlined in Figure 7, Kotzen et al. (2016) proposed four major focus areas that need to be addressed and prepared before spinning-off a new venture. The new venture needs to be aligned with the corporate strategy that consists of the overall financial, investor and business strategy. If the corporate strategy defines that a company does not want to be active in the

[66] cf. Kötting, 2020, pp. 488-489

[67] cf. Powel, 2010, pp. 37-47

[68] cf. Tushman & O`Reilly, 1996, pp. 16-17

[69] cf. Powel, 2010, pp. 37-47

[70] cf. Kötting, 2020, pp. 488-489

automotive industry, the business strategy for the new venture should not target the automotive industry with the new developed products and services. Based on that, the target operating model is defined to set KPIs that are measuring the performance of the new venture. It might even require creating new KPIs or target operating models or to delete old ones that are in use for other business units. Furthermore, it is necessary to separate planning and the execution and to establish clear responsibilities for the internal systems. In addition, a focus needs to be laid on the organisation structures, legal and tax purposes, transition services, operations management, and management of culture during and after the integration process. For the overall integration of the new venture, a governance model with management and reporting structures, as well as a master and workplan need to be defined. Such planning preparations need to be aligned with the board in advance to manage and monitor the transition process. Finally, change management and communication structures must be facilitated during and after the transition, particularly if established set-ups such as structures, processes, systems, and practises in the parent organisation or business units are enlarged or even broken up[71].

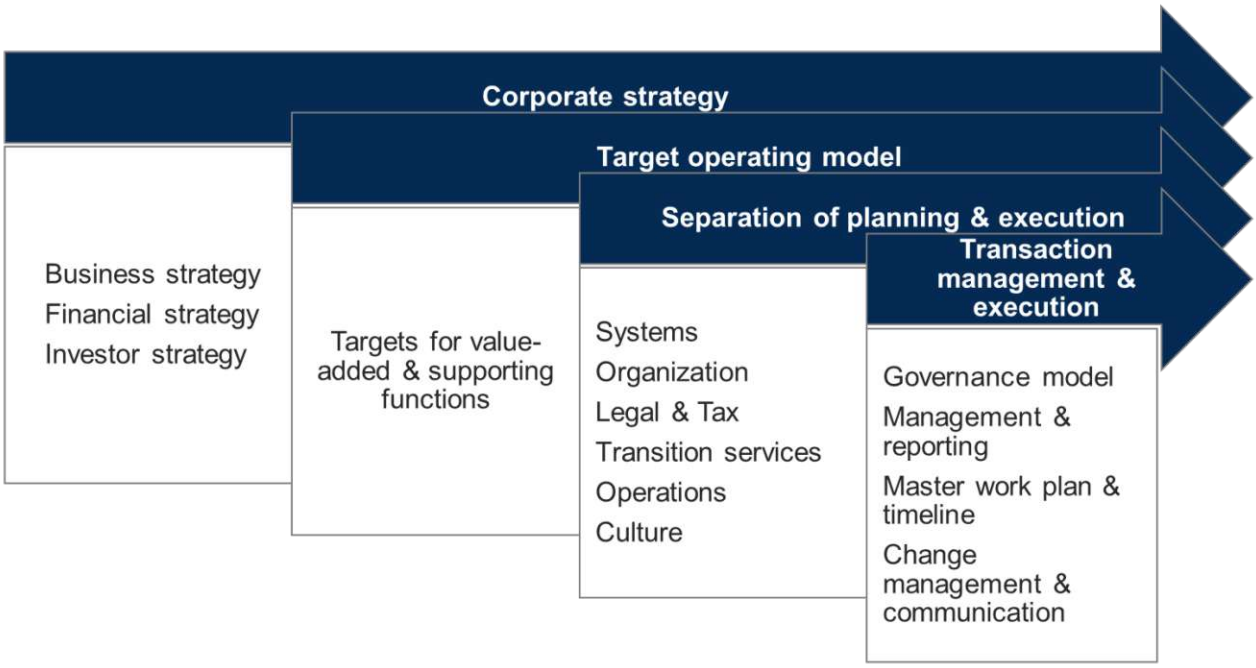

Figure 7: Focus areas for spin-offs[72]

2.6 Advantages

According to Tryc Kitts, a former COO of the National Business Incubation Association, there is a significant relation seen if new ventures are supported by business incubators or not. She claimed that the success rate after five years for businesses that are supported by business

[71] cf. Kotzen et al., 2016

[72] cf. Kotzen et al., 2016

incubators is 87%, whereas the success rate of others is just at 44%[73]. In fact, advantages of corporate business incubation are very broad and difficult to measure with quantitative indicators. In general, however, new ventures that have been supported by business incubators have experienced a higher likelihood to survive on long-term basis, have significant higher revenues and better performance within the job creation[74].

Especially through mentoring services the following advantages for the mentees as well as the parent organisation can be obtained [75].

1. Mentee
    - Improved performance and productivity for the entrepreneurs,
    - Improved knowledge and skills through offered trainings and consultancy,
    - Greater confidence and empowerment that drives job satisfactions and loyalty to the company,
    - Encouragement of positive risk taking,
    - Development of leadership and business administration skills for leading entrepreneurs.
2. Parent Company:
    - Establishment of network and cross-functional collaborations (no silos),
    - Creation of champions that drive new ideas, innovation, and change,
    - Problem solving and solution orientation throughout the company,
    - Entrepreneurial mindset.

Additionally, corporate incubators help companies to develop new innovations by facilitating an environment that promotes an entrepreneurial spirit. The following advantages can be observed[76]:

- Participation of employees into the innovation process,
- Discovery of new value propositions,
- Leverage existing knowledge in the company,
- Expanding perspectives and problem-solving skills,
- Fostering a culture of innovation and change mindset,
- Encourage creativity, out of the box thinking,
- Access to external know-how,
- Diversify company's capabilities and offerings.

[73] cf. Smith

[74] cf. Ayatse et al., 2017, pp.1-17

[75] cf. Pompa, 2013, pp.5-6

[76] cf. Bundl

In general, it can be summarised that the business incubation support cannot only facilitate the entrepreneurial spirit, but also help to develop dynamic capabilities throughout the overall organisation that drive continuous future developments.

2.7 Services

There are various services a corporate incubation team can offer to promote the development of new ventures. Becker and Gassmann (2006) pointed out service categories like branding, networking, consulting, financing, and infrastructure that business incubators are advised to provide[77]. Additionally, Jones et. al (2015) summarised services like financial counselling, network development, office facilities, trainings, mentoring, practical guidance's and business support plan[78]. A summary of a broad range of services is mentioned in Figure 8. The service categories mentoring, networking, business services, funding, and infrastructure, and information technology (IT) were chosen. Business services include the most important services for corporate business incubation, such as business consulting, market research and planning, business plans, feasibility studies, and new venture transfer. The business transfer service[79] covers the transfer of a new created venture into the parent organisation or into a spin-off. In addition, funding services consist of internal and external fundings, financial counselling, general financing and controlling services.

Figure 8: Services for corporate business incubation[80]

[77] cf. Becker & Gassmann, 2006, pp.470-475

[78] cf. Jones et al., 2015, p.409

[79] cf. Tannet-Group. 2018

[80] based on Becker & Gassmann, 2006, p.475 & Jones et al., 2015, p.409

Infrastructure and IT services include everything from information technology hardware and software to separate office spaces where innovation teams can create a physical environment in which to develop new ideas. Silicon Valley, for instance, is the most famous innovation hub for technology firms, where also many companies that are active in the microelectronic industry have an office. Due to the proximity to other tech firms, the innovation activities should be encouraged[81].

2.8 Open innovation

For the business and technology developmental activities, it is highly important to establish mechanisms for new idea collection and generation. A screening through various markets, industries, as well as close interaction with research institutes, innovative companies and individuals is important. Chesbrough was the first researcher who defined the idea of open innovation in 2003. In his publications, he highlighted that companies should not only consider internal sources for innovation activities but also external sources. Customers who are actively using a product or service, or industry experts, for example, may have a different perspective on the problem that needs to be solved. They might propose alternative solutions from a perspective a company has never thought before. Open innovation, therefore, can integrate internal and external ideas into an innovation roadmap that consists of architectures and systems that aim to develop solutions and business models that fulfil customers problems today and in the future[82].

As demonstrated in Figure 9, an open innovation can be an integral part of the companies' innovation pipeline. The innovation pipeline is also orientated on the "Agile-State-Gate-Hybrids" as developed by Cooper in 2016. It shows a technology development process that has a continuous consideration on open innovation and interaction with external and internal sources[83]. Starting with new idea generation, followed by the selection of fruitful ideas can be a part of the open innovation. If the gate for "Go-to-development" is reached, the business incubation process starts with the new venture development. Business acceleration activities are supported to quickly grow businesses to enable a fast time-to-market. If the new venture has matured, the decision to spin-off must be made, for example, if the new venture can be integrated into the parent organisation. Strategic partners, customers, suppliers, industry experts and universities are used as external sources. In addition, market, and technology trends, as well as competitor activities are continuously observed throughout the innovation process and not just when scouting new ideas. Furthermore, also internal competences and activities

[81] cf. Athanasia, 2022

[82] cf. Chesbrough, 2003, pp. 63-65

[83] cf. Cooper & Sommer, 2016, pp. 2-5

through the parent organisation are collected to successfully establish new ventures throughout the innovation pipeline[84].

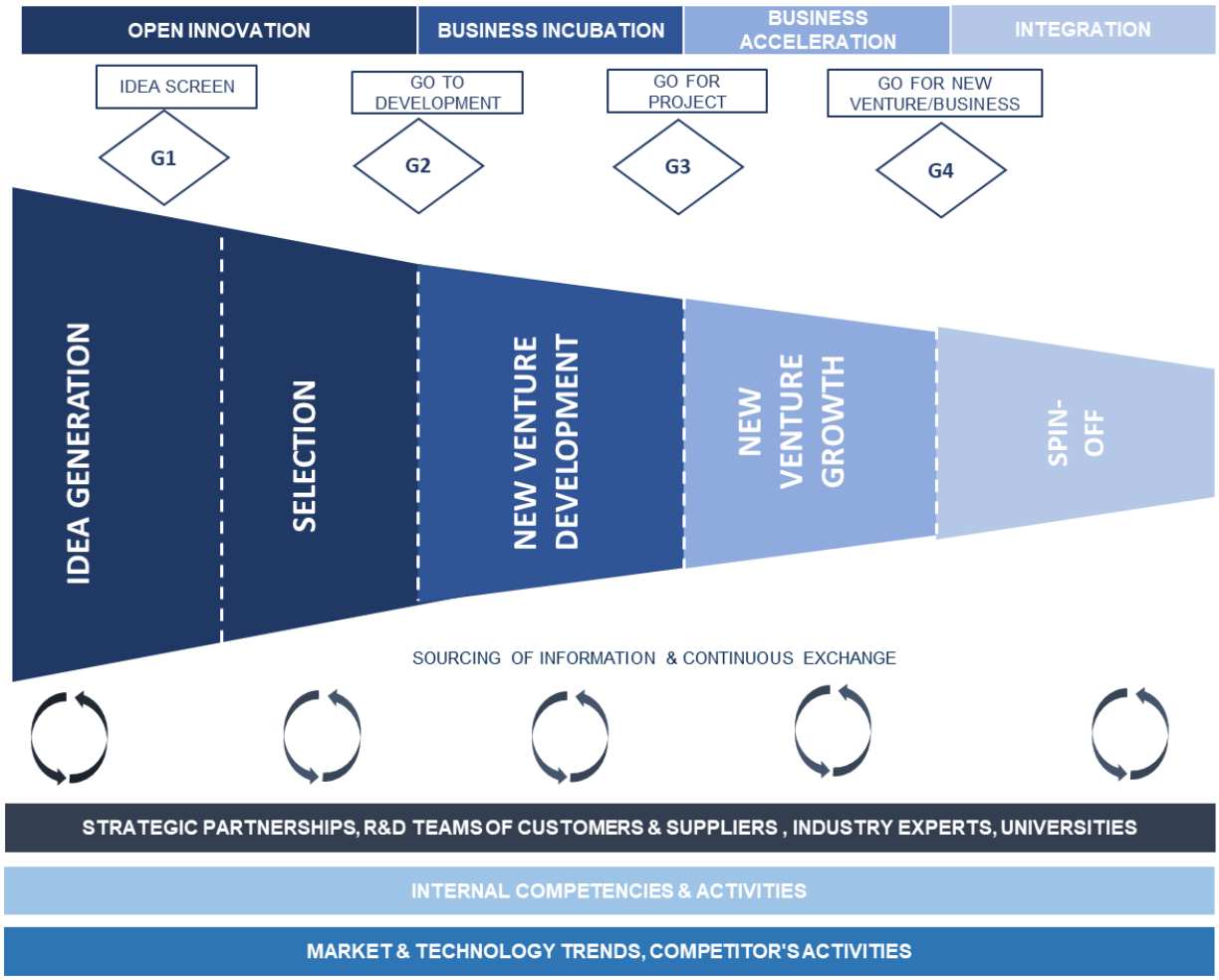

Figure 9: Innovation pipeline - open innovation to spin-off[85]

Business incubators can, therefore, support companies to holistically integrate open innovation into the innovation pipeline. That could be also an attempt to transform a company into an entrepreneurial organisation to keep an open mindset to internal ideas and external development that drive their innovation activities[86]. In addition, Agile-Stage-Gate-Hybrids with continuous exchange cycles between external sources like customer, research and supply chain partners can positively support the integration process of new ventures. Continuous feedback of leading customers to new technologies, support the market acceptance and the solution development to solve problems that customers, their customers or even the whole supply chain

[84] cf. Cooper, 2017, pp. 48-52 & Taleghani et al., 2022

[85] based on Cooper, 2017, pp. 48-52 & Taleghani et al., 2022

[86] cf. Kötting, 2020 pp. 474-499

faces. A few customers can become design partners, beta testers and early adopters[87]. That also strongly supports the establishment and development of new ventures.

2.9 Challenges in today's business environment

There are various macro-economic challenges that the companies are facing today. High inflation rates, climate changes, post-covid impacts, supply chain disruptions, as well as the war in the Ukraine, just to mention a few. In addition, companies will have to face a high number of unknow risks and challenges in the next years[88]. For example, US and European companies are currently concerned that access to their Chinese manufacturers will be completely cut off in the future, so they are aiming to re-shore manufacturing facilities to other countries, including back to Europe or the US[89].

The microelectronic industry offers many opportunities for new innovation in advanced materials, artificial intelligence, internet of things, embedded systems, advanced packaging, miniaturised components just to mention a few [90]. On the one hand, such dynamic developments in the microelectronic industries drive companies for faster development cycles and time-to-market activities that justify resource expenses in innovation activities. On the other hand, such macro-economic developments like disruption in the supply chains or financial crisis as mentioned before, can also harm innovation activities due increasing risk avoidance measures to protect unknow impacts[91].

Macro-economic developments could have a negative impact on the incubation of new ventures within companies. Internal structures, processes and cultures impact the activities as well and need to be managed. There are some challenges that could negatively impact the integration activities[92]. These include:

[87] cf. Kimhi

[88] cf. Feingold, 2023

[89] cf. Vague, 2022

[90] cf. Startups Insight

[91] cf. Kötting, 2020, pp. 474-499

[92] cf. Jablonska

- *Impatient leadership:* New venture creation takes time.
- *Lack of innovation culture:* Innovation is seen to take resources from today's profits.
- *A fear of change:* Companies with long history, might be resistant to new business.
- *Lack of ownership:* No owner of innovation that defends long-term investments.
- *End-to-end processes:* New ideas can be too different and more complex to integrate them in existing process architectures & controlling structures.
- *Inadequate benchmarking:* Ideas must be compared to the problem they solve and not just with an existing product.
- *No innovation ecosystem:* Silo-driven and no bottom-up culture.

There are future challenges that companies might face within the integration of the new venture into the parent organisation. New ventures, for instances, were before "separately managed" with the support of the R&D, technology development and other business incubation teams. Following the successful development, the company's management decides to integrate it into the core organisation as a separate or even in existing business units. Issues will come up, especially if the new ventures are less aligned with the core business, and also if the new business attacks and cannibalise the core business[93].

Dilemma of exploitation versus exploration

Business incubation activities are in close connection with the dilemma of exploitation and exploration in organisations. On the one hand, the companies need to focus on exploitation activities to establish profits and competitive products to survive. Exploration efforts, on the other hand, are strategic and necessary to ensure future success and to remain in the same or a different business for the long term[94]. In addition, exploration, as well as exploitation are aimed to happen in cross-functional set-ups and to drive information within all value-chain functions. Another challenge is to achieve the optimum level of ambidexterity of exploitation and exploration throughout the organization[95].

This chapter provided an overview of some recent literature findings on business incubation and how the function can be used in businesses. The main focus was laid on corporate business incubation that can be an internal function within the core organisation. In order to support new ideas and venture creation, business incubation can play a major role. Companies are frequently too focused on their current day-to-day operations and lose sight of the strategic outlook required to define where and with which services, products, and business models they

[93] cf. Kötting, 2020, pp. 474-499

[94] cf. March, 1992, pp. 71-87

[95] cf. Li-Ying et al., 2008, pp.107-126

can be active in the future. Advantages of business incubation involve increased problem solving skills, mentoring, exchange with external partners, etc. Impatient leadership, fear of change and missing innovation culture are some challenges that companies need to manage to fill their pipeline with future innovations.

If a new venture is developed that has profitable market prospects, the company needs to decide how the spin-off of the new venture should be designed. If the company decides to integrate it in the parent organisation, the integration process needs to be carefully designed and monitored. On a very general level, the integration process confronts the dilemma that all companies face in balancing exploitation and exploration activities. The following chapter elaborates on the main distinction and most recent research findings on how to manage exploitation and exploration concurrently.

3 Organisational ambidexterity

Dynamic business environments, especially in the microelectronics industry require companies to implement simultaneously different styles of strategy. In order to stay successful on a longer period of time, specifically with a production location in Europe, it requires an even more rapid transition over time between the styles[96]. In short, parent organisations are advised to implement both incremental and revolutionary strategies at the same time. Therefore, organisations should be ambidextrous to focus on exploration by the generation of new ideas, while pursuing exploitation on existing businesses, where price competition is driving the market. Industries, particularly in dynamic markets, are rapidly transitioning, with shorter development and product life cycles. Hence, managers are advised to keep the development pipeline filled with new ideas and ventures whilst cannibalising existing businesses with low prosperous market outlooks[97].

Organisational learning, market and technology analysis, technological and cultural changes just to mention a few, are efforts that companies need to take to improve their long-term organisational performance and strengthen their competitive advantages. Such strategies necessitates trade-offs between the simultaneously pursued strategic approaches of exploitation and exploration. The experimentation of new markets, business models and technologies, for instances, requires time, effort, and resources with no short market return expectations[98]. Development cycles in the microelectronic industry can last over several years from the first idea to the establishment of a functioning solution that can be profitably sold to customers. This may necessitate managers today making trade-offs on overall profits in order to invest money in the development of new ideas that may be profit contributors in the future[99]. Exploitation refers to refining and optimising existing competences, processes, business models and technologies. Exploration, in contrast, is focussed on the experiment for new solutions[100].

Especially for technology firms a high focus is always laid on the development of new technologies, processes, and features to create advantages over their competition[101]. Such new technologies, however, can form a baseline, but are not solely contributing to the establishment of a successful business. Thus, the development of patents is just an intermediate step. The exploration direction requires, however, a collaboration between three major areas like market development, technology development including operations and research and development

[96] cf. Reeves et al., 2013

[97] cf. Tushman & O`Reilly, pp. 8-17

[98] cf. March, 1992, pp. 71-87

[99] cf. Huang et al., 2019, pp. 262-276

[100] cf. March, 1992, pp. 71-87

[101] cf. Kassotaki, 2022

(R&D). Therefore, with a simultaneous implementation of both strategic direction societal needs (market pull) and research discoveries (technology push) can be managed[102].

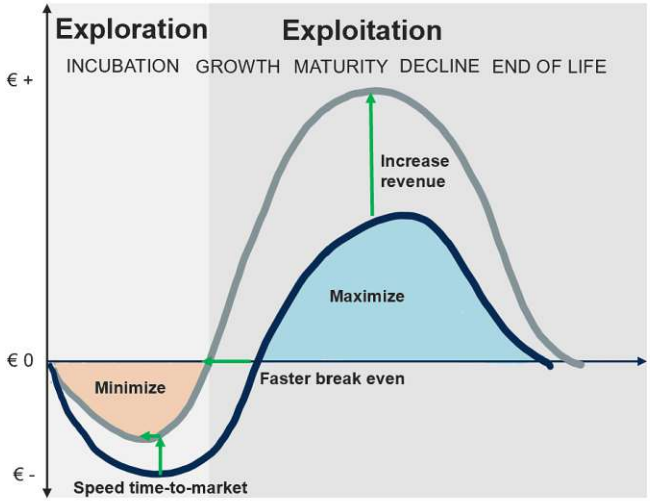

Figure 10: Exploitation and exploration direction in product life cycles[103]

A big challenge for technology-orientated companies is consequently also to focus on technology-based innovations that can be commercialised into successful business models. For example, in electronics manufacturing, the focus on exploitation of a new technology, process, production, and operations, as well as supply chain is advised to be implemented as early as possible in the life cycle to a new venture. The target is to minimise the costs for the development and to speed up the time-to-market as visualised in Figure 10. With an early transition to the exploitation mode, a faster break and higher revenue and profits can be achieved. Early transition is becoming increasingly important in order to manage time-to-market and compete with Asian supplies[104].

Companies are also advised to closely observe the revolutionary technology cycles as demonstrated in Figure 11. The understanding of the cycles can support companies within their forecasting when technologies are entering the markets. Such cycles can represent product innovations and process innovations. In the microelectronic industry, drivers in the direction of miniaturisation, more powerful semiconductors and modularisation can drive the development of new technologies. In order to stay competitive, companies need to participate at the right timing when new technologies are entering the markets that substitute the mature ones over time. Ambidextrous organisations, therefore, need to find a balance with the period of technological

[102] cf. Li et al., 2008, pp. 107-124

[103] based on Cadlog

[104] cf. Cadlog

discontinuity. Such transition is also impacting the integration of new ventures into the parent organisation that already are based on a new emerging technology[105].

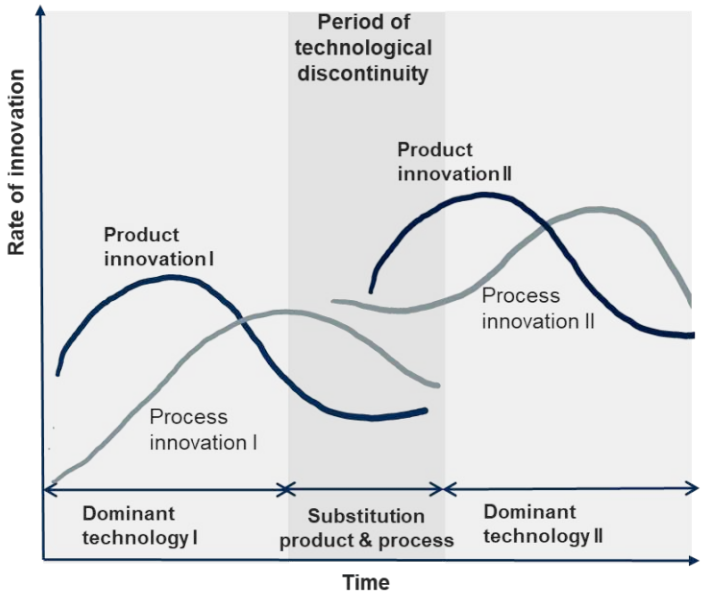

Figure 11: Technology cycles[106]

Among technology and product life cycles, there are a lot of more influential factors that impact the ambidextrous organisational set-up. Environmental dynamics, organisational structures of parent companies, behavioural contexts of diverse team members, as well as leadership styles play an important role. Today research has been done in different fields of organisational learnings, technological innovation, organisational changes, and design, as well as strategic management. Thus, more the balance between exploitation of existing businesses and the exploration of new businesses are investigated in order to find a right recipe to simultaneously manage both paradigms[107].

3.1 Types of ambidexterity

Calvi and Johnsen (2020) differentiated between four types of ambidexterity: structural, contextual, sequential, and managerial ambidexterity as visualised in Figure 12. The differentiation is based on managing styles, practises, structures, and cultural mindsets that parent companies apply to support both directions.

[105] cf. Tushmann, 1997, pp. 14-17

[106] based on Tushmann, 1997, p. 17

[107] cf. March, 1992, pp. 71-87

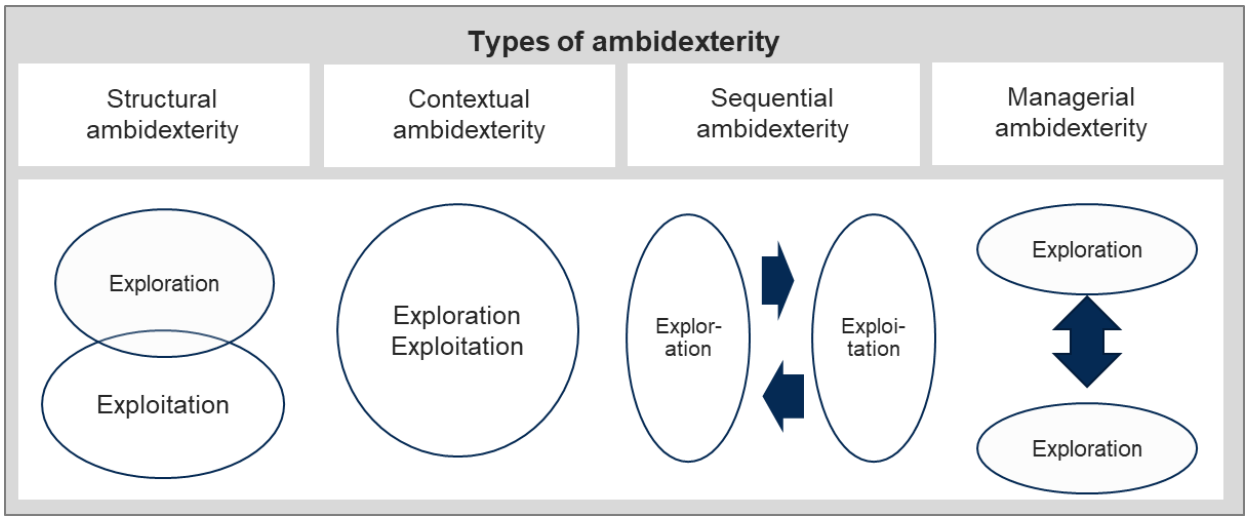

Figure 12: Types of ambidexterity[108]

Below all four types are shortly explained.

3.1.1 Structural ambidexterity

Structural ambidexterity basically deals with the assumption that companies create two different organisational units where one focusses on exploitation and the other one on exploration. This differentiation is also closely orientated on the recommendations of Tushmann & O`Reilly (1996) that suggest a need for structural separation of exploitation and exploration[109].

Nestlé is one example that successfully implemented a structural ambidexterity model. The Nespresso story started more than 30 years ago when the Nestlé's concern started to support the incubation of a new business concept. That concept was very different from what N Nestlé had previously sold on the market, and it revolutionised the coffee world. Still today, Nespresso is a complete separate organisational unit at Nestlé[110]. Figure 13 displays an example for a structural ambidexterity where existing businesses and emerging ventures are broadly separated in the organisation and have their dedicated sub-functions to develop and penetrate the markets in the most market-oriented way[111].

[108] based on Constant et al., 2020, pp. 1-35

[109] cf. Tushmann & O'Reilly, 1996, pp. 14-17

[110] cf. Nestlè

[111] cf. O'Reilly & Tuschman, 2004

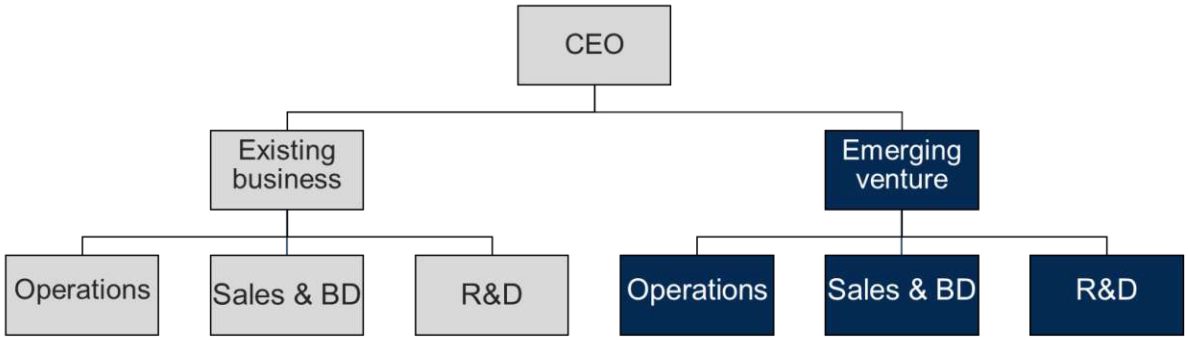

Figure 13: Structural ambidexterity organization example[112]

3.1.2 Contextual ambidexterity

Contextual ambidexterity involves the combination of both exploitation and exploration in the same organisational set-up. Individuals are asked to manage both activities simultaneously in their team. As a result, both coexist, and the individual implementation of exploitation or exploration is context-dependent and depends, for example, on the respective project, problem situation, or related activity[113]. It is also argued that contextual ambidexterity can promote dynamic capabilities within an organisation that support companies to react faster to dynamic market developments. Individuals, for instances, are asked to decide by themselves how to split their time between both directions. The responsibility, therefore, lies mostly with the individual employees. This necessitates a high level of flexibility, personal responsibility, and training for individuals who must be able to apply both directions depending on the needs of the particular situation[114].

3.1.3 Sequential ambidexterity

Sequential ambidexterity considers a sequential change of an exploration and exploitation focus within a business unit for instance. Due to fast changing market conditions such a direction involves structures and processes that focus on exploitation for a longer period. However, if market conditions are changing, like decreasing margins, the organisation needs to switch to an exploration mode. In such organisation, a culture needs to be implemented that can easily switch between exploration and exploitation[115]. However, an extreme focus on exploitation might limit the flexibility of the organisation to switch back to exploration and to react quickly to dynamic developments, like current digitalisation trends for instance. Ongoing technical changes especially in the micro-electronics industry require the stimulation of both directions,

[112] based on O'Reilly &Tuschman, 2004

[113] cf. Constant et al. 2020, pp. 1-35

[114] cf. Raisch et al., 2009, p. 689

[115] cf. O'Reilly & Tuschmann, 2013, pp. 6-8

however, the risk is very high, and companies are not able to switch fast and willing to spend also relevant resources for exploration activities[116].

3.1.4 Managerial ambidexterity

Managerial ambidexterity describes the leadership team orientation towards exploitation and exploration. Depending on different events and timings, leaders have the freedom to stimulate exploitation or exploration. Therefore, leaders can strongly influence the focus on exploitation and/or exploration through their decisions, implementation of structures and processes. Additionally, leaders make trade-offs in their decisions between exploration and exploitations based on what is needed in individual situations[117]. There is a clear difference between contextual ambidexterity that is mainly shaped and implemented by the employees itself in the specific organisational units. Managerial ambidexterity, in contrast, is more related to the individual decision of leaders to allocate resources towards both directions[118]. The risk is always present when managers must choose between both directions at the same time. Resource spendings for exploration might fall to the wayside if a higher focus is placed on stabilising the current business, which is especially the case during crisis or recession periods.

3.2 Exploration

An explorative strategic direction requires a strong focus on the generation of new ideas that can be profitably sold on the market. Such exploration involves the experimentation of new markets, business models and technologies[119]. The target is also to fill the innovation pipeline with new ideas and opportunities that can be transferred to successful ventures. Open innovation, business incubation and acceleration are some support activities to promote the exploration approach[120]. Furthermore, structural ambidexterity and innovative climates have a high influence on the exploration of new ideas. Internal entrepreneurial environments are required that support risk taking, creativity and the development of new creative concepts and technologies[121].

[116] cf. Nölleke-Przybylskia, et al., 2019, pp. 20-21

[117] cf. Raisch, et al. 2009, p. 689

[118] cf. Constant, et al. 2020, pp. 4-5

[119] cf. March, 1992, pp. 71-87

[120] cf. Cooper, 2017, pp. 48-52

[121] cf. De Visser, et al., 2010, pp. 291-299

Characteristics	Exploration
Strategic direction	Innovation, growth, long-term success
Critical tasks	Adaptability, new technologies, products, services, scouting for new markets, business models, radical innovation
Competence	Entrepreneurial, open mind-set, creativity, critical thinking
Structure	Adaptative, loose, flat organisation
Controls & rewards	Milestones, qualitative
Culture	Risk taking, flexibility, experiments, higher error tolerance
Leadership role	Visionary, involved, participation

Table 3: Exploration characteristics[122]

In explorative organisational units as summarized in Table 3, structures are more loose and controls depend more on milestones than on quantitative targets. Besides, the culture is more characterised by risk taking, high flexibility and focus on experimentation. The leadership role of the organisational unit is more focussed on visions and shows appreciation of the development results. Moreover, a leader that focus highly on exploration is highly involved in the exploration of new ideas and innovations and follows a more visionary leadership style[123].

Open innovations, research projects and strategic partnerships with supply chain partners are some external explorative sources. Open innovation is playing a key role especially in high technology fields to develop solutions that solve current and future challenges[124]. According to the platform openinnovaton.eu[125], there are more than 70 published methods for open innovations that companies can apply. Besides, the platform is working as an open space and stimulates the exchange of knowledge between academia, practitioners, and other users. Such open innovation platforms can support companies' exploration activities.

In the microelectronic industry, it is also very common to establish research projects or even closer strategic partnerships with supply chain partners to jointly develop technical solutions. Such collaboration is focussed to test new use cases in target application fields (e.g., electric powertrain) and define standards for future products. In course of such research initiatives, fruitful solutions with unique selling points can be established. However, such explorative tasks also require resources and time. Furthermore, not all research projects may have a positive impact on the company's results in the future. Many of them fail because, for example, products are over-engineered, and no market is emerging in which such innovations are a technological

[122] cf. O'Reilly & Tuschman, 2004

[123] cf. O'Reilly & Tuschman, 2004

[124] cf. Bogers, et al., 2018, pp. 5-16

[125] cf. Openinnovation.eu

breakthrough and can be sold profitably[126]. Companies in the microelectronics focus their explorative activities currently on some of the following five main trends[127]:

- *Energy efficient chips*: The target is to reduce overall energy consumption.
- *Power semiconductors:* The target is to improve reliability and establish solutions for smart appliances.
- *Smart sensors:* The target is to improve performance and accuracy.
- *Advanced optical equipment:* The target is to develop more efficient technologies for chip manufacturing.
- *Compound materials:* The target is to develop new materials and devices suitable for more advanced chips.

Companies that are active in the microelectronic industry or new players are advised to spend explorative efforts in that areas in order to ensure their long-term competitiveness.

3.3 Exploitation

Exploitation as strategic direction focusses on the refinement of existing products, process, technologies, knowledge, and capabilities in general[128]. Efficiency, productivity, and timing are priority to optimise current products and services. Exploitation is mainly focussed on incremental learning and uses internal sources for that[129]. Thus, the strategic direction is focussed on costs and profit. Critical tasks are done by operations with a focus on efficiency and productivity. The cultural set-up is driven by efficiency, low risks, improved quality, and high level of customer satisfaction as shown in Table 4. Leadership styles are highly authoritative and top down with clear quantitative targets and guidelines[130].

Especially for the dynamic market development in the microelectronics industry, a new technology, service, or business model will face soon competition from other companies` products and services. If the demand over time increases for a certain product, then also more competitors appear. Such events drive companies to make their solutions even more efficient, innovate processes and reduce costs. The market dynamics will continue until a mature market set-up has been established, in which the most cost-efficient companies dominate the market

[126] cf. IPCEI, 2022

[127] cf. IPCEI, 2022

[128] cf. Sinsha, 2015

[129] cf. March, 1992, pp. 71-87

[130] cf. O'Reilly &Tuschman, 2004

or until a new service or product solution has reshaped the market again. Then the exploitation focus will begin[131].

Characteristics	Exploitation
Strategic direction	Cost, profitability, cash generation, short-term success
Critical tasks	Operations, efficiency, productivity, quality, process documentation, incremental innovation
Competence	Operations, accuracy, continuous improvement
Structure	Formal, strong hierarchy, defined responsibilities and scope of work
Controls & rewards	Margins, profitability, quantitative KPIs
Culture	Efficiency, low risk, zero-defect culture, customer satisfaction
Leadership role	Top down, authoritative, clear guidelines

Table 4: Exploration characteristics[132]

Exploitation activities operate mainly within the boundaries of the triangle shown in Figure 14[133]:

- **Quality:** Product/service/solution that will be sold in order to satisfy the customers' needs.
- **Cost:** In order to keep the margins to the optimum, intense efforts are done to keep costs low and to manage a high level of efficiency and productivity.
- **Time:** Faster deliveries of solutions can have a positive impact on customer satisfaction, internal costs, and utilisation of resources.
- **Scope:** In order to fulfil the customers satisfaction, all efficiency efforts are advised to not harm the quality level of the offered solution. With new features the customers satisfaction and margins might be even increased.

[131] cf. Tushman & O'Reilly, pp. 16-17

[132] cf. O'Reilly & Tuschman, 2004

[133] cf. Rudder et al., 2023

Figure 14: Triangle for exploitation activities[134]

The exploitation direction is characterised by a high number of KPIs that are frequently measured and compared. KPIs are measuring the financing, operations, sales, production, and other perspectives of the service provision of an organisation. Among main financial KPIs like profit and margin, on-time-delivery, efficiency, scrap rate, machine down-time rate, customer return rate are also measured in production companies that are operating in the microelectronic industry. All KPIs support to improve the efficiency of the service provision[135]. Hence, the exploitation direction is essential to manage the current profitability of the offered solutions.

3.4 Transition process

Considering structural ambidexterity, it is recommended to establish a separation between exploitation and exploration direction in the organisation on a macro-level. Business units in the parent organisation are mostly specialised in the exploitation activities in order to manage the company's profitability and short-term competitiveness. On the one hand, support functions are mostly used to support the provision and promotion of the business that is responsible for companies' sales today. On the other hand, there are separated organisational units with own departments, own functions that are even located at different locations focussing on exploration activities. These organisational units focus on idea generation, practise open innovation and have close exchanges with research partners. The target is to generate new ideas that can be formed in new ventures with the help of business incubation and acceleration activities. At one point, however, the company needs to decide if a new venture will be integrated into the parent organisation or if a spin-off outside the company's borders will be established[136].

[134] cf. Rudder et al., 2023

[135] cf. Drew, 2022

[136] cf. Hansen et al., 2018, pp. 484-508

New separate spin-offs, for example, are typically discovered when the new venture's service and product portfolio differs significantly from that of the core organisation[137].

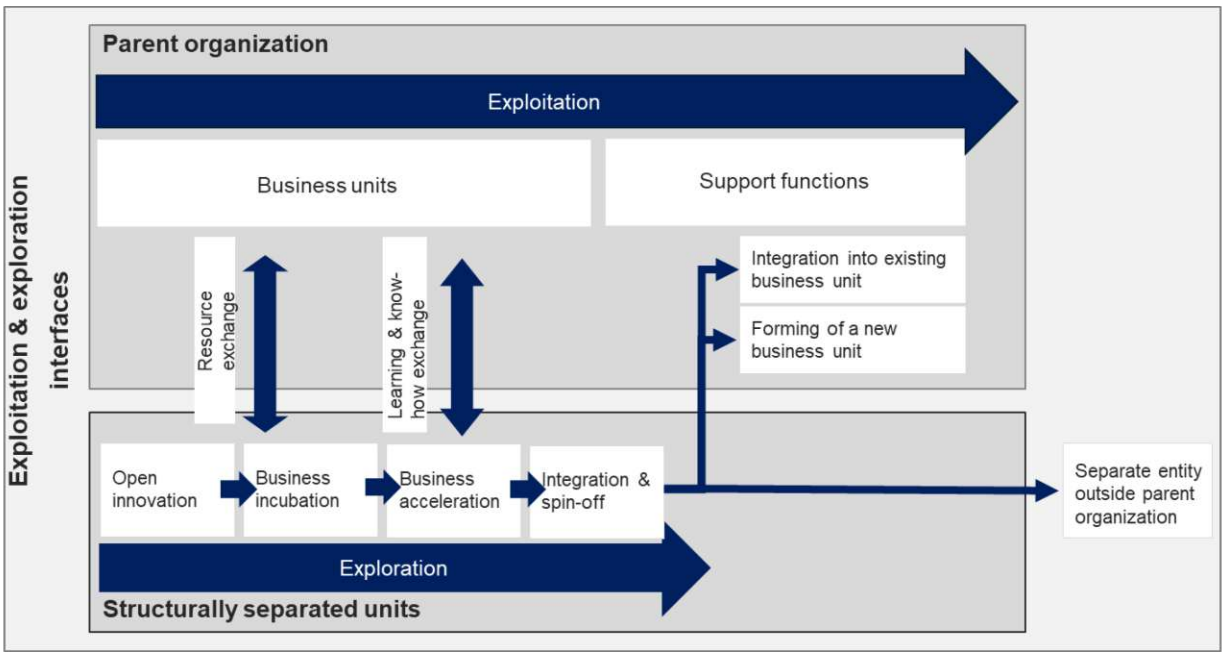

Figure 15: Exploitation and exploration interfaces[138]

If a company decides to separate the two paradigms in the organisation that demands a integration of new ventures to a later period in the innovation life cycle as shown in Figure 15. Such an integration can be accompanied by many challenges. In course of research activities and the innovation life cycle of a new product, there can be several touchpoints to exchange resources, know-how and learnings[139]. In the microelectronic industry, it is common to use production resources (e.g. machines, experienced process engineers) for new technology experiments while running normal series production. In such a case, there has to be a trade-off made by the exploitation team that is driven by very strict KPIs to provide free capacities for the technology experiments[140]. Therefore, some involved engineers are also asked to practice a form of contextual ambidexterity.

If a new venture, for instance, shows market acceptance, and is technically feasible and has a profitable market potential, the parent organisation can decide to integrate it in the core organisation and into any existing business unit as a new service and/or product portfolio or establish an own business unit[141].

[137] cf. Dreischmeier et al., 2021

[138] based on Hansen, 2018, p. 496

[139] cf. O'Reilly & Tuschmann, 2013, pp. 6-8

[140] cf. National Instruments Corporation, 2023

[141] cf. Hansen et al., 2018, pp. 484-508

3.4.1 Challenges

If the decision is made for an integration, the integration process into the parent organisation needs to be started. This mostly involves difficulties and challenges. The right timing for the handover of a new venture into the exploitation mode is very important. Additionally, missing commitments of the business units cause resistance of the parent organisation that is specialised on exploitation. Another risk is that the organisation underestimates the resource needs that are required to support the transition process of the new venture in the parent organisation. Moreover, the risk of falling back into old habits and working modes that were practiced for the mature business is high, which are contra-productive for the new ventures[142]. New incubated business models might require different structures, processes, cultures, mindsets and working styles of involved individuals. Such change is a big hurdle that needs to be managed in order to enable a successful transition[143].

Another challenge is to manage the balance of the integration process and the ongoing future explorative activities. On the one side, the integration process of a new venture requires resources. But on the other hand, a team in the explorative functional units need to be continuously developing new solution that at a later point can be integrated as well. The risk is also that responsibilities are unclear, necessitating an excessive amount of time and effort from the exploratory teams that support the transition. Therefore, the biggest challenge is to manage exploitation and exploration simultaneously and apply trade-offs where necessary during the transition[144]. Nonetheless, with a transition process, the basic direction of both practices should not be jeopardized, and clear ownership roles should be defined. When a whole exploration team is just focussed on the integration of “one new venture” for a very long period, it has no time to really perform additional exploration practices to generate further ideas for potential new ventures[145].

3.4.2 Success factors

Success factors in general can consists out of various variables that all together contribute to a “successful” outcome of some endeavour. Critical success factors, for instance, are the smallest properties of a company that a company needs to manage properly in order to be successful. Leadership, strategy, employee focus, resource implementation, processes, customer satisfaction are some variables that are aligned with the company’s vision, mission, strategic and operative goals. The number of critical success factors are recommended to just

[142] cf. Chen & Kannan-Narisimhan, 2019,pp. 30-33

[143] cf. O’Connor & DeMartino, 2006, p. 494

[144] cf. Hansen et al., 2018, pp. 484-508

[145] cf. O’Connor & DeMartino, 2006, p. 494

constitute of a number of managerial variables that are put in the forefront of each endeavour[146]. Skilful teams, adequate resources, financial and top management support, the recognition of a certain endeavour of stakeholders, information sharing and communication, customer support and the establishment of success measurement methods can be some variables[147]. Moreover, for the integration process of new ventures it is recommended to also list down some relevant success factors that companies carefully focus on and put in the centre of their decisions.

Hansen et. al (2018) divided the transition process into three phases: linkage in early phases, the transfer, and after the transfer. All of these phases face challenges and involve potential success factors, which managers need to carefully consider[148]. The phases are:[149]

1. Linkages in early phases
    - *Market and product innovation:* A new venture can be more than just a new technology development and needs dedicated focus of cross-functional team members for exploration of new markets and technologies.
    - *Internal showcasing:* Communication of new innovation to individual employees in the parent organisation.
    - *External validations:* Externally test a new innovation with lead customers.
    - *Time and resource for incubation and acceleration:* Plan enough time and resources not just only for innovation discovery, but also for incubation and acceleration activities[150].
    - *Innovation friendly environment:* Exploration requires time, space for new ideas and psychological safety[151] to take risks.
    - *Transparent assessment criteria:* It assess not just technology feasibility, but also ability to replicate process for manufacturing in an efficient manner, to generate competitive costs and production of a set of qualified customers that want to actually buy the product.
    - *Quality and technical requirements:* Study and consider the requirements of the new business field, especially important in the high complex microelectronics segment[152].
    - *Great market and technology potential on overall market.*

[146] cf. Noè, 2014, pp. 39-65

[147] cf. Tuan, 2020, p. 5

[148] cf. Hansen et al., 2018, pp. 484-508

[149] cf. Hansen et al., 2018, pp. 484-508

[150] cf. O'Connor & DeMartino, 2006, p. 495

[151] cf. Gallo, 2023

[152] cf. Vyrian, 2023

2. Transfer
   - Know-how transfer: The integration process is a transition that needs time and resources for know-how sharing.
   - Proven market potential: Consider not an too early transfer when the new venture is not market proven.
   - Integration framework: Standardised process with project milestones and performance indicators to hold both business units and exploration team accountable[153].
   - Responsibilities for integration process: Defined and agreed roles and responsibilities with top management.
   - Pre-defined scope of new venture: Balance between must have for new venture and trade-offs that are not required for commercialisation.
3. After transfer
   - Sustain structural ambidexterity: Continue product diversification in exploration team and not put all resources to exploitation mode.
   - Definition of measures for re-organisation: Including change of formal structures, routines, culture, people management and resource allocation.
   - Manage capability mutation: New hires, one-to-one replacement of staff, re-organisation, know-how transfer.

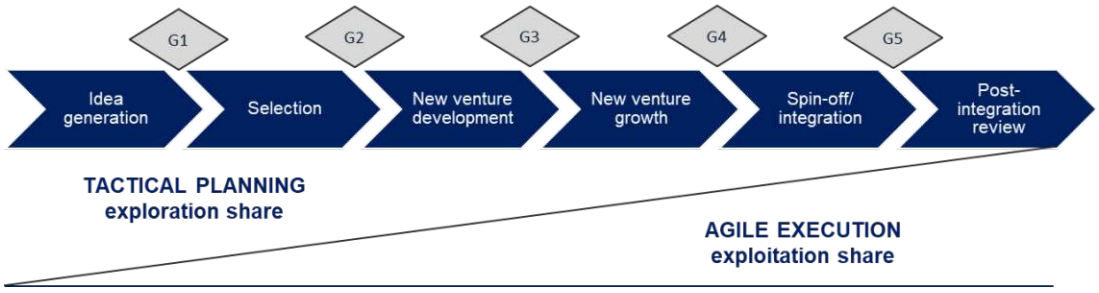

Figure 16: Stage gate process [154]

In addition, Chen and Kannan-Narisimhan (2019) developed a structure based on the timing for the involvement of the business units in the creation of the new venture unit. These include early-stage involvement, mid-stage involvement and late-stage involvement. If business units are involved early, they are more likely to share higher ownership of a new venture than with a late involvement. In return, however, an early involvement also requires higher resource and coordination efforts. A late-stage involvement will be also selected if the services or product

[153] cf. Chen & Kannan-Narisimhan, 2019 pp. 30-33

[154] based on Copper & Sommer, 2018, p.19

offerings of the new venture is very different from the core competences of the existing business units and would also cannibalise some of their current business[155].

Moreover, Copper and Sommer (2018) pointed out that also manufacturing industries are required to use agile stage gate process to evaluate and develop new innovations. Dynamic market developments require flexible stage gate process with screenings and close customer interaction. A hybrid model could integrate the elements from exploitation and exploration and help companies to deal with the balancing of both directions. Tactical planning is most important in early stages followed by a continuous importance of agile execution. Stages for this planning include ideation, conception, business case and development phase that mainly represent exploration approaches but having clear checklists after each stage that needs to be completed. The integration mostly starts by the testing phase and then launching into the organisation as visualised in Figure 16. Increased flexibility, productivity, communication, and coordination between the departments, as well as better focus and ownership of the departments were benefits of analysed case studies that have implemented a hybrid model. Using a hybrid model, contributed to a reduction of 30% in time-to-market at Danfoss, when compared with previous ventures [156]. Thus, the creation of an integration framework involving a stage gate process can also be a success factor that needs to be in place that an integration process is successful.

3.5 Cultural dimensions

Globally, we can observe many diverse cultures. Culture itself can be seen as a very large complex as a whole. Beliefs, arts, moral, law, custom, knowledge, experience and also religion among many other characteristics and habits can be all summed up under the term of culture[157]. Individuals, for instance, have acquired their unique culture as a member of their society or even within a company. Moreover, culture can be learned through the interaction with others, and can be acquired from our families and reflect how individuals think, feel and act[158]. Geert Hofstede analysed the difference of cultures through his work in the last decades. He underlined that cultures can be described by their different values that emerged over the time. Hence, such values keep unique cultures together but differ from other cultures[159]. In course of the industrialisation of the technologies into separate plants where different cultures and other mindsets emerged over the last years, some conflicts might occur due to the clash of

[155] cf. Chen & Kannan-Narisimhan, 2019, pp. 27-47

[156] cf. Copper & Sommer, 2018, pp.17-26

[157] cf. Tylor, 1920, pp. 1-10

[158] cf. Harris & Johnson, 1987, pp. 10-15

[159] cf. Hofstede, 2001, p. 25

different cultures. A high focus on intercultural or also cross-cultural management within a company is required if colleagues from diverse cultures are working together. In the microelectronic industry, for instance, many different cultures are involved. Especially, Chinese, and other Asian players were heavily investing in the microelectronics industry in the past and have set-up high quality and very automated production facility that compete with AT&S.

Hofstede's dimensions of culture provide valuable knowledge about cross-cultural relationships that help to identify the values, beliefs and practices of individuals belonging to a certain culture. He created six dimensions that serve as a model of how cultural behaviour can be characterised. The six dimensions he described are[160]:

- Individualism versus collectivism
- Power distance
- Masculinity versus femininity
- Uncertainty avoidance
- Long term versus short term orientation
- Indulgence

Austria and China have a quite different ranking in the areas of power distances, individualism and uncertainty avoidance, long-term orientation, and indulgence. China is described to be a power distance country, whereas Austria has a low power distant society and prefers a high level of consultation between superiors and subordinates. China has a low level of uncertainty avoidance, whereas Austria's shows a high uncertainty avoidance. Similarly, Taiwan also shows a high uncertainty avoidance level than the mainland China. Furthermore, Americans are very short-term oriented compared to China that scores with a very high long-term orientation. Although companies widely use Hofstede's dimensions, they only provide general information about the characterisation of cultures and the information that was collected in 2010 where a lot of developments were passed that already had an impact on the parameters[161].

Especially, in an intercultural environment, it is important to also consider the culture and diversity in the transition process, remarkably with different plants and diverse teams. It is also advised to learn about the basic personality traits and cultural differences of the team members. As Hofstede found out in his investigations, individuals from a Chinese society, for example, have different motivators than Austrians. It is assumed that these differences need to be considered to prevent and/or also to successfully address conflicts that can harm the integration process.

[160] cf. Hofstede-Insights

[161] cf. Hofstede-Insights

3.6 Dynamic capabilities

Furthermore, ambidextrous organisation structures as explained before also require a management of dynamic capabilities to establish a smoother transition process[162]. Teece et al. (1997) outlined dynamic capabilities as companies' ability to integrate, develop and reconfigure internal, as well as external capabilities. Such ability is required to be able to react to dynamic market developments in a timely manner. With the development, companies can prevent stacking and depending on internal paths that make them inflexible[163]. Dynamic capabilities should give companies the opportunity to develop innovative ideas and competitive advantages on a long-term basis. With a high focus on the resource allocation and development of dynamic capabilities, continuous technological, as well as market innovations can be established, which can ensure the company's long-term success[164]. The three main areas for dynamic capabilities are sensing, seizing, and reconfiguring or also transforming as outlined in Figure 17. Companies should apply a dynamic capability framework in order to direct their financial resources that are consistent with the market needs. In particular, these needs include sensing with the identification of opportunities by market and technology screening. It requires a continuous sensibility to the macro and micro economic development and to observe and utilise latest market developments. Seizing is more focussed to structure, design and refine internal processes to establish a successful business model[165]. It is strongly related with sensing as it takes over from sensing activities, to industrialise new products, processes, services, or combination of new alternatives. Moreover, resource allocation based on internal priorities is required [166]. Sensing is represented by exploration direction, whereas seizing is represented in the seizing direction that is more targeted towards productivity and efficiency of internal processes and structures[167].

[162] cf. O'Connor & DeMartino, 2006 p. 495

[163] cf. Teece et al., 1997, pp. 509-533

[164] cf. Zhou et al. 2017, pp. 731 - 747

[165] cf. Teece, 2007, pp. 1319 – 1350

[166] cf. Ellström et al., pp. 272-296

[167] cf. March, 1992, pp. 71-87

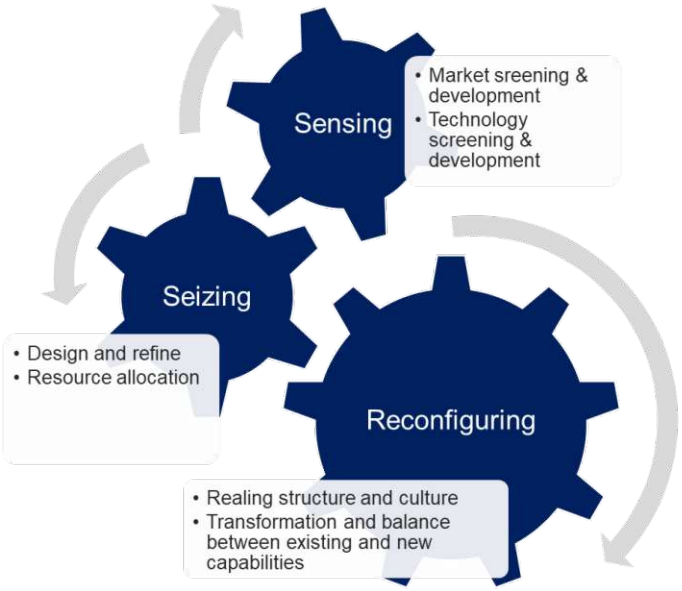

Figure 17: Dynamic capabilities[168]

Lastly, reconfiguring or transforming deals with the re-alignment of structures and cultures in the company. It is focussed to keep the balance between existing capabilities and the learning and development of new capabilities. The target of reconfiguring is to maintain companies' competitiveness to enhance, combine, protect, or completely develop new intangible and tangible assets. The challenge behind the reconfiguring ability is to be flexible to transform to new businesses and to support the current capabilities with required exploitation activities[169]. Especially, the ability of reconfiguration is very important to integrate a new venture into the core organisation of a new or existing business unit. Therefore, the important role of that ability is related to the transformation of existing resources to be able to cope with new strategies, technologies, and market developments[170]. The course of the changing of routines, working styles and organisation structures can also be very risky and needs to be properly addressed and managed[171].

Figure 18 summarises main capabilities of companies that are recommended to develop in their organisations in order to be prepared for any transformational undertakings[172]. Transformation moves are mainly targeted to boost the overall performance of the company by improving current value-added services or by entering new profitable markets. Most of them also involve digital transformation to restructure processes and make them more automized and

[168] based on Teece, 2017, pp. 40-49

[169] cf. Teece, et al. 1997, pp. 509-533

[170] cf. Ellström, 2021, pp. 272-296

[171] cf. Teece, 2007, pp. 1319-1350

[172] cf. Lukito et al., 2022, pp. 1-20

efficient. Transformations are also initiated to react to external challenges, industry discontinuities or any other macroeconomic developments like price pressure from Asian markets in the microelectronic industry[173].

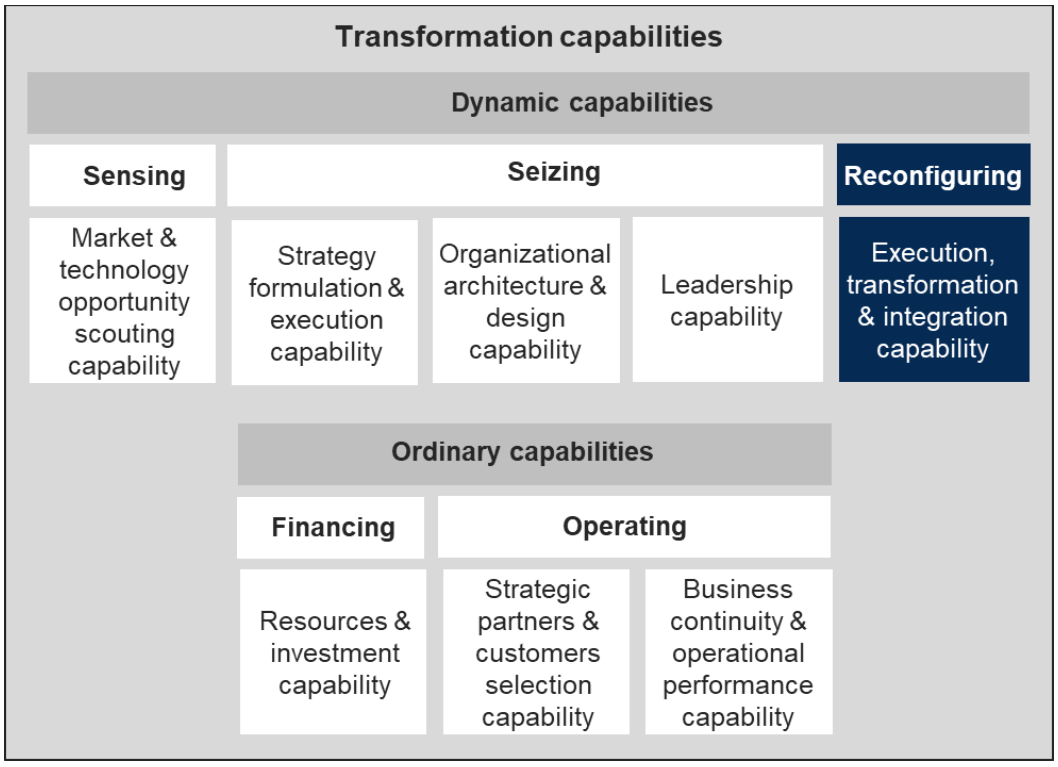

Figure 18: Transformation capabilities[174]

Such transformation capabilities can be structured in ordinary capabilities and dynamic capabilities, whereas financing and operating are considered to be ordinary capabilities. Ordinary capabilities involve main supportive and management expertise, structures, and process. Resource allocation and investment is a capability that needs to be managed out of the financial area. Strategic partners, customer selections, as well as business continuity are main operating capabilities. Market and technology scouting and opportunity detections are main capabilities out of the sensing. Strategy formulation and execution, organisational architecture, and design, as well as leadership belong to seizing. Execution assurance, transformation and integration of new businesses can be structured under the reconfiguring capability. An execution assurance capability requires the leadership team to prepare the organisation and the people so that a new technology can be implemented to monitor the daily execution with high management awareness. Close relationships to customers, partners, research partners for fast reaction and knowledge acquisition are considered in the reconfiguring capabilities that drive a faster transformation and integration of new businesses into the parent organisation[175].

[173] cf. McKinsey & Company, 2023

[174] based on Lukito et al., 2022 p.16

[175] cf. Lukito et al., 2022, pp. 1-20

In this chapter, main characteristics of organisational ambidexterity were highlighted. Types of ambidexterity were explained, and their benefits and challenges were elaborated. Especially structural ambidexterity is one set-up that is nowadays practiced by a lot of companies, especially technology companies that invest a lot of money and resources to develop new technologies and business models to ensure their long-term competitiveness. Structural ambidexterity, however, not just brings benefits for the company, but also involves challenges like the integration of new ventures that were developed in the exploration-focussed functional units. Such an integration involves many challenges such as selecting the right timing for the integration, sufficient resources and recruiting talented employees. Potential resistance in the core organisation should be overcome and the commitment of the new exploitive business unit needs to be established in order to successfully grow a new venture to a long-term profitable business.

Such a transition process needs to be properly designed and supported also by the management team in order to enable a smooth transfer. It is also important to keep the explorative functions equipped with sufficient resources to fill the innovation pipeline with further new ideas. The definition of success factors before, during and after the transition are recommended that are closely monitored by the persons in charge for the transition. Also, stage gate processes with milestones and decision gates are used already by many companies to streamline the new venture creation processes within a company. Lastly, the focus on ordinary and dynamic capabilities supports companies to be more flexible to adapt to transformation undertakings.

Further, cultural perspectives and traits between different cultures like China and Austria should be considered.

In order to investigate success factors of such integration approaches in the microelectronic industry, the following chapters are aimed to give insights in the qualitative research that was conducted in course of this master thesis.

4 Methodology

This chapter explains the empirical part of the thesis. The research objectives, research limitations, method selection, and a full explanation of the qualitative research strategy are all detailed. Besides, the research instruments, the research sample and the evaluation methods are presented.

4.1 Aims of the research

The aim of the research applied in this thesis is to collect relevant information on the success factors of corporate business incubation. In detail, the experiments should answer the defined research questions. It should also provide recommendations to AT&S and companies in the microelectronics industry on relevant elements that can be considered in the integration process of new ventures.

4.2 Limitation of the research

The empirical research is applied on lessons learned and individual experiences of integration cases within AT&S history. The findings are complemented with relevant information from of the literature research. The research is focussed on the performance of AT&S as only internal documentations and the results of interviews were considered. The empirical part, therefore, does not take other companies into account. By this approach, the author aims to generate categories and focus areas that are relevant to successfully integrate new businesses. No quantitative research is applied to generalise the findings throughout the whole microelectronic industry.

4.3 Selection of the method

Research must be divided into secondary and primary research or desk and field research. On the one hand, for the desk research already existing data is collected and analysed to solve a certain problem. Such desk research is based on a high number of primary research data that was already generated by other researchers. On the other hand, by conducting a field research, new data is collected by surveys (e.g. field survey, panels, interviews, group discussions) or observations are made. Additionally, field research can be divided into quantitative and qualitative research. The quantitative research aims to collect data in terms of standardised methods and the sample is representative for a certain population. The qualitative research, however, involves the collection of data to develop an understanding about a certain topic. Besides, the research process is more flexible and involves open-ended questions that

intend to generate as much information as possible. Hereby, interviews also with individuals and focus groups or case study analysis can be differentiated[176].

A secondary research approach was used to collect information on the areas of business incubation, structural ambidexterity, and the integration process itself. Based on the secondary research, the author decided to conduct a primary research with the help of a qualitative research method. As no specific evaluation of business incubation success or even the integration of new ventures were available at AT&S or any other company in the microelectronic industry, qualitative research was chosen over a quantitative one.

Qualitative research focusses more on the perspectives of the insiders and uses interpretative frameworks to study both the physical and human phenomena. Additionally, qualitative research is characterised to be acting in the context of complex social interaction and, therefore, the research design needs to be open to change during the investigation process. A wide range of historical events, personal experience, tradition, individual reasoning, and authority are source of knowledge that are targeted to be collected in a qualitative research process[177].

4.3.1 Qualitative research

The methodological approach is based on the framework of inductive research developed by Goia et al. (2012)[178]. The framework is built on a case-study-based research design and involves an interpretive approach to explore as much as possible information on a certain case. By continuous data generation, analysation and comparison on a certain case, the research targets to develop a final emergent model as also used within the grounded theory approach[179]. Figure 19 displays the main steps conducted for this research. Qualitative research by Goia et al. (2012) complemented by main structural elements of the grounded theory was used as the framework. The methodological approach starts with the definition of the research questions, followed by the sampling of cases and the recruiting of interviews. The data collection is done by a literature search, followed by analysing internal cases for the integration and by conducting interviews to the cases. After the collection of the data, the data evaluation is done. Therefore, first order concepts were created out of the received data. As a next step, second order themes were developed and structured in themes. The dimensions which formed the model of success factors or theory have been aggregated as part of the themes in subsequent steps[180].

[176] cf. Magerhaus, 2016, pp. 63-95

[177] cf. Glaser & Strauss, 2005, pp. 12-13

[178] cf. Goia et al., 2012, pp. 15-31

[179] cf. Nag et al., 2007, p. 1

[180] cf. Goia et al, 2012, pp. 15-31

Throughout the process, the methodology was aimed to apply a theoretical sampling to develop theoretical dimensions that finally present the success factors for the integration of new ventures[181].

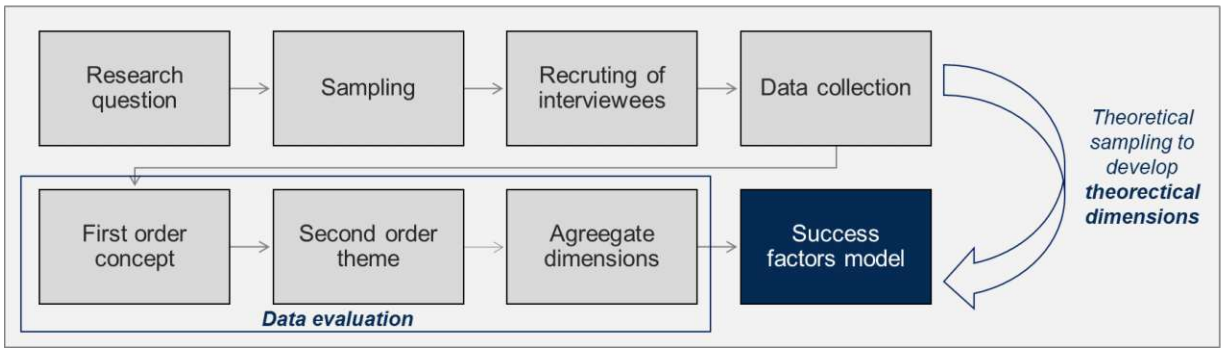

Figure 19: Data structure based on the Goia et al. methodology[182]

4.3.2 Related methodologies

The applied qualitative methodology is closely linked to the grounded theory approach that was firstly developed by Glaser and Strauss (1976) and focusses on generating a theory by the application of a continuous comparative analysis. In detail, the grounded theory is an inductive theory discovery methodology that allows the researcher to develop a theory based on empirical observations and the collection of data[183]. This theory is designed to make the results understandable by everyone, for researchers and sociologists as well as those who have not participated in the research process. In a company, the theory should be easy to apply for experts, as well as for every other employee. Besides, the methodology involves an inductive approach showing how data is collected. The way in which data is created is therefore very important for the output of a theory. As information of the integration process of new ventures has not been documented before, no deductive approach by deriving hypotheses can be applied in the first step[184].

There are some other theories and methodologies for the application of a qualitative research that emerged over the past years. In the German speaking area, the qualitative content analysis advanced by Philipp Mayring is widely used for the inductive development of a theory. The basic characteristics are orientation at categories, interpretative systematic and role-based process, and inclusion of latent meanings. A special focus is also laid on the quality criterion

[181] cf. Charmaz, 2014, p. 120

[182] based on Goia et al, 2012 & Manke, 2022, p. 39 & Charmaz, 2014, p. 120

[183] cf. Glaser & Strauss, 1967, pp. 2-4

[184] cf. Glaser & Strauss, 2005, pp. 12-13

reliability (analysis of the right area to solve the problem but using the appropriate questions and defining the correct scope) and validity (focus on the consistency of the data)[185].

Case study research is another qualitative research practice applied to investigate the complex interaction process between individuals in an organisation. Such a research method is focused on investigating a certain case in very detail, whereas others might just touch the surface of a topic. In general, the aim of case studies research methods is to find out about the complexity of activities, decisions, human interactions and effects on individual contributions from a defined case. A differentiation between intrinsic and instrumental case studies is also required. Intrinsic case studies just emphasis main developments within a case, whereas instrumental case studies are focussing on deducing conclusions about a general theory or explaining an overall phenomenon. Furthermore, there are different case study types available, like single cases studies, multiple case studies, and multiple site case studies such as comparative case studies. For single case studies, only a single incident is investigated, whereas for others multiple cases are studied. Moreover, a number of events related to certain purposes are discussed and compared for multiple sites cases[186]. For the research in this thesis, a few elements of a case study research are used to investigate the selected cases of AT&S.

4.4 Research question

The main research question on the thesis is:

- What are relevant success factors of corporate business incubation, with a focus on the integration of new ventures into the parent organisation?

Sub-questions

- What measures can a company apply to support the integration of new business ventures into the core organisation?
- Which steps should a company consider while managing the integration process?
- How should be the set-up of cross-functional business incubation teams that are dealing with integration process?
- What are the difficulties and risks in “mature” organisation for the integration of new businesses?
- Which guidance can be given to companies like AT&S operating in the dynamic microelectronic industry?

[185] cf. Mayring, 2000, pp. 4-6

[186] cf. Lapan, 2011, Chapter 10: Case Study Research

The obtained information out of the literature and empirical research should serve as a baseline to define success factors and answer the sub-questions of this master thesis.

4.5 Sampling

The data generation will be done based on the evaluation of internal historic projects that represent the multiple site cases. The projects are all orientated on the successful or not successful integration of new ventures.

4.5.1 Selected cases

The main cases that were chosen represent a total four projects out of AT&S history. The selected cases are listed in Table 5. Activities, decisions, interactions between the project teams, environmental factors, as well as the market prospects are some areas that were analysed for the individual cases and compared with each other.

No.	Case	Description	Time	Area
1	Substrate technology	Establish as leading substrate manufacturer and industrialise the technology in Chinese, Austrian & Malaysian facility	2012 - 2025	Austria, China, Malaysia
2	Packaging for power application	Establish power packaging business with a lead customer in AT	2015-2023	Austria
3	Advanced packaging in China	Establish advanced packaging technology for series business in China	2015-2023	China
4	Packaging concept for a high complex board	Establish collaboration with a lead customer that targets a very complex board	2016-2023	Austria

Table 5: Selected cases from AT&S

4.5.2 Interviews

Interviews with involved persons in at least one case were conducted in order to investigate their experiences in the individual case. Thus, individual interviews were conducted as deeper insights in the experiences of involved persons can be generated [187]. In detail, with the help of individual interviews guides, specific information related to the business incubation and integration process could be generated.

4.6 Data collection

The data collection was done with the literature research and the interviews of AT&S employees that have been involved in the selected cases.

[187] cf. Berekoven, et al., 2004, p. 97

4.6.1 Interview summary

In order to gain an understanding of the integration process across functional lines, interviews were conducted with persons from 10 different departments. A summary of the interviews is shown in Table 6. The duration of the interviews was between 40-60 minutes and the interviews were recorded with the Webex application. Two interviews were done in person and the rest over the video conference function of Webex. Two to four interviews per case were deducted to get a more detailed insight in the specific case. Case two and case three are closely linked together. In case three, the same technology that has been developed in case two was transferred to another business unit and plant.

Document Name	Department	Type	Language	Case
Interview 1	Product Management	online	German	2
Interview 2	Operations & Quality Management	F2F	German	4
Interview 3	Business Development	online	English	4
Interview 4	Strategic Marketing & Strategy	F2F	English	3
Interview 5	Technology Development	online	German	2
Interview 6	Industrialisation Engineering	online	German	1
Interview 7	Application Engineering	online	English	3
Interview 8	Research and Development	online	German	1
Interview 9	Operations Management	online	English	1
Interview 10	Sales Engineering	online	German	2
Interview 11	Sales	online	English	1

Table 6: Details of the interviews

4.6.2 Interview guides

Main characteristics of qualitative research methods were interviews with involved individuals in the main selected cases. The personal perspectives and experiences contributed significantly to the development of the emerging theory of the qualitative methodology. Therefore, it is recommended to use open-ended questions to allow an in-depth exploration within the interviews[188].

[188] cf. Charmaz, 2014, pp. 60-69

Key considerations for the interview guides were considered as follows:[189]

- Reflection of the study purpose,
- Use of different question techniques,
- Preparation of the participants of the interviews,
- Formulation of easy understanding questions,
- Use of follow-up questions,
- Keep participants focused on the subject,
- Adapt questions throughout the research process,
- Focus on a positive ending of the interview.

For the interviews, interview guides were created that are attached in appendix A (A-2). The interview guides include a short introduction to the overall aims of the study. As a preparation for the interviews, the interviewees received the interview guide with the questions from section A and section C. For the specific case study questions, the questions and focus areas were not shared in beforehand with the interviewees. The focus of this section was more targeted to ask the interviewees to openly share their experiences.

The interview guides were structured into three general sections:

- Section A: General questions (10 min)
- Section B: Selected cases (40 min)
- Section C: Integration process (10 min)

Section A of the interviews was mainly targeted to receive general information about the involvement of participants in the integration processes. Information like functions, tasks, responsibilities of the involved persons and their overall lessons learned from integration processes were asked. In addition, the intention was to get their opinion when new ventures should be integrated in an existing business unit and when a new business unit should be established. The questions were aimed to get overall feedback, before going into more details of the chosen cases.

Section B of the interviews were aimed to collect specific experiences of the selected cases. The assumptions were also that general indicators about the business model of the new venture impacted the decision and process for the integration like the customer relationships on the market. The session was more focused on the overall experience sharing of the chosen case. The participants did not receive detailed questions in advance. The author, however, prepared some more questions and focus items in the background. For the focus items, the

[189] cf. Charmaz, 2014, pp. 60-69

elements of the Canvas business model[190] were chosen to evaluate the characteristics of the parameters. Furthermore, it was also designed to obtain an individual opinion from the interviewed people on reasons for successful or unsuccessful integration processes in this section. Section C was targeted to get more forward-looking information about the ability of AT&S in general to integrate future new ventures into the organisation. Starting with a SWOT analysis, followed by a proposal of how to overcome risks and utilise opportunities, the section was targeted to collect already proposed success factors. Lastly, detailed questions to the success factors and difficulties were prepared. If the participants have not stated difficulties and challenges in the previous section, these last questions were aimed to wrap-up the interview.

4.7 Data evaluation

Following the successful recording and transcribing of the interviews, a data evaluation has been initiated by coding received data in first order concepts, second order themes and aggregate categories. The process of abstraction aims to generate codes, which then are summarized into themes. The themes form the process model and concepts that later represents the emergent theoretical model as demonstrated in Figure 20[191].

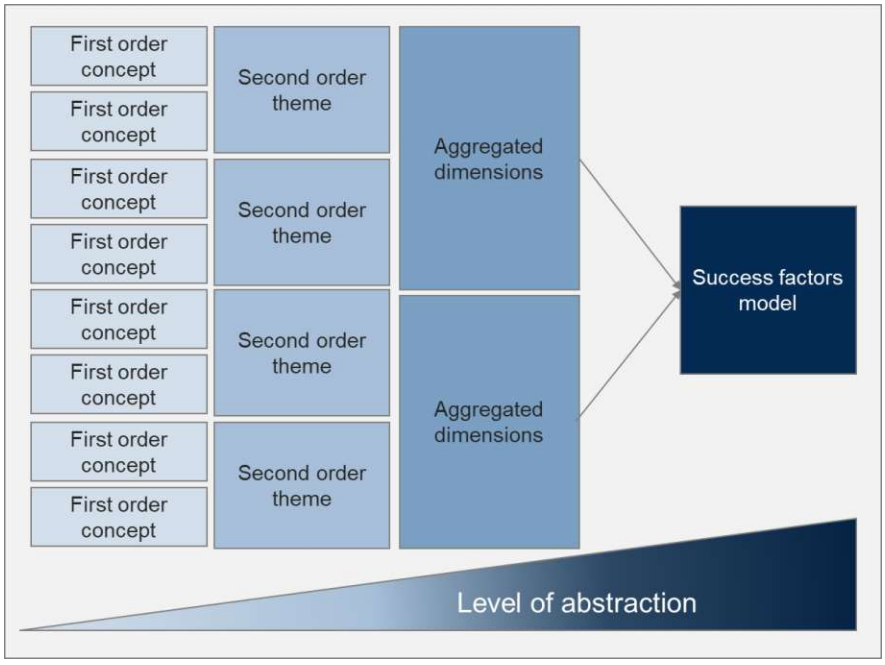

Figure 20: Data evaluation based on level of abstraction[192]

[190] www.strategyzer.com/canvas/business-model-canvas

[191] cf. Goia et al., 2012, pp. 15-31

[192] based on Goia, et al., 2012, p. 39

The interviews were transcribed with the help of the software Amberscript[193] and then uploaded in the MAXQDA application[194]. The data evaluation was done with the help of the MAXQDA application.

4.7.1 First order concept

After finalising the interview transcripts, the data evaluation was done to generate first order concepts. In order to create the first order concept, the author uploaded all interviews to the MAXQDA application. Each interview was named from “Interview one” to “Interview eleven”. A rough interview guide is displayed in Table 7. Based on that structure, the author created categories that were used as a starting structure for the coding.

Interview structure for the coding	
Participation	Case 2
Tasks/responsibilities	Case 3
Business integration manager	Case 4
Involved departments	Challenges
Existing BU – criteria	Success factors
New BU – criteria	Stage gate process
Case 1	SWOT

Table 7: Interview structure for the coding

All the interviews were screened, and codes were placed in certain text areas. These text areas represented interesting findings that were used for further analysis. In total, the author defined around 800 codes, whereas some codes were double counted and used for more categories. The most relevant information can be obtained from the first interview with around 100 codes, and up to an overall count of about 270 codes in case one which includes interviews 6, 9, 8 and 11.

After reviewing the codes, the first order concepts were created.

Figure 21 shows an example from MAXQDA how the first order concepts of the case two were coded.

[193] www.amberscript.com

[194] www.maxqda.com

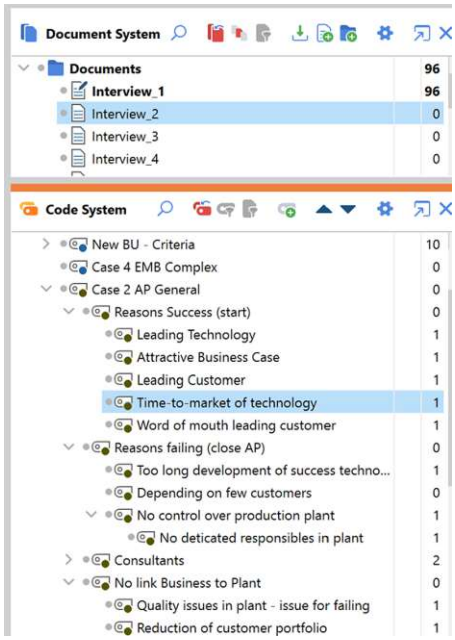

Figure 21: Coding with MAXQDA[195]

In the following figure, the most-frequent first order concepts are shown in Figure 22. Top management commitment was most often mentioned by the interviewees as important element in an integration project. Moreover, it was stated that a stage gate process is not rolled-out and that a leading customer is important. Additionally, a lot of items were mentioned that directly link to the interaction with the leading customers.

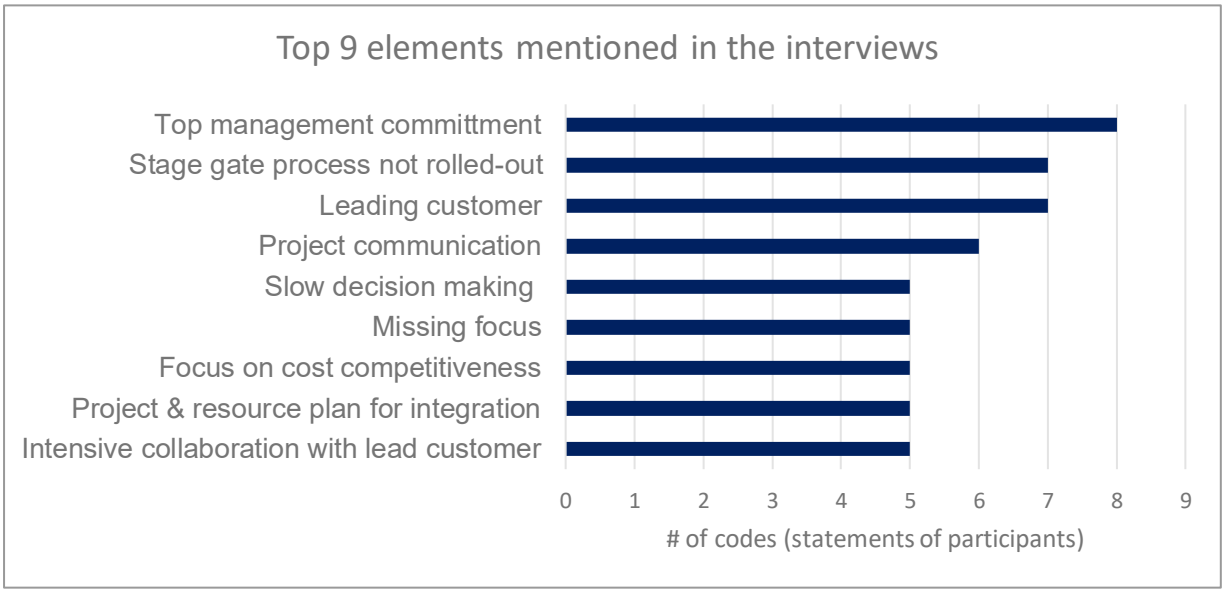

Figure 22: Top 9 mentioned elements in all interviews[196]

[195] Based on qualitative interview analysis with MAXDA

[196] Information derived out of interview 1-11

4.7.2 Second order theme

After carefully reviewing the first order concepts, the second order themes were developed. Within this process, appropriate segments were developed, and the codes clustered. Such clustering was done on a logical basis under the categories. Table 8 demonstrates the process of how the second order themes were created. The example is based on case four. Sub-categories were formed to have a better structure to compare the cases with each other. The categorisation was also oriented on the checklist that was used for the interview guides. The checklist items were combined out of the elements of the Canvas business model[197] and added with another useful items. The example for the value proposition for instance shows that four elements of the first order concepts were clustered under the value proposition. By comparing the findings and frequency of the elements, the success factors for the specific case were derived.

First order concept of each case *(example for value proposition)*	**Categorization to compare projects**		**Second order themes** *(success factors from case 4 as example)*
Complex solutions require close customer interaction	Value proposition	Success factors for case 4	Middle management coaching of the project teams
Capability - AT&S understood problem			
AT&S has high flexibility in development			Close collaboration AT&S & customer project teams
Deep technical exchange with customer			
	Supply chain		Customized solution development
	Customer relationship		
	Cost structure		Technical capability with high flexibility
	Revenue streams		
	Key partners		Top Management exchange of both parties
	Key activities		
	Key resources		Dedicated project teams at both parties
	Competition intensity		
	Degree of innovation		Support of top management
	Top management involvement		
	External support		Development contracts with deliverables
	Customer segments		

Table 8: Process of second order themes generation on example of case 4[198]

[197] www.strategyzer.com/canvas/business-model-canvas

[198] Information derived out of interview 2-3

The detailed summary of each case is also attached in the appendix C, D, E, and F (A-7 to A-10) where all the main findings of the cases out from the MAXQDA analysis are summarised.

4.7.3 Aggregate dimensions

The success factors of each case were retrieved and compared. As shown in Table 9, nine success factors were found in at least two of the cases. For the nine success factors that were derived out of at least two cases, three were mentioned in all cases. Top management support and involvement, dedicated project teams, innovative technology and problem-solving capability were mentioned in all cases as factors that were relevant for the success of their project. Moreover, in each of the cases there were two additional factors listed together with four other factors.

Success factors *(in at least 2 cases)*	**Frequency in the cases**
Top management support & involvement	4 out of 4
Dedicated project teams	4 out of 4
Innovative technology & problem solution capability	4 out of 4
Close collaboration between AT&S and customer with transparency of AT&S	3 out of 4
Leading customer	3 out of 4
Attractive and long-term business case	2 out of 4
Time-to-market technology	2 out of 4
Customer development contracts	2 out of 4
Strategic direction and transfer that into whole organization	2 out of 4

Table 9: Most frequent success factors out of the four cases[199]

In addition, there is another question related to the overall success factor of integration for all projects independent of each other. It was specifically focussed to receive further information about any other factors based on the individuals experiences. Most interviewees participated not only in the integration procedures of the interview case but also in other relevant AT&S or another company's projects. Thus, as a next step the success factors of the general questions were summarised and segments were created. The success factors of the four cases were complemented with the derived success factors from the general view on AT&S.

In Table 10, the data aggregation is again summarised based on the level of abstractions. The aggregated dimension for the success factors overview were oriented at the transformation capabilities created by Lukito et al. in 2022[200]. For example, for the “configuration” capability of AT&S several codes at the beginning of the interview analysis were defined. Based on that

[199] Information derived out of interview 1-11

[200] cf. Lukito et al., 2022 p.16

the first order themes were created. For the configuration capability, many elements were summarised into a success factor in the second order themes. The second order themes were then structured into one of the capability areas. Hence, success factors like “project communication” were then clustered under the reconfiguring, with execution, transformation, and integration capability. This area represents the capability to be able to integrate future new ventures. The same methodology was applied to the other areas of the capabilities as shown in Table 10. The table below is an example of the process, and the results are shown in the next chapter.

First order category	Send order theme	Aggregate dimensions	Success factors model
Understand the pig picture	Inspiring project leader	**Execution & transformation, integration capability**	**Reconfiguring**
Good network in the plant			
Project communication	Project communication		
Team spirit	Dedicated & qualified integration project team		
Reflection time & check items during transfer			
Frequent review meetings	Regular review meetings with sponsors		
Participation of involved stakeholders			
Participation of relevant stakeholders			
Time for planning phase	Project & resource plan for integration		
Clear decision gates & milestones			
Clear responsibilities of teams			

Table 10: Data aggregation example for success factors[201]

This chapter is aimed to summarise the methodology that was applied for the empirical part of the thesis. Starting with the summary of the aims of the research and the limitations, an insight was given on the selection of the methodology. Qualitative research was chosen that was oriented on the process that Goia et al. developed. Furthermore, an insight was provided into other related methodologies liked the ground theory or case study analysis. Additionally, the research questions, among the sampling of the empirical part were explained. For the sampling, four cases were selected that represented integration projects that were conducted in AT&S history. An insight was provided on the interview sample and the interview guide that was developed and structured into three sections. For the data transcription and evaluation

[201] Information derived out of interview 1-11

two online tools were used. The process for the aggregation of the derived data involved several steps, starting with the first initial codes to the aggregated dimensions. Aggregated dimensions were derived during data evaluation. These dimensions form the success factors for the integration of new ventures.

The main summary of all findings and a more detailed elaboration to the success factors model will be explained in the next chapter.

5 Results

In the following the results are summarized based on the empirical part of this thesis. The results are structured into the general findings of the interviews and the development of the success factor model.

5.1 General findings

Overall, all participants of the interviews were involved in integration projects in the past. Most of the integration projects were, however, managed as a “technology innovation” where a first idea from the R&D department was created and a first prototype was made available. Such first prototype was also mostly developed in course of any joint funding research initiatives with high level industry players. In all cases, a lead customer was involved that was driving the further development and industrialisation of the new technology. In the following sub-chapters, the main findings derived out of the interviews beyond the success factors are summarised.

5.1.1 Involved tasks

In the interview, around 17 tasks were mentioned that are important to consider in the integration process.

Tasks	#
Technical & commercial risk assessment	4
Quality requirements check	3
Technology qualification	3
Development of technology	3
Intellectual property rights check	2
Opportunity assessment	2
Business case calculation	2

Table 11: Selected tasks of the integration[202]

Table 11 shows the tasks that were mentioned at least by two interviewed persons. As shown in the table the top four actions were highly related to the technology development and other requirements in general.

The technical and commercial risk assessment was mentioned by four persons as very important task, as also quoted below from interview 2. It was highlighted that in addition to the attractiveness of the market and the lead customer, an internal validation of the involved risks

[202] Information derived out of interview 1-11

of a new technology or new business model was proposed. Additionally, also a check of the required technology requirements should be done early in a new venture project.

"Beside an opportunity assessment, it is also important to check the risks that are involved. If there are too high risks, it can be decided not to follow that direction"[203].

In addition, in three cases, the development of a new technology was mentioned. Only case three focussed on the technology transfer to another facility to target also other markets. As a result, technology qualification and development were an essential part of the integration, as stated by one interviewee who previously held several project management and technology integration management positions at AT&S.

"I have been involved as the overall project manager and my main tasks involved the coordination of the technologies and the development of the technologies. I have also coordinated the material and process qualification"[204].

Intellectual property rights also play a major role in the microelectronic industry, especially due to the strong competitiveness. For each new endeavour, an opportunity assessment and business calculation is required at AT&S. This also verifies the potential long-term outlook. This was also mentioned by at least two interviewees.

In general, named tasks were then clustered in the following categories:

- Market research
- Technical requirements
- Technology development
- Industrialisation
- Legal matters
- Business planning
- Customer management

The most tasks were highlighted for the technology development and business planning. Particularly in one case, the importance of diversifying customer portfolios was stressed as an important task while ramping up the leading customers. That was explicitly highlighted in the interview 11 as quoted below.

"My main tasks and responsibility is to manage the additional new customers. From early stage, business development perspective, we do talks with the customer to attract them to work with our company to also attract them into our technologies"[205].

[203] Interview 2, Pos. 5

[204] Interview 5, Pos. 7

[205] Interview 11, Pos. 10

In accordance with the internal strategic direction, AT&S is highly focussed on the diversifying its customer and market portfolio, especially with the technology development of “IC substrates” that were described in case one. Even in the latest investor relations presentation (Q1 2023/24), the strategic direction for the IC substrate was also introduced to the external stakeholders. AT&S also emphasised the focus on customer diversification and application diversification to find additional applications fields in new growing areas like cloud computing, artificial intelligence or 5G[206].

5.1.2 Stage gate process

The results from the interviews show that the stage gate process was available for the individual integration cases (also available in appendix C, D, E and F A-7 to A-10). It was used at the beginning for the initial concept development of most cases. Once the collaboration started with the lead customer, however, only a few or formal documentation based on the stage gate process was done. In one case, it was specifically mentioned that work packages, timelines and deliverables were aligned for the qualification and industrialisation with the lead customers. Such agreements were also based on the internal development timelines of the customer and their customers.

Seven out of the eleven interviewees even mentioned that the stage gate process was not rolled out in the organisation and not everybody was aware and committed to organise their projects according to the stage gate process. Future improvement potentials were also mentioned. The stage gate process should be mandatory with clear milestones to check if technical and price targets are met. It was also suggested that the process owner should be in a group function rather than in one of the business units. Furthermore, it was stated that the stage gate process is only geared towards technological innovations and not business model innovations, and that more commercial and business development stages should be included.

There was one important quote out of the interviews related to the stage gate process:

“Even though the application needs and basic criteria for the stage gate process is defined in the working instructions, the culture to really persistently implement it is important”[207].

With that statement it was also highlighted that the culture in a company is very important. To have the individual responsibility to document, be creative and proactive could be vital. Future improvement possibilities included mandating a stage gate process and appointing an independent group function as the process owner.

[206] cf. AT&S AG, 2023, p. 9

[207] Interview 9, Pos. 15

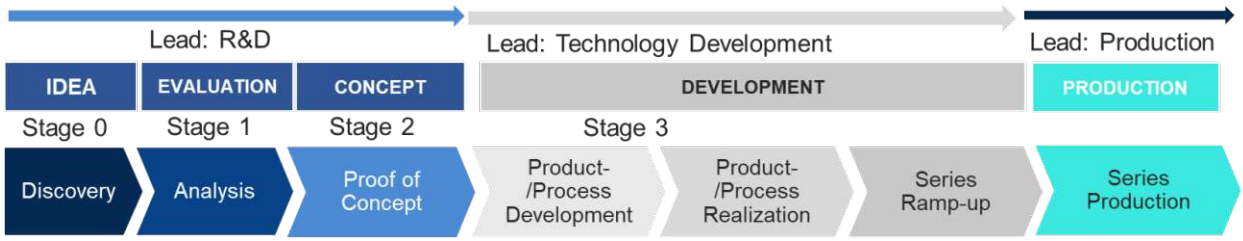

Figure 23: Summary of the innovation process at AT&S[208]

Furthermore, based on internal documentation, it was determined that the AT&S stage gate process is only concerned with technology development and was developed by the R&D departments as a guideline for phasing in new technology ideas and developments into the organisation. It was also stated directly by one person in the interview that AT&S is just using the stage gate process for technology qualifications as mentioned in the quote below.

"I think the stage gate process is more useful for new processes, new materials, new technologies rather than business fields or any other customer engagements"[209].

Figure 23 provides an insight into the established stage gate process of AT&S. At AT&S, this process is called "innovation process" and currently mainly maintained by project members in the R&D and technology development department. The owners were also clearly defined. R&D takes the lead until the proof of concept. The technical development and integration into the production is mainly performed by the technology development department. After the series ramp-up, the hand-over is done to the production management. There are also checklists defined per milestones. However, there is no recommendation or even mandatory action item defined that refers to a close interaction with any business or market related function.

5.1.3 Involved departments

Many different departments are involved at AT&S in the integration endeavours. Depending on the size of the business, more or fewer resources are needed from several departments. The main departments that were involved in the past are mentioned in Figure 24.

Operations management is named to be the most important function in such a project. Such a function is responsible for the existing and new operations process developments. The plant management and operations planning are sub-functions, which were mentioned.

[208] based on AT&S internal implemented innovation process

[209] Interview 11, Pos. 44

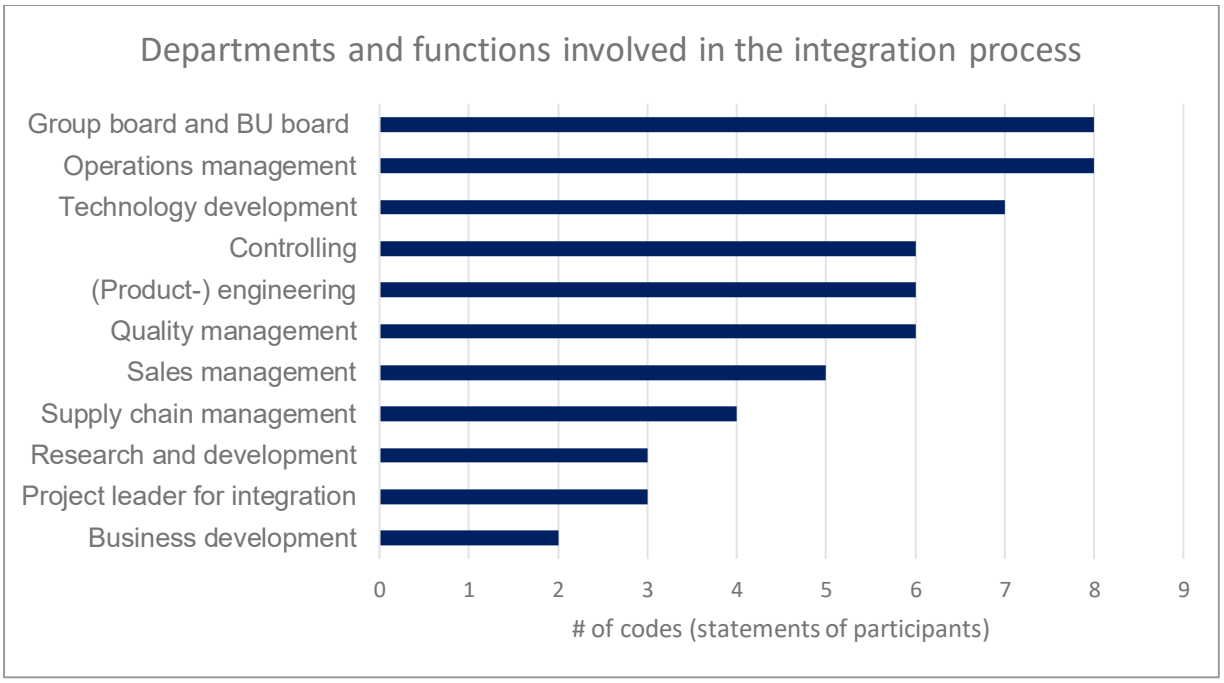

Figure 24: Departments and functions involved in the integration process[210]

The group board and business unit board members were also named to be very important to act as a sponsor with regular reporting. Furthermore, they are responsible to release the required resources. Additionally, quality management, technology development, (product-) engineering, controlling and supply chain management were also stated to be important functions in the integration.

"Such a process is always very technology focussed, therefore you need always the technology development, production, operations, quality and very strong controlling, project management, the project teams, purchasing and the view of the stakeholder of course"[211].

Generally, it can be derived that an integration process is very technology-orientated as also mentioned with the quote from interview 6. A various range of departments are involved to set-up internally the process, test the technology feasibility and monitor the costs for instance.

"Let's say if we want to name the important ones, the first is the sales team and then technology development team, quality, operation and also purchasing"[212].

As the new innovations are mostly developed very closely with the leading customers, also the importance to involve the sales team was mentioned. The sales management was even more often named than business development management. It can be assumed that in general the

[210] Information derived out of interview 1-11

[211] Interview 6, Pos. 9

[212] Interview 4, Pos. 11

involvement of the more explorative functions like business development, R&D and even strategy management is not so high in the integration. The market was represented by mainly the leading customers and R&D handed over any agendas to departments such as technology development. Business development functions, however, became more important in later stages at AT&S to start with the multi customer acquisition.

Furthermore, some interviewees mentioned that the success of an integration endeavour strongly depends on the business or project integration manager. The responsibility of this function is to oversee the whole process and to regularly report the status to the top management. Such a personality should have some basic understanding of the technology that is being integrated. In addition, the person is advised to have a good skill to identify and involve relevant stakeholders. A structured and inspiring personality, as well as structured working methods in addition to a logical and transparent working mode were proposed to be some essential qualities. Moreover, the person should be able to coordinate a dedicated project team that is working on the integration.

5.1.4 Integration level of a new venture

The interviewees were also asked about the decision criteria for a new business integration. Criteria were created for an integration into an existing or new business unit. The findings of the interviews could be structured into five parameters: complexity of the businesses model, the timeline and effort required for the integration, the organisational set-up needs, the strategic importance and the involved risks. Based on the interviews, it can be derived that new ventures with high synergies to the existing business, were more likely to be integrated. However, if the market segment, the business model, the technical and customer requirements are significantly different, it is more likely that a new one will be developed. As shown in the quote of interview 3 below, the decision is also heavily pending on the target market segment where a new business is entering or just expanding the service portfolio. The size of the market, as well as the market growth also contribute to the overall decisions. If the size is only smaller like a niche segment or extension to the existing one, the decision is more likely that AT&S will integrate the new venture into an existing business unit.

"If it is an extension of the existing business, it could be a sub-segments or a vertical segment to the existing one. The main decision for that is, as you know, what is the potential and how big is the market and what is the CAGR?"[213].

The integration into an existing business involves less time and effort. Whereas if a new venture requires a high number of investments to establish a new separate production, then it is

[213] Interview 3, Pos. 12

more likely that a new business unit will be created. Dedicated customer capacity commitments also increase the likelihood that a new business unit will be created.

Parameter	Existing BU	New BU
Complexity	High synergies with existing business	Different market segment
		Different business model, customer base and/or technical requirements
Timeline & effort	Less time & effort consumed to establish a business	High number of investments
		New separate production
		Customer capacity commitments
Organisa-tional set-up	Lower overhead costs	Clear focus, not dilute existing business
		Independently set-up business with new culture & mindset
Strategic Importance	Low portion of overall revenue (like niche market)	Long-term view (>5 years)
		Attractive business case
		Future high contribution to the overall revenue
		Lead customer strategy
		Multiple customer projects
Risks	Existing working method, structures and quality standards	New interfaces to support functions
	Priorisation within high product mix	Administrative effort, costs & financial re-porting of a stock company

Table 12: Decision criteria for integration into an existing or new BU[214]

Furthermore, as shown in Table 12, the organisation set-up requirement is another parameter to be considered. In the existing business units, the integration might involve lower overhead costs. In the new business unit, however, an independent set-up is targeted. The target is to establish a new culture and not dilute the existing business as also shown in the quote of the interview 4 below.

"This is very clearly mentioned that in the existing business unit the team got very comfortable to use their methodology or to handle the same ways even for a new business, which sometimes is really a blocking point for the success. So instead of having a new technology within the existing business unit, it is better to generate a new one"[215].

The strategic importance of the new business for the overall organisation is also relevant. If the new business will only contribute with a small portion of the company's overall revenue, an integration into the existing business unit is more likely at AT&S. If the new business has a long-term potential, an attractive business case and will contribute significantly to the future revenues of the organisation, the chance is very high that a new business unit will be created.

[214] Information derived out of interview 1-11

[215] Interview 4, Pos. 27

A lead customer strategy and the available acquisition of multiple customers could also positively influence the decision to establish a new business unit.

In the last investor relations presentation AT&S has also emphasised the strong growth path for the IC substrate business. The IC substrates development was also described in the case one (appendix C A-7). AT&S aspires to be one of the top three substrate manufacturers in the world in the medium term. Additionally, there is a strong focus to expand the “triangle” for the production competences worldwide, with the plants in China, Austria, and Malaysia. In the next few years a lot of new capacity will be installed, to serve the target markets like servers, cloud computing, artificial intelligence and 5G. The production facilities also work independently from the other business units. Just starting officially by April 2023, with the new financial year, AT&S has decided to form an own business unit for the IC substrate technology. Therefore, a dedicated focus team at AT&S is working to grow that new venture in the future[216].

There are also risks that have an impact on the decision. Some risks that the interviewed persons mentioned are the existing working method, structures, and quality standards in the existing business unit. That might negatively contribute to the successful industrialisation of a new technology. As the existing business unit might support a high product mix, there can be a likelihood that the new business does not receive the priority level that is needed. That is also highlighted with the quote from interview 5 below.

“One of the main challenges was the priority setting. In the existing business unit, it was not clear which products and technologies have a priority. The new technology, as it was more complex, was treated a bit like the “unloved child” in the existing business unit with no special focus”[217].

For a new business, new interfaces of supporting functions can be risks, as processes and reporting structures need to be established. Additionally, a new business unit comes with higher administrative effort and costs. Also, in a stock company like AT&S the revenues of the new business units need to be transparently reported to the public, including all investors. This requires a kind of transparency in that new business.

5.1.5 SWOT analysis on new venture creation capabilities

After the focussing questions on the specific cases, the interviewees were asked to name a few strengths, weaknesses, opportunities, and risks with focus on AT&S new venture creation capabilities in general. The target was to evaluate the position of AT&S for future similar endeavours. The top four elements out of the different categories are reviewed in Table 13.

[216] cf. AT&S AG, 2023, pp. 10-18

[217] Interview 5. Pos. 65

Strengths	Weaknesses
Innovation capability	Slow decision making
Industrialisation capability	Cost competitiveness
Diversification in plants & global footprint	Failure culture and mindset
Solution orientation	Cross BU, group functions and plant alignments
Opportunities	**Risks**
Plant automation & digitalisation	Ongoing organisational transition
Market dynamics: changing of industry players	Price competitiveness
Customer relationships	Missing focus
Utilizing potential from growing markets	Overall market understanding

Table 13: SWOT overview regarding future new venture integrations[218]

The strong innovation and industrialisation capability was named as strengths (as shown in the quote of interview 5), among the diversification in plants and global footprints, as well as the solution orientation of AT&S.

"Compared to our competition AT&S has a high sense for innovation. AT&S has always benefited from new technology developments. We have a lot of new and good technological ideas and also a certain sense of economic efficiency"[219].

AT&S solution capabilities were demonstrated in very different application examples, starting with the development of a technology to connect high performance ICs with the accelerator's boards for high performance server units[220]. Further, in regards to miniaturisation, AT&S has developed several solutions, as an example for the medical industry. Together with a university collaboration and a start-up, AT&S has developed the PCB that is integrated into a plaster for body temperature measurement[221]. Moreover, beyond the core business, AT&S also focusses on intelligent recycling systems and even won a supplier award[222] for the best improvement projects from Airbus Avionics. Further, the quote below refers to the continuous technology developments at AT&S that contributed to the overall success in the past.

[218] Information derived out of interview 1-11

[219] Interview 5, Pos. 67

[220] cf. AT&S, 2023 January, 10

[221] cf. AT&S, 2023 January, 10

[222] cf. AT&S, 2023 June, 13

"I think our strength is our long-term development. We have a culture to focus on the development of new technologies, we were always trying to advance and integrated new features"[223].

AT&S has seven production facilities in five different countries. The production especially of IC substrates is specialised in Asia, however, also a new plant focussing on lower volumes and R&D competences will be operational in 2024 in Austria. All these plants have different focus areas and can serve a wide range of applications and technology requirements[224].

In contrast, a slow decision making, cost competitiveness, the failure culture and mindset, as well as the cross-group functions, BU and plant alignments are seen as weaknesses. Especially, the slow decision making was highlighted as the most frequent weakness. Two interesting quotes from the interviews are highlighted below that expressed the opinion of the interviewees.

"Our decision paths in the company are catastrophic. Everybody needs to submit 1.000 justifications and involve a huge amount of people. Also, everybody shares their critical comments and takes no ownership"[225].

"In the stage gate process, it happens that people just skip some steps and even gate keepers are not aware of their responsibly that they need to make a decision for instance"[226].

Among the changing market dynamics and emerging industry players, plant optimisation and digitalisation are opportunities in the future. In addition, the established partnerships to already existing customers were seen as an opportunity, and it was recommended to utilise future potentials of growing markets in the microelectronic industry.

"The opportunities that I see is that we don't need to be winning new customers. I don't see any roadblock to ask existing customers where we can help them to deliver new products and new technologies. So, there's lots of opportunities too to offer them more of our services"[227].

Digitalisation megatrends and electrification, as well as a diverse customer portfolio across multiple industries, are other opportunities that AT&S will be heavily focusing on in the future.

[223] Interview 7, Pos. 64

[224] cf. AT&S, 2023, Q2, pp. 38-42

[225] Interview 10, Pos. 69

[226] Interview 5, Pos. 69

[227] Interview 9, Pos. 41

AT&S assumes that they can benefit greatly from the macro-economic environments and that is also demonstrated in many different external and internal strategic presentations[228].

Ongoing organisational transitions, price competitiveness compared to the Asian competitors, a missing focus, as well as the overall market understanding were named as risks. As shown in the quote below, the market understanding was highlighted to be a risk. A more profound knowhow about the customers' requirements and macro-economic developments was recommended instead.

"*I think we need to better understand the market. There are already improvements from years ago, however, that can be seen as a weakness or risk*"[229].

5.1.6 Challenges of the integration

The SWOT analysis mentioned before was focussed more on the overall position of AT&S to create new ventures. Additionally, at the end of the interview a question was asked about challenges that are related to the integration endeavour itself. In Table 14, the main challenges that are derived from the interviews are noted. The challenges are structured into the technology development, market, customer relationships and integration process.

It could be derived that challenges are related to the way how a business case is calculated for a new technology development that is needed in some years. Another challenge is seen as the too high internal technology view of AT&S to establish a feasible technology. The teams occasionally lack a clear picture of market requirements and the ability to determine whether there is a genuine market for that type of new technology. The quote below also emphasises the challenges that AT&S faced in the past.

"When a decision is made only for one customer to develop that technology, it is not enough. We did not have in the past a function to check which other customers demand such a technology as well. In one project we even failed, because there was no customer demand afterwards"[230].

Another challenge is to keep a good customer relationship or more partnership with the key leading customers. The joint development of a technology and all related following steps like qualification, industrialisation will consume effort and time from both parties. Moreover, difficulties are related in such joint collaborations that need to be addressed. However, the leading customer for AT&S are very important for a successful integration, hence a lot of measures

[228] AT&S, 2023, Q2, p. 18

[229] Interview 8, Pos. 63

[230] Interview 7, Pos. 14

are required to keep such a relationship for long-term. The importance to address these challenges was also highlighted in the interview 7 as shown below.

"The second point is our customer base. It would be a challenge, if our customer base are not loyal to AT&S anymore and consider other suppliers"[231].

Area	Challenge
Technology development	Justify a business case for new, early technology development
	Only focus on technical feasibility, not if there is a market
Customer relationship	Keep relations to few leading customers
Integration process	Unclear interfaces responsibilities
	Many integration projects at the same time - weakens middle management coordination
	Unrealistic targets
	No room for failure culture
	Change of day-to-day business of employees
	Find people with needed capabilities
	Established silos in the organization
	Slow decision making process
	Uncertainty related to transition
	Loosing qualified people during transition
	Too high product mix in 1 BU
	Priorities are not clear
	Find qualified project integration managers
Market	Quality requirements of new industries
	Cost competitiveness

Table 14: Challenges of the integration[232]

The integration process itself can involve several other challenges, starting from the slow decision making of the management to approve the integration, to the availability of capable employees that support the endeavour. The following quote from interview 4 highlights the mindset challenges regarding the decision styles of Europeans and Chinese culture that were expressed in the interviews as well.

"From Asian type of working, we say: "Let`s do this!" We can do it well and we can learn. But then I would say from a more European style, it's like we want to think more and always find the perfect business and perfect solution. Then a lot of the progress itself is pretty slow, compared with the our competitors"[233].

[231] Interview 7. Pos. 92

[232] Information derived out of interview 1-11

[233] Interview 4, Pos. 87

Unclear interfaces in the organisation, especially for support functions are a challenge as well. If many integration projects are handled at the same time, the middle management might face issues in the coordination of the endeavours. Furthermore, unrealistic targets and organisational factors such as silos in the organisation, change of working modes for employees, uncertainty in the transition, and unclear priorities were mentioned in the interviews. Some statement related to the changes of the tasks for the established organisation, is mentioned in the following quote.

"So, people would get new work packages. You know, the day-to-day business will change. And this is sometimes where people are not comfortable with"[234].

Another challenge in such integration projects was to avoid losing any qualified people in the process. Considering the market environment, cost competitiveness and strict quality requirements of new industries were also seen as challenges that can have an impact on the integration process. An important quote regarding the cost competitiveness is included below that also expresses the need in the future to proactively address the costs controlling.

"We need to be able to optimise the costs and process structures. If not, we will not be able to compete with the other Asian manufacturers on long-term. We should not just observe that cost are continuously increasing. We should proactively work on measures to control them"[235].

A summarized picture to each analysed case is available in the appendix C, D, E and F (A-7 to A-10). The identified success factors out of the cases are integrated in the success factors model that is described in the next chapter.

5.2 Success factors model

In the following section, the success factors for the different categories are described that could be derived out of the interviews. Generally, based on the interview findings, success factors in the integration are not purely related to the integration capability itself. The integration at AT&S is seen as a project with a business and project integration manager. That integration manager coordinates the industrialisation and integration of an already established technology into a new or existing plant and operations team. In some cases, however, it was analysed that some factors need to be considered already in advance in course of the technology or business development before the integration. Thus, an overall picture of success factors in different phases of the new venture creation was reported.

[234] Interview 3, Pos. 106

[235] Interview 5, Pos. 87

The success factors are divided into two categories: ordinary and dynamic capabilities, with financing and operating capabilities falling under the ordinary category. Sensing, seizing, configuring were structured under the dynamic capabilities. In total, overall, 53 important factors could be identified that were clustered into the main overarching dimensions to get an organized overview. In the next sub-chapters, the success factors are summarized.

5.2.1 Ordinary capabilities

In Table 15, the success factors of the ordinary capabilities involving the financing and operating areas are shown. The ordinary capabilities include the capabilities that are required to assure the business continuity of the overall company in general.

Financing

An attractive business plan, the development of contracts with clear deliverables, as well as capacity agreements with customers were mentioned as success factors under the financing dimension. As shown in the following quote, the business plans related to any investments should be evidenced with customer commitments that want to use the technology.

"Before investments are released, you need to check if the business plans are „waterproof" with a customer commitment who is also a driver for the technical development"[236].

Operating

For the operating dimension, two sub-areas were defined: the strategic partners and customer selection capability and the business continuity and operational performance capability.

For the first capability area, seven factors were derived from the interviews. The first factor is the establishment of a partnership with a leading customers with whom a close development collaboration was created. The next factor is the power and the reputation of the leading customers. In the past, AT&S was heavily benefiting from the close collaborations as the customers transferred a lot of know-how to AT&S. That helped AT&S to establish the necessary quality systems and process qualifications for instance. Especially for complex solution developments, close interaction with the customers were essential as also expressed in the following quote of interviewee 2.

"There is no other way if you want to develop complex technologies. You can just do it with a leading customer. Out of my history at AT&S we always had a leading customer"[237].

[236] Interview 10, Pos. 13-14

[237] Interview 2, Pos. 19

Ordinary Capabilities		
Financing	**Operating**	
Resources & investment capabilities	Strategic partners & customer selection capability	Business continuity & operational performance capability
Attractive business plan	Leading customer	Consider quality requirements early in development
Development contracts with deliverables	Power & reputation of leading customers	High quality standards in operations
Charge development costs to customers	Complex solutions require close customer interaction	Focus on cost competitiveness
Capacity agreements with customers	Multi customer approach as risk mitigation	Transparent KPIs to measure success
	Trade-offs on market where not to play	
	Good supply chain network	
	Network to research institutes & local agencies	

Table 15: Success factors of ordinary capabilities[238]

Another important factor is also how decisions on trade-offs are made. This means to decide not to operate on a certain market field that is less profitable or even has too high entry barriers for instance. As stated in the interviews, AT&S's collaboration with the lead customers is a strength, but also a weakness because only having exposure to a few customers can be risky.

"The customer base for AT&S is a strength but can be also a weakness"[239].

Therefore, a muti customer approach was considered to be important. It can help to mitigate the risks to be heavily exposed for a certain business only to a few leading customers. Based on resource constraints and development contracts, in the start phase of the technology development, a multi customer approach is tricky to establish. However, after the qualification and market acceptance of a certain technology with the leading customers, such approaches might be implemented to diversify the customer and even market portfolio.

Good supply chain networks, as well as networks to research institutes such as universities and local agencies, were also mentioned as important factors in the following interview statement 9.

[238] Information derived out of interview 1-11

[239] Interview 1, Pos. 63

"R&D needs to have dedicated teams with internal capabilities and good partnerships with external agencies, local universities, the new suppliers and coming suppliers and so on"[240].

AT&S is member of the IPCEI fundings[241] in the working group for power devices among around other 30 European companies operating in the microelectronic industry. AT&S is also a partner of Hi-Efficient, UltimateGaN and various other funding programs, where leading industry players are experimenting together on the latest technology developments[242].

The third capability dimension in the ordinary capabilities is the continuity assurance and operations capability. Important factors for that capability are high quality standards in operations, the focus on the cost competitiveness, and the consideration of quality criteria already early in the development. In addition, also transparent KPIs to measure the success were named. It is vital to also have indicators to regularly measure the success of the new venture developments. The importance to manage the cost competitiveness was mentioned by nearly half of the interviewees. An interesting statement is shown below that proposes to have a cost management in place for a certain technology for instance.

"Determining one technology is one topic, but also if you can meet the cost will be another topic. Maybe one technology is quite good and also, it's really fantastic. But finally, if the cost is quite expensive, then customers will not use that"[243].

5.2.2 Sensing

Actions like the monitoring of the time-to-market of the technology integration, the alignment of the development time with the customers and a market and data driven decision -making are derived factors out of the interviews. A related quote to that of interview 3 is also shown in the following.

"A Decision making based on data is important. It is important to have a view if AT&S can address the external risks and opportunities with the company's strengths and capabilities"[244].

In addition, as described in Table 16, establishing a system understanding of the customers' products and continuous observation of external market developments were mentioned as critical components.

[240] Interview 9, Pos. 19

[241] cf. IPCEI

[242] cf. AT&S, n.d.

[243] Interview 7, Pos. 20

[244] Interview 3, Pos. 84

Dynamic Capabilities
Sensing
Market & technology opportunity scouting capability
Monitor time-to-market of a technology
Aligned development time with market and customer
Market & data -driven decision -making
System understanding of customers products
Continuous observation of external market developments

Table 16: Success factors of sensing capabilities[245]

5.2.3 Seizing

Seizing as another dynamic capability concentrates on the design and improvement of internal processes like the production process for instance. In Table 17, the success factors that could be derived out of the interviews are mentioned.

Strategy formulation & execution capability

The priority setting based on the strategic direction of the company was stated as an important factor. In addition, the resource allocation along with the strategy and the commitment of the whole organisation was mentioned as additional success factors. The following two quotes are relating to the strategic direction that around two third of the interviewees mentioned to be important.

"The success factor is really the view towards the complete strategy of the company. It can bring some lead time before a certain project is started what also would mean more planning accuracy"[246].

"So, I think that having a clear direction from the senior management team is really important and that needs to be a strength"[247].

Furthermore, long-term persistence and horizon, as well as communicating a purpose and the picture of the new ventures, were viewed as essential, as expressed in the following interview quote by interviewee 7.

[245] Information derived out of interview 1-11

[246] Interview 6, Pos. 55

[247] Interview 9, Pos. 33

"From previous experience. I think the first one is we need a strategy and a detailed strategic decisions. We need to look into the market for not only now but also in next 3 or 4 years"[248].

Dynamic Capabilities			
Seizing			
Strategy formulation & execution capability	Organisational architecture & design capability	Innovation capability	Leadership capability
Priority setting based on the strategic direction	Cross-functional communication	Fast problem solving	Middle management coaching of the project teams
Align resource allocation with strategy	Consider organisational development & trainings	Early customer integration in development cycle	Top management commitment
Commitment of the whole organization	Establish needed organisational culture	Dedicated highly educated teams (new hires)	Internal & external sponsor of new businesses
Purpose – big picture	Resource split between exploration & exploitation	Early in-house R&D initiatives	Engagement of top management with customer
Long-term persistence & horizon		Innovative technical solution capability	Good leadership skills of middle management & project managers
			Aligned company leadership team
			Fast & aligned decision making
			Stakeholder management

Table 17: Success factors of seizing capabilities

Organisational architecture and design capability

The organisational architecture and design capability focusses on the design of internal management systems. Cross-functional communication, the consideration of organisational developments and trainings were also highlighted by the interviewees. The below quote from interview 7 also emphasises the importance of training and know-how sharing in the company that, for instance, back-ups are defined and not all workload is just allocated to a few highly experienced employees.

"The employees are very important in such projects. Unfortunately, we only have some that are experts at certain topics and who need to practise a lot of work. There is a danger that we are overloading them if we do not practise a kind of knowledge sharing."[249].

[248] Interview 7, Pos. 20

[249] Interview 1, Pos. 63

The facilitation of a required company culture for a new venture is an additional factor that could be derived out of the interviews. Another intriguing finding was that an interviewee also stated that a resource split between exploration and exploitation is critical, as demonstrated by the statement below.

"As part of the structural ambidexterity you need to have dedicated teams. Let's say this is the team that focuses on the explorative areas, and this is the team operations that focus on exploitative areas. The dedicated teams are also linked to the culture you need"[250].

Innovation capability

Fast problem-solving capabilities, early customer integration into the development cycle, dedicated and highly educated teams, that also involve many new employees are seen to be notable factors that drive the innovation capability.

"*The technology in my opinion was really good. The approach on how to improve the performance for the system of the customer was unique at that time and it worked well from my point of view, and it still works today*"[251].

Early in-house R&D initiatives and an innovative technical solution capability were other factors that could be derived out of the interview findings as also expressed in the following quote from interview 8.

"You need to make some kind of advance performance with some early research projects to a certain technology. So, if there is an opportunity with a customer you do not start from zero"[252].

Among some other key performance indicators, AT&S also measures the vitality index. That indicator measures the ability on how fast AT&S can develop new innovations. Therefore, the revenue from the new products that have been integrated into the market versus the overall revenue is measured. The last years result (FY23) was around 35.6%. That means that 35.6% of the revenue was made with technologies that have been integrated into the market within the last few years. The target of AT&S is an average of 20%[253]. Based on the analysis for 2022 published only at fortune.com, the information technology (IT) sector has by far the highest vitality index, with over 50%. Due to the market slowdown in 2023, the value can drop in 2023[254].

[250] Interview 9, Po. 17

[251] Interview 1, Pos. 50

[252] Interview 8, Pos. 59

[253] cf. AT&S, 2023, p.85

[254] cf. Reeves et al. 2023

Finally, there is also a very interesting quote from the Vice President of R&D of AT&S that emphasises the importance for the innovation's capability of AT&S.

"Whether in technology, business processes or implementing environmental improvements, innovation is the driving force behind AT&S, from the initial idea right through to execution. We're playing a key role in shaping an interconnected future"[255].

Leadership capability

Eight important factors can be derived out of the interviews that were important for the interviewees in that dimension. For each case, it was mentioned that the management commitment was very strong, and the management was very involved in the integration endeavours. An aligned leadership team that provides consistent guidance to their teams was also identified as important. Fast and aligned decision making, as well as not missing any market window or time-to-market for a new technology, were mentioned. The statement from interview 1 below also highlights the aligned decision making of the top management team.

"One important factor in my point of view is that the top management is aligned and committed to do a certain project. That is number one, very clear. If that is not happening, then several escalations are involved in the project"[256].

Stakeholder management, middle management coaching of the project teams, as well as good leadership skills of the middle management and the projects managers were also named to be valuable factors. Given the high lead customer involvement, the factors internal and external sponsors of new businesses, as well as top management engagement with customers, were also mentioned.

"I also believe if you are developing a new technology with a customer as sponsor, it will work better, as without any customer as sponsor"[257].

The above mentioned quote also emphasises the importance of a lead customer at AT&S that is acting as a sponsor. It also gives an indication that projects might work faster and/or with less challenges if customers or the management team even of a customer is acting as a sponsor.

[255] Hannes Voradberger, VP for R&D at AT&S

[256] Interview 1, Pos. 63

[257] Interview 1, Pos. 65

5.2.4 Reconfiguring

The reconfiguration capability deals with the process of the integration of a new venture into the core organisation in particular. As shown in Table 18, the most relevant factors for reconfiguring capability were collected as the interviews were specifically targeted to the integration process of a new venture.

Dynamic Capabilities
Reconfiguring
Execution & transformation, integration capability
Inspiring project leader
Project communication
Consider change management
High level reporting
Close alignments with leading customers
Dedicated & qualified integration project team
Regular review meetings with sponsors
Project & resource plan for integration
Flexible to market changes
Implementation of change requirements
Data driven & automated industrialisation

Table 18: Success factors of reconfiguring capabilities

An inspiring project leader was named as an essential factor as shown below in the quote.

"Team spirit is important. One person in the team should be inspiring the whole team"[258].

Regular review meetings with sponsors, a project and resource plan for the integration, as well as high level reporting and project communication to the stakeholders were stated as valuable factors. Clear communication was highlighted in the interview 4 as shown in the quote below.

"Clear communication and communication of the vision why we need to do certain things is important to provide the people a kind of certainty. Because there is always a kind uncertainty involved"[259].

Moreover, among the data-driven and automated industrialisation capabilities, dedicated and qualified project teams are seen to be important, as stated below and in the quote from interview 8.

[258] Interview 2, Pos. 111

[259] Interview 4, Pos. 101

"Where I see a high necessity is for project management skills. A good basis knowhow of the technology is relevant, but you also need to have the ideas and skills to intervene where problems are occurring, for the technology but also for other organisational matters"[260].

Additionally, the factors close alignments with the leading customers in course of a technology development and integration was highlighted. It was also emphasised to consider change management activities in such endeavours. It also involves the capability to flexibly react to market changes and to implement changes in a timely manner that impact the integration of a new venture as also highlighted in the quote from interview 6 below.

"During a project there are external developments, where the management asks the teams to consider that and that and that. There will be always some kind of changes, what requires communication and change management to react to them and also to update priority settings if necessary"[261].

Within this chapter the relevant findings of the empirical part were presented. At the beginning, the general findings were highlighted that gave an insight in the involved tasks like commercial and technology assessment. Also, the current use of a stage gate process at AT&S was elaborated. Furthermore, the departments involved in the integration as well as the level of integration of a new venture were elaborated. A SWOT analysis of AT&S's overall new venture creation capabilities was attached, which provides additional conclusions on potential future fields of action. Furthermore, challenges of the integration were added that provided an insight in areas that need more consideration in the future.

Finally, the success factors model was added, which provided a compromised overview of the capabilities that needed to be developed for the overall creation of a new venture. Ordinary capabilities like financing and operating are necessary to sustain the business continuity of an organisation. The strong partnerships with leading customers are an important factor for AT&S in that area. Moreover, the dynamic capabilities like sensing, seizing, reconfiguring and the sub-dimensions are added. This gives another insight into the factors that contribute positively at AT&S to facilitate these capabilities. An aligned strategy, top management involvement, among continuous market screenings and dedicated project teams for the integration, were some important factors that were stressed as well.

The next chapter discusses the interview results, which are complemented with relevant findings of the literature research.

[260] Interview 8, Pos. 45

[261] Interview 6, Pos. 67

6 Discussion

The findings of the empirical part gave already some very useful insights about the success factors of new venture creations and the integration into the parent organisation. The following section includes a discussion and recommendations based on the findings, which are supplemented with relevant findings from other studies. In addition, a statement to the research questions is provided at the end of the chapter.

6.1 General findings

The discussions on the general findings are elaborated in this sub-chapter.

6.1.1 Involved tasks

New businesses can involve different risks that a company should be aware before entering the market. Such technical and commercial risk assessments are very important, especially if new markets are being addressed. A risk assessment is closely related to quality requirement check. Quality control or certification requirements are mentioned to be very important for AT&S. For example, in the medical industry, different certification requirements need to be fulfilled to ship into that industry. Starting from ISO9001, the offered products need to pass a lot of other specification criteria. Very high reliability assurance measures are required if the electrical devices are integrated. Failures can have huge consequences for the persons involved. If damages occur, suppliers and sub-suppliers will be liable for such damages[262]. Furthermore, based on the interviews it could be derived that AT&S is placing a high importance on the quality and risk assessment of new technologies in markets, beside evaluating the potential for an opportunity before starting with a new venture development. However, different markets and application fields have different requirements.

In addition, Becker and Gassmann (2006) summed up services like branding, networking, consulting, financing, and infrastructure as relevant services for business incubations[263]. A summary of services from Jones et al. (2018) also involved practical guidance, business plan support with feasibility studies, mentoring of the new ventures, network development to relevant stakeholders, as well as financial consulting and trainings of the responsible persons in the new ventures[264]. Comparing with the literature, there is a link from the results towards business planning, including feasibility studies and opportunity assessment. It can be derived from the

[262] cf. NQA

[263] cf. Becker & Gassmann, 2006, pp.470-475

[264] cf. Jones et al., 2015, p.409

interviews that AT&S is concentrating on the opportunity assessment to understand the technical requirements to verify the feasibility of a new technology or identify the related risks.

The network development at AT&S mainly targets the creation of partnerships with the lead customers to find joint development collaborations. AT&S mentioned customer relationship management and strong communication as relevant tasks in course of the integration. Whereas mentoring or training in general were not frequently mentioned as important tasks. Mentoring and coaching were highlighted by some other sources as important in driving the development of new ventures. One interviewee highlighted coaching of the project managers as success factors when specifically asking him. As shown below with the quote of interview 2, in tough situations when the projects teams need to overcome many challenges, a coaching also from the management was proposed.

"It lies in the DNA of people to look around what has not been done or re-question if a person is even capable to do that job…I think it is important to calm down the people and together brainstorm how to overcome problems and challenges"[265].

Thus, this element was also added to the success factors model in sub-chapter 5.2.

6.1.2 Stage gate process

Moreover, providing a practical guidance[266] for the integration can be linked to technology development to give the team a guideline which steps should be considered. Copper and Sommer (2018)[267] also highlighted that manufacturing industries should do their new technology developments based on Agile-Stage-Gate-Hybrids to evaluate and develop new technology innovations.

Augusten et al. (2017) also provided an insight about the practical integration of continuous innovations in the company's strategy and cultures. Companies should not only focus on advancing its capabilities, but rather focus on the development of new core capabilities and new markets. Differentiations on improvements on the daily business, competence innovations, market innovations and business model innovations were mentioned that give an overall framework for innovations [268]. At AT&S, for instance, the explorative areas like R&D, technology development and product engineering are more oriented towards the competence innovations and less in the market and business model innovations. They do not yet have a process in place that focuses on more than just technology development.

[265] Interview 2, Pos. 75

[266] cf. Jones et al., 2015, p.409

[267] cf. Copper & Sommer, 2018, pp.17-26

[268] cf. Augsten et al., 2017, pp. 53-58

Based on the findings out of the interviews (see appendix C, D, E and F A-7 to A-10), AT&S is very good in the technology innovation and seen as competent partner in the industry. According to other sources, technology innovation can be quite resource intensive, requiring special engineering know-how as well as dedicated equipment[269]. As a result, it is reasonable to assume that, prior to making any investments, an appealing market must be identified. Among a new technology qualification, AT&S could target new markets with new solutions, if any new market segment is found that shows quite good growth rates. Beyond the development of the technology with a leading customer, for instance, the literature also advises to look beyond current business. It is advised to screen for potentials where even a new business model can be established that involves new revenue and costs streams and value propositions[270]. Therefore, a continuous observation of growing markets and the detailed understanding of their needs and ecosystems, might be also a direction.

6.1.3 Involved departments

AT&S is very innovative based on the findings. However, a new innovative technology needs to be also industrialised in a timely manner to achieve the target costs, required quality criteria and high output yields. This requires a high effort on the operations team to integrate and industrialise a new technology. Some challenges mentioned in the interviews included an excessive product mix in production, a change in the day-to-day business for the employees, a no-failure culture, and unclear priorities (see sub-chapter 5.1.6). It can be assumed that the integration involves such challenges exactly where the exploration mindset of the new business encounters the existing exploitation mindset. Such “old” mindsets can involve already learned and practised working methods in existing operations processes in the business units[271]. Thus, it can be assumed that the operations management needs to overcome and balance a lot of challenges in such endeavours. Therefore, operations management was the most frequent mentioned department for an integration endeavour.

Proctor (1997)[272] argued that a company needs to establish a strategic direction. Such a direction needs to be rolled-out in the whole organisation and each employee should know how they can contribute. A high management involvement of strategic projects is a requirement to monitor the process and to implement interventions if needed. The goal is to avoid deviating from the strategic course in the short term. Therefore, it could be also assumed that projects at AT&S have a better chance to succeed, if the management is continuously monitoring the

[269] cf. Dieffenbacher, 2023

[270] cf. Dieffenbacher, 2023

[271] cf. Keller et al., 2022, p. 4

[272] cf. Proctor, 1997, p. 150

integration status and aligning with the strategic direction of the company. That was also emphasized by AT&S that the high level involved at the important projects was provided.

In the interviews, the importance of integration managers was mentioned to manage the stakeholders and to keep the internal team together, also in challenging situations. In light of that discovery, it can be argued that a business or project integration manager, as well as the dedicated teams, should have a contextual ambidextrous mindset in those functions. On the one hand, the explorative teams of the technology developments are still working in a very creative mode to optimise and further advance the technical solution. On the other hand, the integration or establishment of new business and operations processes require some standards and efficiency needs [273]. Organisational units that practise contextual ambidexterity require persons with a high flexible and personal responsibility and training to individually balance both directions[274]. In the case of AT&S, such a consideration in the selection of an appropriate business integration manager for future integration endeavour can be helpful.

6.1.4 Integration level of a new venture

A new business unit involves many advantages as mentioned in the example of AT&S. If budgets are released, a new scale-up factory can be established by hiring specialised engineers, talents and purchasing new equipment and tools. If new ventures focus on the development of a disruptive technology, the generation of a start-up mindset, as well as the empowerment of the new combined teams will be recommended as well[275]. Based on the findings of AT&S, it can be derived that within a new business unit, AT&S targeted to set-up a new production plant, to establish new cultures with new outside employees that contributed positively to the industrialisation. There are already steps in place to support more radical innovation in the future, such as the previously mentioned triangle production network of IC substrates. It is also argued that such a move also involves several new administrative efforts. Especially, in economic crisis situation or overall weakening performance of the company, such additional costs can be a burden for the company. Investments might not be released as mostly such endeavours will not bring profitable revenue in a short-term period[276]. This can be seen as risks in the future for AT&S that the company can just spend lower fundings for the innovation activities.

The integration into the existing business is from the financing perspective the less risky option. Also, as mentioned in the interviews, the existing business model can benefit from established market access, quality standards, and technological know-how. However, such endeavours

[273] cf. Constant et al. 2020, pp. 1-35

[274] cf. Raisch et al., 2009, p. 689

[275] cf. Kötting, 2020, pp. 488-489

[276] cf. Powel, 2010, pp. 37-47

also involve some challenges. Processes in the existing business units are targeted to the existing exploitation mode[277]. An integration of a new mode might dilute the existing business. Strong path dependencies of the existing business unit might also cause an integration to fail[278]. Prioritizing new technologies versus the existing business, which have a very high product mix, has been identified as a risk as well.

Cannibalisation of the existing business with the new one might be also a target that has not been named by the AT&S interviewees. It could be even a strategic move as the existing business is not showing a long-term profitable growth. Furthermore, an integration can have an impact on the short-term profitability of the existing business unit was also not mentioned by interviewees. Resources might need to be relocated to the new integration of the business. This also requires resource effort and therefore less resources are available for the existing established operations. If AT&S's top management is asked to make a decision about the level of integration in the future, such a KPI burden must be considered and accepted in the short term[279].

6.1.5 SWOT analysis of the new venture creation

Based on the results different strengths, opportunities, weaknesses, and risks for AT&S future new venture creation capabilities can be identified. Some of them are more related to the integration itself and some others to the overall general position of AT&S with some general statements for instance.

The developments of the macro-economic environment can have a negative, but also positive impacts on the future integration capabilities at AT&S. High inflations rates have a negative impact on the price competitiveness as also mentioned in the interviews, especially in the European facilities. The supply chain disruptions and emerging of new supply chain players can also result in opportunities [280]. Moreover, the geo-political tensions between US and China can offer opportunities to expand the European production facilities. At the same time, it may pose risks because a significant portion of the microelectronics supply chain, for example, is located in China or Taiwan [281]. There are a lot of technological disruptions and ongoing developments

[277] cf. Tushman & O`Reilly, 1996, pp. 16-17

[278] cf. Powel, 2010, pp. 37-47

[279] cf. Kötting, 2020, pp. 488-489

[280] cf. Feingold, 2023

[281] cf. Vague, 2022

like advanced materials, artificial intelligence, internet of things, advanced packaging and miniaturisation of components to mention some[282]. Such technological disruptions offer great opportunities for AT&S. AT&S has mentioned to be having good innovations and industrialisation capabilities, hence expanding these strengths could enable AT&S to benefit greatly from the new technological trends on the market. Moreover, some were also summarised in the SWOT, like the future business in growing markets, as well as the changing supply chain environment. To benefit from the developments, also a good market understanding is required that was currently rated as a risk item. To conclude, it is, therefore, highly recommended to establish functions, responsibilities to enable a closely monitoring of the market. Therefore, with the link of the internal technology advancements to the market requirements a connection to the market pull (solutions needs) and technology push (research developments) can be simultaneously enabled[283].

6.1.6 Challenges of the integration

In the results, some challenges related to the technology development, the market environment and the integration process itself were highlighted that are impacting an integration endeavour.

One finding of the interview was the missing link between the market demands and internal technology development activities. This challenge can be related to the missing link between the market pull and technology push perspective. The risk behind that is to develop a technology and then push it to the market without prior alignment if the market needs that technology. Or even if somebody is prepared to pay for it. Augusten et al. (2017) also highlighted the difficulties that the company faces. An issue is also that companies have sometime a too narrow perspective towards the market. They tend to look for opportunities that can be fulfilled with their existing competences, without considering the development of new competence or upgrade existing ones that can even open more opportunities[284].

A right time-to-market, missing commitments of the new business units, underestimation of the resources needs, falling back into old working habits are future challenges that are identified in the literature[285]. Slow decision making as a challenge was identified in the interviews as well and can negatively impact the right time-to-market. As highlighted also by Yates et al (2016)[286],

[282] cf. Startups Insight

[283] cf. Li et al., 2008, pp. 107-124

[284] cf. Augusten et al., 2017, p. 30

[285] cf. Chen & Kannan-Narisimhan, 2019, pp. 30-33

[286] cf. Yates, 2016, pp. 109-110

cultures have different decision making styles. That was also experienced by AT&S interviewees, who complained that their Asian competitors make faster decisions than the Europeans, who are more prone to seeking the ideal business and solution.

New incubated business models might require different structures, processes, cultures, mindsets and working styles of involved individuals. Such change is a big hurdle that needs to be managed to enable a successful transition[287]. No room for failure culture was mentioned in the interviews. Further, in the SWOT analysis, the failure culture and mindset were in general evaluated to be a weakness that needs to be addressed. This could have as well a negative impact on the integration if not managed well.

Another challenge is to make trade-offs of an organisation to invest current cash flows and a lot of effort into an endeavour that will only generate revenues in few years[288]. Furthermore, a challenge is ensuring that exploration areas are still working on new innovations and are not solely focused on the transition for their first established innovation[289]. AT&S might face these challenges as well, but were not specifically addressed. More interviewing and questions in specific areas could have resulted in statements in those areas as well.

The challenges are also closely linked to the success factors that are explained in the next sub-chapter. Areas where the company faced challenges in the previous projects, might represent success factors for future endeavours. If the lessons learned from the challenges are reflected, such challenges might be overcome in a future project.

6.2 Success factors model

The success factors summarise the entire new venture creation process, not just the integration endeavour itself, because decisions made in the early stages have an impact on the overall integration. If there is no attractive market and a positive business case with one or few strongly supporting customers, the integration might fail. The endeavour will be deprioritised or will be even not successfully ramped-up. Related issues include meeting time-to-market or cost targets, as well as successfully integrating the new technology. Thus, it was decided to establish a success factors model to link all relevant success factors to the overall capability dimensions that were originally created by Lukito et al. (2022)[290]. The ordinary and dynamic capabilities are mentioned and sub-dimensions are defined to have a general picture on the areas of new venture integration capabilities[291]. Another sub-dimension of the seizing area with the name

[287] cf. O'Connor & DeMartino, 2006, p. 494

[288] cf. Hansen et al., 2018, pp. 484-508

[289] cf. O'Connor & DeMartino, 2006, p. 494

[290] cf. Lukito et al., 2022 p.16

[291] cf. Lukito et al., 2022 p.16

"innovation capability" was added as shown in Table 19. Some success factors address the strong innovation and technology capability of AT&S. The success factors were therefore classified under the "best-fitting" dynamic and ordinary capabilities.

Dynamic capabilities					
Sensing	**Seizing**				**Recon-figuring**
Market & technology opportunity scouting capability	Strategy formulation & execution capability	Organisational architecture & design capability	Innovation capability	Leadership capability	Execution & transformation, integration capability
List of success factors					

Ordinary capabilities		
Financing	**Operating**	
Resources & investment capabilities	Strategic partners & customer selection capability	Business continuity & operational performance capability
List of success factors		

Table 19: Structure of success factors model

The success factors models was aimed to give a forward-looking recommendation of the factors AT&S and other companies for instance in the microelectronic industry can consider in similar undertakings. As the microelectronic industry is a very dynamic market, it has a high need to develop dynamic capabilities throughout the whole organisation. Therefore, the elaboration on the success factors model is also closely inspired by the dynamic capabilities firstly developed by Teece et al. (1997)[292]. Teece et al. proposed that companies should develop, integrate and configure dynamic capabilities throughout the organisation. As a result, companies can react quickly to any outside developments and are less likely to take the path that makes them inflexible.

6.2.1 Ordinary capabilities

Ordinary capabilities involving relevant financings and operating capabilities were mentioned by the interviewees.

[292] cf. Teece et al., 1997, pp. 509-533

Financing

Lukito et al. (2022) defined the financing dimension as a company's ability to make necessary investments in future needed technology developments and other equipment and infrastructure, for example. A strict KPI monitoring was also proposed to calculate the return-on-investments (ROI) with the help of business cases and to forecast the profitability of any investment initiative[293]. Technology innovations in the microelectronic industry require a high number of investments as already mentioned in the previous chapters. Hence, a focus on the ROI in course of a long-term attractive business plan are required. This was also mentioned as one of the success factors in these dimensions. Moreover, the charging of development efforts was mentioned as important element to cover some costs of any customized developments. The establishment of even joint research centres with industry partners and customers is already common practise in the industry like in the example of Wolfspeed and ZF that announced in 2023 to jointly establish a research centre in Germany[294].

Operating

In the operating dimension, strategic partners and assessment capabilities are mentioned. These capabilities involve the selection of the most fruitful partners that support the company within their future success. Such partners should also have a certain expertise in the fields where the partnerships are created[295]. The capability used in this thesis is “strategic partners & customers assessment capability”. Therefore, the importance for the leading customers was emphasised[296].

There are various funding programmes, such as the IPCEI fundings, where AT&S is a member of the working group for power devices, along with about 30 other European companies in the microelectronic industry[297]. In the past, AT&S was heavily benefiting from the close collaborations as the customers transferred a lot of know-how to AT&S. This helped AT&S to establish the necessary quality systems and process qualifications. Especially for complex solution developments, close interaction with the customers is essential.

Moreover, a muti-customer approach was stated to be important. It can help to mitigate the risks to be heavily exposed for a certain business only to a few leading customers. Based on resource constraints and development contracts, in the start phase of the technology development, a multi customer approach is tricky to establish. However, after the qualification and

[293] cf. Lukito et al., 2022 p.16

[294] cf. Wolfspeed, 2023

[295] cf. Lukito et al., 2022 p.16

[296] cf. Lukito et al., 2022 p.16

[297] Cf. IPCEI

market acceptance of a certain technology with the leading customers, such approaches might be implemented to diversify the customer and even market portfolio.

The third capability dimension in the ordinary capabilities is the continuity assurance and operations capability. Continuous know-how exchange and monitoring of the operations results on effectiveness and efficiency are clustered under this capability. Also coaching and counselling of the employees are mentioned to be integrated in that capability[298]. For this thesis, also the term “operations” was added in the definition of the capability as the operations management at AT&S plays a major role in the integration as well. Important factors for that capability like high quality standards in operations, the focus on the cost competitiveness, the consideration of quality criteria already early in the development were derived from the interviews. In addition, also transparent KPIs to measure the success were named. It is vital to also have indicators to regularly measure the success of the new venture developments.

KPIs especially for new ventures can be the frequently monitored. Examples are the total addressable market (TAM) for the target market, customer acquisition costs and the customer retention rate considering any former collaborations. The lifetime value of the leading customers, and the monthly burn rate are additional indicators. The monthly burn rate, for instance, gives an overview on the gap of the expenses and returns at the beginning of a new business in the introduction phase. Besides, the overall revenue and the profit margin is another relevant KPI for new ventures to measure when a new business is starting to enter a profitable area[299].

6.2.2 Sensing

Based on the results by Teece (2007), the sensing capability involves the screening and identification of market and technology opportunities. A continuous open and sensitive view towards any market developments is advised to establish a market intelligence. This enables decision makers to make informed decisions to enter certain markets with existing or new technologies[300]. Sensing can be seen as also an exploration endeavour to establish new ideas for technology and business innovation that can be derived out of the findings of the market screening [301].

Lukito et al. (2022) also claimed that the sensing represents the opportunity detection capability that requires leaders to be informed about any external developments and especially chances in the market. Such developments might have a high influence on the new venture

[298] cf. Lukito et al., 2022 p.16

[299] Cf. Indeed, 2022

[300] cf. Teece, 2007, pp. 1319 – 1350

[301] cf. March, 1992, pp. 71-87

creation[302]. This term was re-named in this thesis to “market & technology opportunity scouting capability” to highlight the need to screen the market and technology developments.

There are several items that are aiming to facilitate the sensing capability at AT&S. Continuous observations of the external environment or the monitoring from time-to-market were highlighted. This also expresses past lessons learned from the interviewed participants.

In general, it is recommended to continuously have a high focus on the sensing area from the first initial idea for a new venture until the post-integration. Conclusions like market or competence diversification, or even to implement new business models could be also derived from the market information. Even if the market is declining, adaptations to the strategic direction might be done to deprioritise a certain business. A close monitoring and analysing of the market data could provide AT&S valuable input for the establishment of the multi customer diversification.

6.2.3 Seizing

Seizing as another dynamic capability concentrates on the design and improvement of internal processes like the production process[303]. Seizing is strongly linked to the sensing capabilities and combines the abilities to utilise the information that have derived of the sensing activities. The development of innovations that are targeted to solve a customer need. The development and industrialisation of new products, processes or the combination of new features are supported out of the seizing capabilities[304].

Lukito et al. (2022)[305] structured the strategy formulation capability, the organisational architecture design, as well as the people unifying capability within the sensing dimension. The strategy formulation capability involves that leaders in the organisation to define a clear vision and strategic direction that are also linked closely to the creation of new ventures. Any internal projects for instance need to be aligned with the overall strategy that resources are assigned accordingly[306].

Strategy formulation & execution capability

The original formulation of Lukito et al. (2022) was renamed in the thesis and the “execution” was added to the ability to emphasise and focus on the implementation of the strategy in the organisation. The priority setting based on the strategic direction of the company were stated

[302] cf. Lukito et al., 2022 p.16

[303] cf. Teece, 2007, pp. 1319 – 1350

[304] cf. Ellström et al., pp. 272-296

[305] cf. Lukito et al., 2022 p.16

[306] cf. Lukito et al., 2022 p.16

as an important factor. In addition, the resource allocation along with the strategy and the commitment of the whole organisation was mentioned as additional success factors. This ensures that strategic projects in the company, for example, receive adequate resources, or at least that this is important, according to the interviews. Moreover, Kötting (2020) showed in his framework that the strategic direction in the company has a high influence on the incubation and development of new businesses. Contradicting directions and targets do not support such endeavours[307]. Furthermore, Procter (1997) stated that such strategic directions that companies define have a high need to be circulated in the whole organisation and every single employee needs to know how they can contribute to it. Furthermore, in strategic projects anyway a high management involvement and reporting is proposed to keep monitoring the project progress[308]. A clear and aligned strategy of the senior management was also highlighted in the interview, which indicates that in successful project at AT&S the senior management can strongly support the projects and the teams to receive sufficient resources.

Organisational architecture and design capability

The organisational architecture and design capability focusses on the design of internal management systems. Such capability involves structures, processes, culture, and people's behaviour control[309]. The findings of the interviews can be closely linked to the general dilemma [310] of exploitation and exploration within organisations. On the one hand, exploration efforts are essential to generate new ideas and ventures for the future, but on the other hand, the current performance of the existing business is also important to ensure the short-term profitability. Hence, it is advised to review the strategic direction [311] and based on that establish the optimum level of ambidexterity for exploration and exploitation.

Innovation capability

The innovation capability was newly added into the success factor model. As continuous innovation efforts are essential in the microelectronic industry to stay competitive, a separate focus element was created. The innovation capability can be described as the company's ability to continuously generate new innovations. These innovations can be later exploited to generate profitable business out of it. An innovation strategy, the innovation structures, the innovation process, innovation tools, as well as the innovation cultures are essential parts[312].

[307] cf. Kötting, 2020, pp. 480-481

[308] cf. Proctor, 1997, p. 150

[309] cf. Lukito et al., 2022 p.16

[310] cf. March, 1992, pp. 71-87

[311] cf. Li-Ying et al., 2008, pp.107-126

[312] cf. Augsten et al., 2017, p. 154

AT&S has already identified key performance parameters for monitoring the innovation capability, such as the vitality index, which is already in a very good industry position. In order to still compete with the big industry players, it is recommended to keep that value at a high level and continuously advance it.

Zhou et al. (2017) also highlighted that a high focus on the resource allocation and development of dynamic capabilities should be made. Continuous technological, as well as market innovations need resource investments to ensure the company's long-term success[313].

The innovation capabilities are also required to address the challenges related to the new venture creations like impatient leadership when new venture creation takes time and that no profitable revenues occur on short-term. Additional challenges like the lack of innovation cultures and the lack of ownership need to be addressed. Missing cross-functional alignments with silo-thinking can be also difficult to drive innovations[314]. Impatient leaderships and the lack of innovation cultures and ownership in detail have not been mentioned in the interviews. However, still it is recommended to have a focus on the innovation capabilities with an assigned owner that drives the development and provision of the needed ecosystem.

Leadership capability

Lukito et al. (2022) defined the third seizing ability as people unifying capability. In the thesis, the capability was renamed into the "leadership capability" as essential factor in the new venture creation. The factor describes that the leadership team within the company need to develop skills to drive any transition and integration projects in an organisation. Caring for the employees, facilitating cross-functional collaboration in a new venture creation process, as well as implementing measures to get rid of silos in growing organisation are main elements based on the results reported by Lukito[315].

For each case at AT&S it was mentioned that the management commitment was very strong, and the management was very involved in the integration endeavours. As highlighted also by Proctor (1997), companies should work on forward-looking strategic views that are rolled-out in the whole organisation[316]. If the leadership team in the top management is not aligned on that, it might create chaos and uncertainty for new venture creation and integration teams and even other support functions that need to provide resources.

East-Asian groups, for instance, are characterised to practice collaborative decision makings, especially for complex decisions. There is also a differentiation about the cognitivism on the

[313] cf. Zhou et al. 2017, pp. 731-747

[314] cf. Jablonska

[315] cf. Lukito et al., 2022 p.17

[316] cf. Proctor, 1997, pp. 143-145

decision making process. Studies investigated that Japanese are more indecisive than Americans and Chinese. They are more likely to make thorough decisions on what requires a lot of information collection. In Japan, the decision making styles tend to be slower, whereas in South Korea or China people favour faster and intuitive or rule-based decision making. Based on the investigated studies by Yates et al. (2016), Europeans show a high level of indecisiveness when important decision problems are faced[317]. This can also result in slower decision modes when a lot of data collection is needed to get more transparency and certainty on the required decision. It is assumed that this relates also to the high level of uncertainty avoidance in Austria, compared to other countries that has been studied in the cultural dimensions of Hofstede[318]. Such a culturally difference should be also kept in mind at AT&S and maybe decision criteria and information needs to be defined beforehand for different types of decision. Therefore, all internal stakeholders know which criteria are relevant to make fast decisions and can prepare accordingly. The success factors model already serves as a kind of checklist; as a next step, it may be proposed to identify qualitative and quantitative scoring systems for the factors.

Due to the dynamical market developments of the microelectronic industry, managers at AT&S are asked to switch frequently between the explorative and exploitative focus. On one occasion, the decision about the plant infrastructure needs to be done, to install a new handling system that improves the overall quality in an existing plant. Two hours later, the management is asked to make a decision on whether to begin a strategic partnership with a new customer, which would necessitate a long-term development agreement, for example. Such a development agreement would also consume a lot of manpower and resources and AT&S would be binding for some time to the development. Hence, it is proposed that the management team should be able to practice a kind of managerial ambidexterity[319]. An important factor in that direction is also in crisis or recession periods; the long-term perspective of the company should not be undervalued[320]. Thus, even though a managerial ambidexterity is practised, it is advised to keep the areas separated and not underestimate the perspective of the long-term view.

6.2.4 Reconfiguring

Based on Teece et al. (1997) the reconfiguring capability focusses on the refining and redesigning of structures, processes, and cultures. It also aims to establish a balance between existing and future needed capabilities that drive the success of an organisation. Integrating

[317] cf. Yates, 2016, pp. 109-110

[318] cf. Hofstede-Insights, 2023

[319] cf. Raisch, et al. 2009, p. 689

[320] cf. Constant, et al. 2020, pp. 4-5

new businesses in the organisation and still supporting the existing ones that are responsible for the short-term profitability, are challenges that the configuring capability addresses[321]. Changing of working methods and daily working routines of the employees that are needed for a new business are related challenges, among many others that need to be addressed when integrating new businesses[322].

Lukito et al. (2022) clustered the execution assurance capability under reconfiguring. In this master thesis, this capability was renamed into the "execution, transformation and integration capability" to place a higher importance on the integration of new ventures that have been investigated in course of the master thesis.

Such a capability is required to prepare the involved stakeholders and directly affected employees for a planned integration of a new business and technology. A regular monitoring of the integration, as well as fast decision making is proposed. Relationships and networks to the involved internal and external stakeholders are recommend, among the provision of the required ecosystem and resources. Also, the definition of integration milestones and targets are suggested[323].

Among various other factors, AT&S also mentioned the importance of data driven and automated industrialisation capabilities as essential, especially for a production location in Europe. As proposed by McKinsey (2022), the digitalisation of the manufacturing plants and internal process can offer a high number of benefits, especially for a high-end manufacturing companies like AT&S. Examples for value potentials are advanced production methods, data generation and connectivity, as well as advanced analytics, artificial intelligence and the automation of knowledge work. Labour productivity, cost of quality and a better forecasting are just some advantages that can be obtained[324]. With the implementation of such digitalization digitalisation and automation measures, AT&S may be able to address the aforementioned challenges such as cost competitiveness and high quality criteria of new industries.

As also stated by Hansen et. al (2018)[325], there needs to be an early link in the development phase of a new venture between the exploration and exploitation focus areas. That also involves the innovation friendly environment, the time and resource spent for innovations, the external validations with lead customers, as well as internally displaying and communications. Cross-functional alignments are also highlighted by Hansen et al. as relevant factors. Most factors have been also identified in the interviews with AT&S. External validations with lead

[321] cf. Ellström, 2021, pp. 272-296

[322] cf. Teece, 2007, pp. 1319-1350

[323] cf. Lukito et al., 2022 p.17

[324] cf. Gregolinska et al., 2022

[325] cf. Hansen et al., 2018, pp. 484-508

customers, as mentioned by Hansen, were a high priority at AT&S because lead customers are regarded as critical to the success of new technology development. Important factors during the integration like defining responsibilities for the process, the integration framework, the know-how transfer, proposed by Hansen et. al (2018) were also mentioned in the interviews.

Hansen et. al (2018) divided the transition process into three phases: linkage in early phases, the transfer and after the transfer. All that phases face challenges and involve potential success factors, which managers need to be carefully considered. Hansen et al. also highlighted the need for a proven market potential before making the decision of an integration. The results of the interviews showed that AT&S had in nearly all cases a leading customer that had a very good supply chain power, technical know-how and therefore was driving the integration from an external side. It was, however, also mentioned that there were lessons learned in the past where developments failed with some leading customers, where AT&S did not check the overall market potential for a new technology.

In the success factors also the multi customer approach was mentioned once the first few leading customers were developed. Therefore, AT&S is already focussing on mitigating the risk to be exposed to only few customers. Furthermore, Hansen et al. highlighted that links between the exploration and exploitation focus areas should be done already in early phases. Therefore, the strong focus of the stakeholder alignment was stated. However, the cross-functional alignment between the BU, group board and different plants was named to be a weakness in the SWOT analysis. Hence, in that area AT&S has still some improvement potential, as it can be assumed that there is a need for more communication and regular exchanges.

6.3 Future recommendations

Considering all relevant findings out of the interviews and the literature, the following three recommendations can be derived:

1. Establish a link between the technology and new venture development cycle,
2. Maintain and facilitate the success factors model by a group function,
3. Encourage a proactive market development.

The three recommendations are described in the following sections.

6.3.1 Establish a link between the technology & new venture development cycle

It is important to provide a practical guidance where steps and milestones need to be considered when creating, developing and integrating a new venture. Thus, within the thesis a proposal was added on how to link the technology development cycle to a new venture creation cycle.

Figure 25 combines a proposal of how a combined technology and new venture creation stage gate process could be created. The stage gate process model is orientated on the "Agile-Stage-Gate-Hybrids" that Cooper and Sommer (2016) created. They highlighted the need for open innovation as very important process to receive impulses for any innovation activities[326]. In this thesis, the model of them was complemented afterwards also with the business incubation timeline that was oriented to the framework of Hansen et al. (2018)[327]. The findings were also linked then to the already available innovation process at AT&S.

Integrating the leading customer focus

Open innovations begin with the idea generation and the selection of the most attractive innovations for AT&S. At that point, based on the findings of the case interviews, AT&S has already found a few "leading customers" for the development of the new venture. Beside the technology development activities that are closely done with the leading customers, business incubations activities are recommended. In addition, to the technology development, it is advised to start with business incubation activities to support the development of the new venture from a business side. Once there is a feasible technology concept with the leading customer and attractive market potential identified, business acceleration activities are starting to enable a fast-time-to-market entry.

[326] cf. Cooper & Sommer, 2016, pp. 2-5

[327] cf. Hansen et al., 2018, p. 496

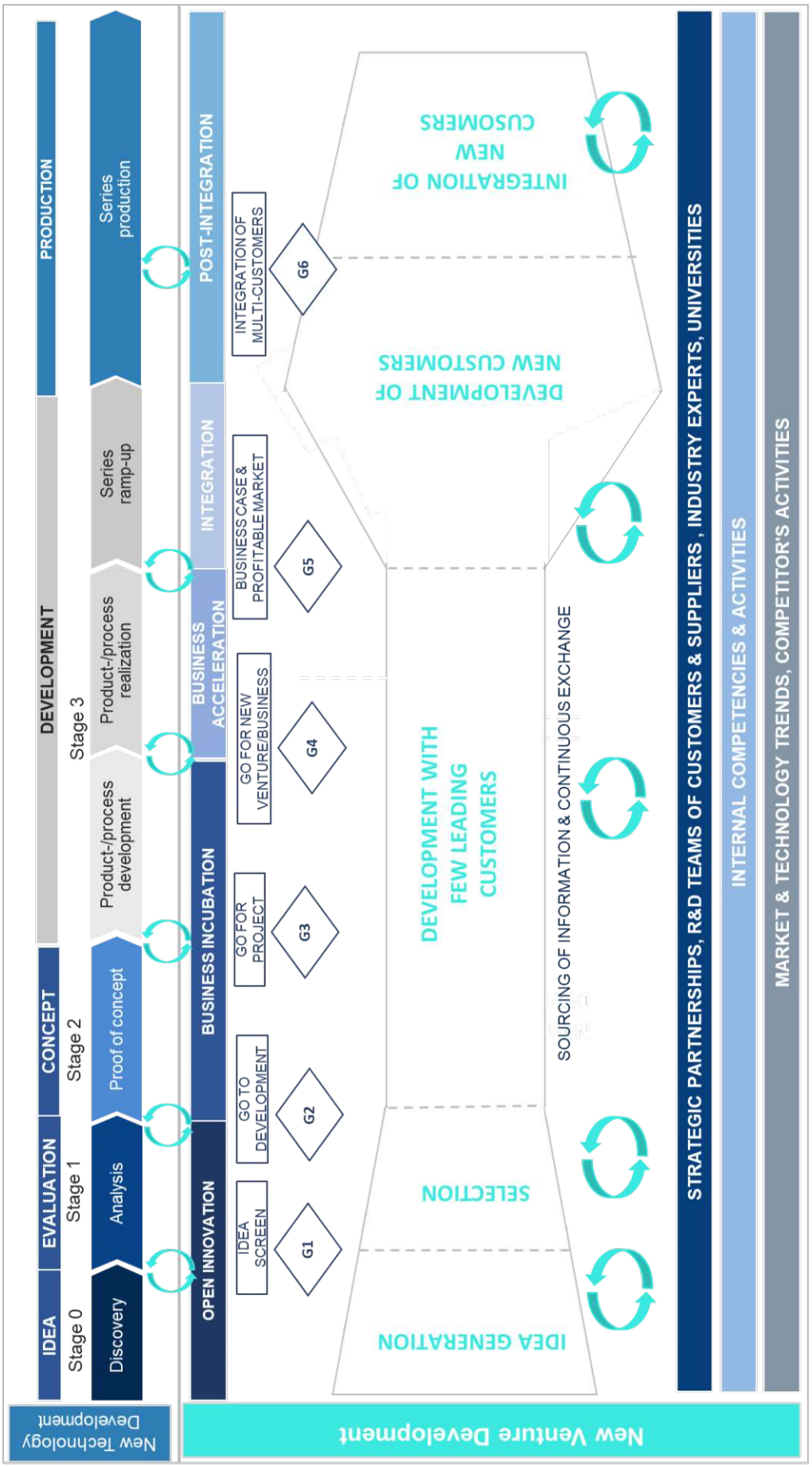

Figure 25: Combined “new technology” and “new venture” stage gate process[328]

Practise open innovation and observe market and technology developments

In order to also observe the markets continuously beside the lead customer development, Cooper (2012) argued that the Agile-Stage-Gate-Hybrids need to have continuous exchange cycles with relevant external and internal sources. Research and supply chain partners, leading customers and competitors can be external sources for instance[329]. A continuous monitoring is, therefore, also advised for AT&S to observe any external developments like the development of new disruptive innovations. This could have an impact on the venture's development, both positively and negatively. Cooper also pointed out that design partners are important like beta testers or early adapters in the development cycle[330]. The presence and network of AT&S's leading players in such early innovation is critical to being first in technology development. Such continuous exchange for open innovation can also support to understand the needs of the leading industry players and to jointly work on a development collaboration with them. With the strong and early collaboration of leading customers, AT&S is already well-positioned. However, such collaboration mostly targets the technology developments and fewer business model innovations. Thus, the link of the technology and new venture creation process can contribute positively to the innovation capability of AT&S.

Later in the innovation pipeline – phase in new customers

In the case of AT&S, in nearly all cases, the close collaboration with few leading customers were named as important success factors why most integration projects turned out to be successful. Thus, in the explained stage gate model, the innovation pipeline was kept straight until the development of the new business with the leading customers reached a "ready-stage" where the technology was developed and industrialisation, as well as ramp-up in high volume manufacturing, was completed. After having a basic and more standardised set-up of the technology, AT&S can start phasing in other customers, as well. Thus, the size of the opportunity pipeline is targeted to increase again.

Decision gates with milestones, checklists, and decision makers

Based on the interviews, it was highlighted that the current stage gate process, for instance, is not rolled out and especially that in general the decision making process is quite slow. Thus, in the attached proposal for the stage gate process decision gates are highlighted. Another step is to work out with focus groups what the qualitative and quantitative decision criteria are for passing a certain step. Additionally, a proposal and management approval of the required decision makers need to be made, to form a kind of steering committee.

[329] cf. Cooper & Sommer, 2016, pp. 2-5

[330] cf. Kimhi

Criteria can be divided into:

- **Market parameters** like CAGR, TAM, target price, number of competitors, number of customers and market share of the customers compared with the overall players in the market.
- **Technology parameters** like technical feasibility, equipment and infrastructure need, quality requirements, risks in the development, gaps to internal capabilities, competitors benchmarking.
- **Organisational parameters** like resource availability, capability of existing workforce, need for new capabilities, integration level of a new business, strategic relevance of the new venture.
- **Financial parameters** like profitability range, allowable costs, NPV, cash flow and investment requirement.

The criteria mentioned above are just some recommendations. However, as a next step in course of a cross functional workshop with the involved departments (chapter 5.1.1), such criteria can be worked out. Based on that, the decision-makers' responsibilities must be defined. As mentioned in the interviews, in some milestones even decision from the board level are required. In some other milestones, maybe a department head needs to make decision. In such decision making; however, definitely the business development and business incubation functions should be also relevant stakeholders. For them it is advised to monitor if the decisions are aligned with the overall strategic direction of the company and to bring in the proactive market view.

6.3.2 Maintain and facilitate the success factors model from a group function

A lot of information has been shared already on the new venture creation process and how it should it be set-up. The future proposal also includes a focused view on the continuous generation of new ventures that can be integrated into a new or existing business unit. It was also mentioned by Kötting (2022)[331] in his framework that the business incubation support should be coming from a corporate level and not by directly working in the business units.

The recommendation for the new venture creation is therefore to establish a focus team on a corporate (referred as “group”) level within AT&S in the future. Therefore, it can be assured that the operating business is not heavily influencing the exploration activities. Furthermore, on corporate level also the cross-functional alignment and communication can be facilitated in a more “neutral” way. Further, cross-BU learnings can be integrated, and best practises and experiences can be collected and distributed to the other BUs. Moreover, a group function can

[331] cf. Kötting, 2020, pp. 480-481

have a better objective view on disruptive innovations or the diversification of markets, where a business unit has no experience.

A business incubation focus team is recommended to be an own group department or being a part of a group strategy or technology innovation team as shown in Figure 26. It is also advised to build up a team with minimum three persons that have technology, as well as business and market related experiences. The team should not just consist of engineers, but rather have interdisciplinary know-how to be able to understand the overall economic and technical feasibility of a new venture . Furthermore, it is also advised that the team has already some levels of experience, whether internal one or from previous jobs. The target is also to act as mentor or coach in the organisation where some level of work experience in any related field is required. From cultural perspective, it is also advised to integrate a kind of diversity in them team. Hence, one person should be coming from outside or with a low level of working experience at AT&S. Here, the aim is to bring in new perspectives and ideas about what AT&S has not looked at in the past.

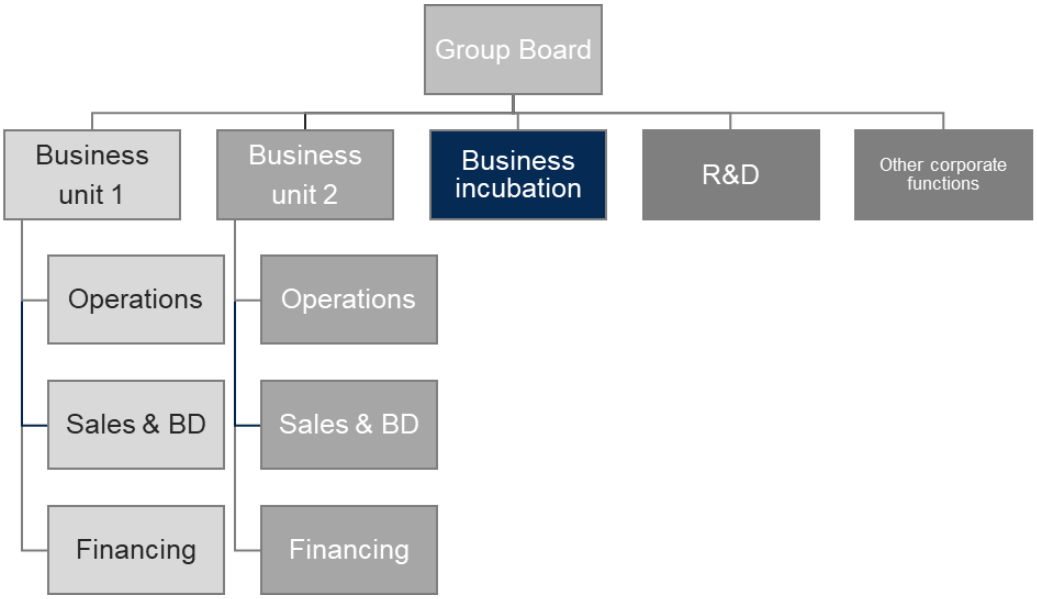

Figure 26: Integration level of a business incubation function

The tasks for this function can be from market screening, the business incubation consulting and to define and oversee the new venture creation cycle. Furthermore, the before-mentioned combined stage gate process should be coordinated and owned by such a team. In addition, the teams are responsible to work out decision criteria and steering committees for any decision gates of the cycle. Moreover, the team should be also monitoring if the company is able to facilitate the elements from the success factors model. A gap analysis or even a scoring with different traffic lights (green = good, yellow = improvement need, red = project at risk) can be done to evaluate the different capabilities. Such performance should be also presented to

the management teams. It is important to highlight what is running in a good way and where AT&S will need to improve in the future to ensure their long-term competitiveness.

Furthermore, maintaining and establishing networks to supply chain partners and research institutes is another important task of the team. Lastly, cross functional communication, best practise sharing in the company, establishment of joined online platforms are further actions that the teams can performance to enable an overall knowledge sharing within the company and avoid the establishment of silos.

6.3.3 Encourage a proactive market development

AT&S long-term strategic target is to become an advanced packaging solution provider as also mentioned in the latest investor relation presentation. For such a strategic move, AT&S will also need to start with the first steps. There was one important statement shared in one of the interviews, as shown below that highlights that AT&S is still very linked to the established PCB business model of a “electronic contract manufacturer”.

“We are still very strong in a “business contract manufacturing” business model that we have successfully practised over the last years. In the future, however, we need to be more proactive and understand which needs our customers have”[332].

AT&S has practised that business model as electronics contract manufacturer in a very good way. Customers communicated their needs to AT&S, and AT&S manufactured them, mostly with the assistance of the customers. Hence, innovations were mostly on a technology level where current competences have been advanced or new competences in form of technology features or processing methods have been established. With the new business unit in the substrate segment, however, AT&S already practises a new partnership business model. Know-how has been obtained from the leading customers, and additional collaborations with multiple customers are being formed on a partnership business model. That is already a significant step in the long-term strategic direction. A proactive market development is another step the company needs to take. It starts with a profound market understanding, beyond the few leading customers. The proactive market development is closely linked to the new venture development cycle and the dedicated to corporate business incubation function.

By having a better “market intelligence”, more data-based decision can be made. Moreover, the specifications and technology features for a new technology development could be “wider” defined as just for the leading customers. Hence, a faster acquisition of multi customers can be done as technology features do not need a high effort to be adapted to the mass market. A

[332] Interview 8, Pos. 65

faster multi customer acquisition can mean that a fast ramp-up of the business is possible, but also reduce the risk to be just exposed to a few leading customers only for a certain business.

In order to develop technological innovations continuously for advanced packaging, expensive equipment, tooling, educated and trained people are required. To justify resource investments, AT&S is advised to build up a profound know-how of the market. That would build up capabilities to forecast long-term technological needs and developments that might even constitute in disruptive innovations.

Impulses for a proactive market development can be given by the business incubation function. The leading customers have provided know-how, and additional collaborations with multiple customers are being formed on a partnership business model. That is already a significant step forward in terms of long-term strategic planning.

Market analysis would also mean more detailed investigations of applications, system break downs and different customer talks. However, it needs to be a collaboration between a cross-functional set-up. The business incubation function can also offer mentoring and coaching and provide a kind of direction on the needed information to make decision to enter a market or not.

6.4 Statement to the research questions

This sub-chapters aims to provide a summary to the defined main research and sub-research questions for the thesis.

6.4.1 Main research question

The main research questions for the thesis were primarily concerned with overall success factors:

“What are relevant success factors of corporate business incubation, with a focus on the integration of new ventures into the parent organisation? “

In order to answer the research question, the author conducted a literature review and collected some useful data from existing investigations that have been done in the area of ambidextrous organisations, dynamic capabilities, business incubation and in detail on the integration process. Next, interviews with eleven employees are conducted to obtain relevant information on the success factors. Based on the summary of the focussed cases, success factors for each case were derived and the cases were compared.

The top five success factors that have been named for at least three cases (from four) are:

1. Top management support & involvement
2. Dedicated project teams
3. Innovative technology & problem solving capability
4. Close collaboration between AT&S and the customer
5. Collaborations with few leading customers.

Furthermore, it was mentioned in the interview and already highlighted by Hansen et al. (2018)[333] that there is a need for linkages between the explorative and exploitative focus teams already early in the innovation pipeline of a new venture. With additional questions in the interviews, further information about the future needed success factors were asked that did not focus on the case itself. Therefore, another important success factors could be derived out of the interviews. These findings with the success factors of the individual cases were then summed up in the success factors model that had been already presented in the Chapter 5.2.

"Each new project should be aligned with the strategy and if strategic relevant, it should get an internal priority. It can become difficult if in every three months other projects are started and also have a high priority and nobody deprioritizes some of them"[334].

This quote reflects the need to involve the top management that define the priority level of the projects, which is aligned with the overall strategic direction. Too many projects might dilute the focus and jeopardize a successful integration of a few important ventures.

To summarise, the master thesis's main research questions could have been answered and recommendations made for future use at AT&S or/and other companies in the microelectronics industry.

6.4.2 Sub-question 1

The first sub-question was:

"What measures a company can apply to support the integration of new business ventures into the core organisation?"

It was intensively discussed in the thesis that a company is advised to keep a balance between exploration and exploitation activities within their organisation. Dedicated projects teams and facilitation and development of a success factor model are further recommended.

[333] cf. Hansen et al., 2018, pp. 484-508

[334] Interview 6, Po. 67

In addition, three general recommendations for practical implementation were provided. These were to establish a link between the technology and new venture development cycle, to maintain and facilitate the success factors model within a group function and to encourage a proactive market development in the company.

Concrete measures from the leadership teams like the involvement in strategically relevant projects, the fast and aligned decision makings are some examples that were also highlighted in the success factor model in sub-chapter 5.2.

The tasks considered by AT&S when integrating a new venture, were also summarised in sub-chapter 5.1.1. A technical and commercial risk assessment, the quality requirements check, as well as the qualification of the technology are some tasks that were mentioned, among the opportunity assessment and business case calculation.

To conclude, relevant information on the potential measures that can be implemented in an integration endeavour was elaborated in the master thesis.

6.4.3 Sub-question 2

The second sub-question was:

"Which steps should a company consider while managing the integration process?"

In order to answer this question, a proposal was given for the new venture creation process that is closely linked to the technology development process at AT&S. AT&S is using a stage gate process to monitor and steer ongoing technology innovations. However, it was stated by most of the participants that they know the stage gate process, but the process is not rolled out in the organisation.

There is no process at AT&S defined for business incubation activities that aims to develop new ventures. Hence, in the recommendations, a proposal was made on how such an overall new venture innovation pipeline can be created at AT&S. Tasks related specifically to the integration of a business were also highlighted in the sub-chapter 5.1.1 and discussion was added in the sub-chapter 6.1.1.

Thus, an insight was given into the important steps that are involved in the new venture creation and integration process.

6.4.4 Sub-question 3

The third sub-question was:

"How should be the set-up of cross-functional business incubation teams that are dealing with integration processes?"

In order to answer this question, the interviewees were asked to mention the most important departments that are involved in an integration process of a new business/technology. Generally, it was found out that it is a cross-functional endeavour where many departments and functions are involved. The most three important departments are:

1. Operations management
2. Group board and business unit board members
3. Technology development

Other important functions that were named are quality management, controlling and product engineering as explained in sub-chapter 5.1.3 and discussed in the sub-chapter 6.1.3. As a result, it is reasonable to assume that such endeavours at AT&S are more technological in nature and involve fewer business development, marketing, or strategy functions. The importance of sales management was even more often highlighted than any business development or incubation functions.

It can be assumed that the primary customer's perspective has been considered, but there have been fewer collaborations with those responsible for overall market assessment. Thus, recommendations in the sub-chapter 6.3 were provided to stimulate an increased business development or business incubation involvement in such endeavours.

Summing up, also for this sub-question some information could be derived out of the interviews and added to the master thesis.

6.4.5 Sub-question 4

The fourth sub-question was:

"What are the difficulties and risks in "mature" organisation for the integration of new businesses?"

There were two main questions related to the challenges in the integration in general. The first question was about any risks that AT&S might face in the future towards new venture creation. The second question was, at the end, what challenges the interviewees see for any future integration activities.

The challenges are elaborated in detail in sub-chapter 5.1.6 and the risks of the SWOT analysis were summarised in sub-chapter 5.1.5. In the literature part, some insights in general were

integrated as well. The findings of the analysis were then complemented with some useful information that could be derived from the literature.

The most important challenges were found for the integration process itself, like finding people or a project integration manager with the needed capabilities, unclear interfaces and slow decision making. To conclude, also information to answer that question was generated in course of the master thesis and relevant findings were elaborated in previous chapters.

6.4.6 Sub-question 5

The fifth sub-question was:

"Which guidance can be given to companies like AT&S operating in the dynamic microelectronic industry?"

There are several recommendations that can be derived from the findings of the master thesis. The main three recommendations are highlighted in the sub-chapter 6.3.

There is additional information included in the thesis that provides relevant guidance for AT&S and other players in the microelectronic industry to consider when launching new ventures.

Within this chapter a discussion was provided on the empirical findings that were complemented with relevant literature sources. Therefore additional information to the general findings like challenges and to the success factors model were added. Furthermore, three recommendations that were derived from the findings were also developed. Moreover, a summarized picture on the qualitative research questions was provided. In the next chapter, an overall conclusion of the thesis is given to conclude the elaborations of the master thesis.

7 Conclusion

In general, the main and sub-questions could be answered during the course of the master's thesis. Additionally, useful information to the new venture creation process was developed based on the literature and interview findings.

The scope of the thesis was to derive relevant success factors for future integration projects. By selecting internal cases that already dealt with such endeavours and by conducting interviews with the involved persons at AT&S, information on past experiences and lessons learned were generated. For the empirical part, therefore, a qualitative analysing method was used that was orientated on the framework of Goia et. al (2012). The research process started with initial coding of the interviews and finally aggregated dimensions were formed that where integrated in the success factors model.

In total, 53 important factors were identified that were integrated in the success factors model. The top management commitment, dedicated project teams, the innovative technology and problem-solving capability of AT&S, as well as the close collaborations with the leading customers were named as the most important factors. Such factors have been in place in similar successful historic projects at AT&S. An innovation capability was added to the success factors model. This emphasises the importance for AT&S to keep the innovation developments ongoing and to also spend sufficient and needed resources for the innovation activities.

In addition, also recommendations were provided to link the technology development cycle with a new venture creation cycle in course of a stage gate process. AT&S must continuously innovate technologies and, as a result, must establish good networks in the supply chain and with industry partners from early on. Once a few leading customers are acquired, the development of the technology is done in close partnerships with the leading customers. Multi customers are approached later. The learned know-how from the initial technology development, therefore, can be then exploited to others as well. It is critical for AT&S to maintain long-term relationships with these few key customers. Furthermore, recommendations on the proactive business development were made. The target is to screen proactively the market for technology and economic developments. Additionally, it was also recommended to maintain and facilitate the success factors model by a dedicated group function. Such a business incubation group function can be a separate department or be a part of the strategy or innovation department. The group function can also encourage cross-functional exchanges and guide the new venture development from a corporate perspective to align it with the strategic direction of the company.

"Before you start any new projects, you need to reflect the past and identify why something went wrong and some other things went well. You should also learn from the organization"[335].

The above-mentioned quote from one interview highlights the importance of organisational learnings. Important factors concerning the organisational architecture like consideration of organisational development and trainings, as well as the establishment of a needed organisational culture for a new venture were mentioned. The quote derived from the interviews also summarises the significance of reflecting on lessons learned from previous projects. Therefore, challenges in future projects can be considered early enough to proactively implement measures to overcome such challenges.

"Internal forces for stability that come from a company's past and present success run headlong into outside forces that demand change"[336].

As mentioned by the quote of Tushman (1997), it is important to learn as an organisation from previous experiences. However, it is also important to address the differences between the exploration and exploitation direction. Some work practises that have worked very well in the past might not be good enough today in order to stay competitive on a long-term basis. If AT&S would have just focussed on single-sided PCBs that are running smoothly in some facilities, the company would not have been able to compete with strong Asian competitors in long term. Hence, the company needed to differentiate its services and production on a technical level with new features, processes and so on. It is also recommended to continue focusing on the balancing of the structural ambidextrous set-up in the future in order to achieve market differentiation with new technology or other service offerings.

In conclusion, the work done in this thesis has established an added value for AT&S, particularly for all related functions involved in any new business creation and integration activities. Personally, the author could also apply skills and know-how that she learned in course of the MBA at the TU Vienna in this master thesis. Furthermore, the author could broaden her knowledge of the new venture creation process in general, including which challenges are involved and which important factors must be considered. Moreover, it was discovered that in such endeavours, internal as well as external macroeconomic developments must be closely monitored in order to implement changes as needed. Therefore, the author can be better prepared for her future responsibilities at AT&S. As a result, the work on the current master thesis benefited not only AT&S in general, but also the author and her future professional career.

[335] Interview 6, Po. 71

[336] Tushman, 1997, p.16

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Appendix

Appendix A: Interview guide

Interview Guide

Function: **Date:**

Interview Partner:
Position/ Responsiblities:
Project Responsibilites/ Experiences:
Years at AT&S:

Master Thesis "Success factors of corporate business incubation"

Larger companies are often experiencing difficulties to support new businesses, especially when they are dealing with radical innovations. In the dynamic market environment like the microelectronic industry, radical and continuous incremental innovations are necessary to establish an overall long-term success of the core organization. Structural ambidexterity is one approach to separate the explorative focus areas like R&D from the exploitative focus areas. Explorative focus areas are focused to develop new technologies and business models. Established business units in contrast, represent the exploitative focus areas that are concentrating more on the productivity, efficiency, and quality criteria to manage the short-term profitability. However, after the successful establishment of a new business/technology, it can be very challenging to manage the integration into the operating business again. Also, there are challenges related to the development of such new venture as well. Difficulties can be related in managing the re-integration with sufficient resources, know-how transfer and in setting-up the right structures, process, and organization for instance.

In my master thesis I would like to investigate the success factors of such re-integration approaches. In particular, I want to collect the key elements that need be considered like processes, structures, leadership support. Therefore, I have pre-selected some projects at AT&S that have been conducted in the past. Based on the analysis of lessons learned and individual experiences of involved persons, I would like to analyze potential success factors for such re-integration projects.

To collect your individual experience from the previous projects, I would like to conduct an interview with you. The interview intends to collect as much information as possible regarding previous experiences to projects, involved challenges, applied processes, environmental developments etc. that impacted the re-integration projects.

I would appreciate your participation that highly supports my master thesis and my work at AT&S.

Inputs for the Interview Partners

- Interview guide (content)

Preparation of the Interview-Partnters

Please send me templates, documentations to lessons learned from your experiences in the projects if available that can support my master thesis.

Interview Agenda – Duration approx. 60 min.

- Section A: General Questions (10 min)
- Section B: Selected Cases (40 min)
- Section C: Re-Integration Process (10 min)

List of Questions:

Section A: General Questions

- A1. Have you participated in the re-integration of a new business/technology into the core organization in the past?
  Yes No

If "yes" (in A.1), continue with the following questions:

- A2.1 If yes, in which function?
- A2.2 What were your tasks/responsibilities within this process?
- A2.3 Which departments were involved?
- A2.4 In your opinion, who (job position, BU, or Group level) should lead/coordinate the project? And who (job position) should strongly support the re-integration process?
- A2.5 Have you experienced re-integrations into existing business units? (yes/no) What were the main decision criteria for that?
- A2.6 Have you experienced re-integrations into a new business unit? (yes/no) What were the main decision criteria for that?
- A2.7 What were your lessons learned within previous re-integration processes and what would you do differently in the future?

If "no" (in A.1), continue with the following questions:

- A3.1 What do you think, which departments are involved in a re-integration process?
- A3.2 In your opinion, who (job position, BU, or Group level) should lead/coordinate the project? And who (job position) should strongly support the re-integration process?
- A2.5 What do think are main decision criteria to re-integrate new ventures into existing business units?
- A2.5 What do think are main decision criteria to re-integrate new ventures into new business units?

Section B: Specific Cases

- B1. Below I have highlighted 1 project/initiative from AT&S in the past that has been conducted. The case involves the establishment of a new/additional business area. In the following a focused discussion is planned based on your experience to the specific case.

No.	Case	Description	Time	Area
1	Substrate Technology	Establish as leading substrate manufacturer and industrialise interposer technology in Chinese, Austrian & Malaysian facility	2019 - 2025	Austria, China, Malaysia
2	Packaging for low voltage power application	Establish power packaging business with a lead customer in AT	2018-2023	Austria
3	Advanced Packaging in SHA	Establish advanced packaging technology for series business out of SHA	2015-	China
4	Packaging concept for a high complex board for satellites	Establish collaboration with a lead customer in packaging that offers a very complex board	2020 -	Austria

- B3.1 – B3.3: For the case where you have been involved, please answer the following questions:

How well were the following indicators developed?	Score 1 (weak), 5 (strong)	Comment
Customer Segments		
Value Proposition		
Supply Chain		
Customer Relationship		
Cost Structure		
Revenue Streams		
Key Partners		
Key Activities		
Key Resources		
Competition Intensity		
Profit contribution (overall AT&S revenue)		

Degree of innovation (1 = radical, 5 = low incremental)		
Top management involvement		
External support		
Stage-gate-process		
What were the top 3 reasons for success/failing?		

Section C: Re-integration process

- C1: If you would consider in general the re-integration processes of new ventures, how would you evaluate AT&S position in that area based on the following SWOT analysis?

Strengths	Opportunities
Weaknesses	Risks

- C2: How could the opportunities being utilized?
- C3: How could the risks be overcome?
- C4: Is AT&S using a stage-gate-process?
- C5: If yes, how well is the stage-gate-process rolled out on the overall organization (e.g., business unit and group functions)?
- C6: What are the top 5 success factors in the re-integration process in your opinion? And why?
- C7: What are the top 5 difficulties in the re-integration process in your opinion? And why?

We are now at the end of the interview. Do you have any additional information that you would like to share? Or do you have any feedback to the interview in general?

Thanks for the participation in the interview!

Appendix B: Success factors model

Dynamic Capabilities					
Sensing	**Seizing**				**Reconfiguring**
Market & technology opportunity scouting capability	Strategy formulation & execution capability	Organizational architecture & design capability	Innovation capability	Leadership capability	Execution & transformation, integration capability
Monitor time-to-market of a technology	Priority setting based on strategic direction	Cross-functional communication	Fast problem solving	Middle management coaching of the project teams	Inpiring project leader
Aligned development time with market and customer	Align resource allocation with strategy	Consider organizational development & trainings	Early customer integration in development cycle	Top management committment	Project communication
Market & data-driven decision making	Commitment of the whole organization	Establish needed organizational culture	Deticated highly educated teams (new hires)	Internal & external sponsor of new businesses	Consider change management
System understanding of customers products	Purpose - big picture	Resource split between exploration & exploitation	Early in-house R&D initiatives	Engagement of top management with customer	High level reportings
Continuous observation of external market developments	Long-term persistance & horizon		Innovative technical solution capability	Good leadership skills of middle mangement & project managers	Close alignments with leading customers
				Aligned company leadership team	Dedicated & qualified integration project team
				Fast & aligned decision making	Regular review meetings with sponsors
				Stakeholder management	Project & resource plan for integration

Ordinary Capabilities			
Financing	**Operating**		
Resources & investment capabilities	Strategic partners & customer selection capability		Business continuity & operational performance capbility
Attractive business plan	Leading customer	Multicustomer approach - risk mitigation	Consider quality requirements early in development
Development contracts with deliverables	Power & reputation of leading customers	Good supply chain network	Focus on cost competitiveness
Charge development costs	Complex solutions requires close customer interaction	Network to reserach institutes & local agencies	High quality standards in operations
Capacity contracts with customers	Trade-offs on market where not to play		Transparent KPIs to measure success

Case 1: Substrate						
Stage gate process	Customer segments	Value proposition	Supply chain	Customer relationship	Revenue streams	Success factors
First Innovation based on stage gate process	Leading customer at begin	AT&S is seen as leading technology company	Leading customer: strong power towards supply chain	Development & capacity contracts with customers	Prices defined in contracts	Flexibility of integration process to ouside changes
After lead customer involvement no stage gate process followed	At begin: customer acquisition for opportunities	Full transparency in AT&S processes	AT&S has smaller network compared with competition	Higher level management of both parties involved	Charges for development efforts	High quality standards in operations
Separate customer aligned project plan & milestones	Investment to the right time	Today: best quality supplier		Intensive collaboration with lead customer	Design fees & simulations	Early in-house R&D initiatives
	Clear strategy on diversification of the market	High complex technical solutions		Leading customer clear requirements - no compromise		Full transparency in AT&S processes for customers
	Multi-customer acquisition after ramp-up leading ones	Need for capacity in the market				Fast & alignment decision making
Key activities	External support	Key resources	Top management involvement	Competition intensity	Cost structure	Dedicated highly educated teams (new hires)
Early in-house R&D initiatives	Lead customer	Fast problem solving capabilities	Strategic direction (alignment on all board members)	Attractive, less competitive market	Less cost sensitive at start	Fast problem solving capabilities
Very early integration of customer in development cycle	Construction & plant design companies	Well-conducted project management	Many investment projects: weak middle management	High end segment lower competitive pressure		Data driven & automated industrialization capabilities
High narrow & exclusive start	Consultants for project leader coaching	Infrastructure for R&D to continuously practise research	Close alignment in decision making with top management	High end segment with growing competition		Time for planning phase
		High digitalization in dedicated plants	Good stakeholder alignments		Strategic direction (alignment on all board members)	Stakeholder alignments
Key partners	Degree of innovation	Change management agents	Fast & alignment decision making		Development & capacity contracts with customers	Well-established project management skills
Few leading customers	Continuous advancement of technology ongoing	Dedicated highly educated teams (new hires)			Leading customer at begin	Very early integration of customer in development cycle
	Technololy very innovative at start	Data driven & automated industrialization capabilities			Higher level management of both parties involved	Right time-to-market

Appendix C: Case 1

Case 2: AP						
Stage gate process	Customer segments	Value proposition	Supply chain	Customer relationship	Key resources	Success factors
Low use of stage gate process	Lead customers at begin	Efficiency improvements with new technology	Start: many collaborations with supply partners	Strong and frequent interaction with leading customers	Broad technology specifications	Time-to-market of technology
Fist fully documented stage gate process	Consumer industry - early adapter of technology	AT&S role model for technology innovation	Start: SC partner open to adapt to technology	Long-term relationship with lead customers & loading	Continuous technology advancement	Dedicated technology and integration project teams
	Profitable market outlook	Innovative technical solution capability	Today: not many HVM set-ups developed	No long-term development agreement with customers	Long history experience with technology development	Continuous advancement of technology
	Market & customer diversification targeted	Technology first a star in the industry	Beyond existing customers, AT&S no big purchasing power		Industrialization capabiliy important to achive high yields	Innovative technical solution capability
	Reduction of customer portfolio due to unstable operations				Before own BU AP, then integrated in existing BU	Power & reputation of leading customer
	Clear strategic focus - also communicated		Key partners	Degree of innovation		Strong and frequent interaction with leading customers
	Start: No strategy or business development function involved		Leading customers	Today: More incremental, but advancements in progress		Leading customers in different phases
						Attractive and long-term business case

Appendix D: Case 2

Key activities	External support	Competition intensity	Top management involvement	Revenue streams	Cost structure	Strong top-management involvement
Hardware manufacturing is core competence	Intellectual property consulting	No standard: very different concepts - no plug & play	Very strong top management involvement	Development and qualification costs charged	Cost competitiveness, compare on customer system level	Clear strategic focus transferred into the whole organization
Design support esp. at the beginning to support market entry	Market studies	Today: some Chinese competitors	High top level reporting	Price performance important to justify higher price		
Full scope services for full turn key solutions offered		Start: low competition				

Case 3: EMB SHA						
Key activities	Customer segments	Value proposition	Supply chain	Customer relationship	Cost structure	Success factors
Design and idea from customer	Clear business case & forecast for mass production	Offer additional service among hardware manufacturing	Some established supply chain partners	Close interaction with main leading customers	Cost competitiveness - no economy of scale	Structured transfer management
Design services among main hardware delivery	Attractive market	Some customer requests - ready-established service portfolio	AT&S low negotiation power for component sourcing	Creation of co-development project for customized solution	High impact on pre-materials	Innovative technology
Integration of high end technology to China	No market development strategy		Low capabilities on component supply chain			Deticated project teams and responsibilities
Utilize already established technology in Austria	Leading customer at begin					Top management support
	No series production with lead customer		Degree of innovation			Attractive and long-term business case
			No high innovation - rather industrialization in new plant			

Appendix E: Case 3

Stage gate process	External support	Competition intensity	Top management involvement	Revenue streams	Key resources	Key partners
Stage Gate Process in place	Market research	Increasing cost pressure	Regular management reporting meetings	Design fees and customized development charges	No clear spezialization of both plants	Main leading customers
		AT&S more innovative than competitors	Clear sponsor	CN customer ask free prototypes	Cross BU function project	Some established supply chain partners
		Only few competitors are in HVM	High top management support		Technology qualification in 2 plants	

Appendix F: Case 4

Case 4: Complex EMB						
Stage gate process	Customer segments	Value proposition	Supply chain	Customer relationship	Key resources	Success factors
Stage gate process available	Lead customer at the begin	Complex solutions requires close customer interaction	Very low level involvement of third parties	High transparency with customers	Dedicated project teams at both parties	Middle management coaching of the project teams
Each stage different project leader	Holistic solution for whole market at start not feasible	Capability - AT&S understood the problem	High purchasing power of customer in supply chain	Top management exchange of both parties	Senior level of engineering	Close collaboration AT&S & Customer project teams
		AT&S has high flexibility in development		Several iterations with customers	Complex & low volume production location	Customized solution development
		Deep technical exchange with customer		Development contracts with deliverables	Solution orientation of involved engineers	Technical capability with high flexibility
Key Partners	Degree of innovation			Daily exchanges with customer	High costs of hardware and engineering support on production	Top management exchange of both parties
Solution development with key customers	Radical technology innovation			Good relationship with the customer		Dedicated project teams at both parties
						Support of top management
Key activities	External support	Competition intensity	Top management involvement	Revenue streams	Cost structure	Development contracts with deliverables
Strong customer push for technical requirements	Few supplier as external support	High complex niche technology	Middle management coaching of the project teams	Charges for specific customer developments	High proportion of specific customer development effort	
AT&S focus on hardware production	No specific partners, except customer	No competition at the start due to missing capability	Top management very supportive	Package quote for prototype builds		