Ctrl+Alt+Innovate: Engineering a Digital Twist for Rejlers

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This thesis intricately traces Rejlers' journey into the digital era. As a prominent engineering consultancy company, Rejlers specializes in delivering comprehensive services spanning Industry, Energy, Infrastructure, Buildings, and Mining and Metals. The writer weaves together valuable insights derived from customer interviews, internal discussions, surveys, and engagements with potential partners. Grounded in a customer-centric approach, the research identifies key challenges, including the limitations of existing IoT systems and complexities in polymerisation processes. The internal landscape reveals a harmonious blend of fiscal acumen and technological foresight, reflecting a delicate symphony within Rejlers.

Surveys echo a unanimous call for prioritizing a skilled workforce and venturing into the digital domain. Potential partner interviews illuminate strategic pathways, advocating a phased approach starting with process optimization and predictive maintenance. The proposed Digital Consultancy Department emerges as the linchpin, poised to leverage existing customer relationships for innovation.

This thesis concludes with a roadmap for Rejlers — a phased, customer-centric journey that aligns seamlessly with internal goals and external opportunities. The envisioned department, driven by adaptability and customer-centricity, positions Rejlers as a proactive digital solutions provider. The next steps are clear — a transformative leap into the digital era, underscoring Rejlers's commitment to excellence in the realms of chemical industry processes and beyond.

The proposed Digital Consultancy Department emerges as the beacon in this transformative odyssey. Anchored in collaboration with trusted customers, it initiates a phased approach, beginning with process optimization driven by AI and AOS360. The roadmap unfolds further with a strategic partnership for predictive maintenance, cementing Rejlers's commitment to innovation. This thesis concludes with a resounding call for Rejlers to embrace its digital destiny, encapsulated in a dynamic department designed not just to adapt but to pioneer transformative solutions. The narrative closes with recommendations echoing the pulse of the digital age, where customer-centricity and technological acumen converge for sustained success.

Keywords
Digital Transformation, Customer-Centric Approach, IoT Systems, AI and AOS360 Integration, Predictive Maintenance, Strategic Partnership, and Process Optimization in the Chemical Industry

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List of Abbreviations

3D	Three-Dimensional
AI	Artificial Intelligence
AR	Augmented Reality
CEO	Chief Executive Officer
CIO	Chief Information Officer
EBITA	Earnings Before Interest, Taxes, and Amortization
ETCS	European Train Control System
IBM	International Business Machines Corporation
IoT	Internet of Things
JSON	JavaScript Object Notation
ML	Machine Learning
MS Azure DB	Microsoft Azure Database
MQTT	Message Queuing Telemetry Transport
OPC	Unified Architecture - OPC UA
PE	Polyethene
PLC	Programmable Logic Controller
PP	Polypropylene
REST	Representational State Transfer
S7-1500	Siemens S7-1500 (a model of Siemens PLC)
SEK	Swedish Krona
VR	Virtual Reality
WWW	World Wide Web

1 Introduction

Heraclitus, the ancient Greek philosopher, wisely proclaimed that "change is the only constant in life." In the modern business landscape, this axiom resonates louder than ever. The ability to adapt and evolve in response to the ceaseless tide of change is imperative for any organization aiming to thrive in a competitive world.

Today, as technology advances at an unprecedented pace, companies across diverse industries find themselves at a critical juncture. To remain competitive and deliver innovative services to their clients, they must embrace digital solutions. The engineering consultancy sector, a domain deeply rooted in traditional practices, is no exception to this digital transformation. (Brynjolfsson, E., & McAfee, A., 2014.)

In the dynamic landscape of contemporary business, the rapid evolution of technology has become a driving force reshaping industries and business operations. Digital transformation, encompassing artificial intelligence, data analytics, and emerging technologies, has emerged as a pivotal strategy for organizations striving to stay competitive and relevant in the face of constant change.

Thus, the primary objective of this thesis is to ascertain the necessity for Rejlers, a distinguished engineering consultancy firm, to make a critical decision: whether to establish a new digital transformation department, venturing into uncharted territories of digital solutions and potentially propelling Rejlers into the digital age, enhancing its overall effectiveness and efficiency. However, we must carefully consider both sides of this equation, as changing Rejlers' business focus might involve risks, potential losses, and the inefficient allocation of resources. Thus, my research will predominantly revolve around evaluating the wisdom of expanding into new digital transformation services versus maintaining Rejlers' current core business activities.

In conclusion below are the objectives of my thesis:

- **To Analyse Advantages and Risks:** Undertake a comprehensive examination of the specific advantages and risks associated with Rejlers' potential adoption of digital transformation services.
- **To Propose Effective Implementation Strategies:** Develop strategies tailored to Rejlers' unique context, providing a roadmap for the establishment of a robust digital transformation sector within the organization.
- **To Explore Integration Mechanisms:** Investigate how Rejlers can ensure seamless cooperation and integration between the digital transformation sector and existing departments, optimizing overall organizational efficiency.

Founded in 1940 in Sweden, Rejlers has grown to become a leading engineering consultancy, offering high-quality services across, Finland, Norway, Sweden, and Abu Dhabi. By comprehensively understanding and embracing emerging technologies, Rejlers can position itself at the forefront of the industry. This proactive stance ensures that any company continues to provide cutting-edge services, remaining a trusted partner to its clients. (Porter, M. E., & Heppelmann, J. E, 2015).

Yet, there is more to this story than opportunity. If Rejlers opts against implementing a new Digital Consultancy Department, it exposes itself to several risks. These include missing technological trends, being unable to provide comprehensive solutions, having limited market reach, and losing ground in terms of innovation and industry reputation. The consequences could range from dwindling clientele and reduced efficiency to a shrinking market presence. (McKinsey & Company, 2018).

In this thesis, we endeavour to uncover whether Rejlers would be exposing itself to various risks or if maintaining its present course as a market leader is the prudent choice.

Research questions:

Questions are divided into 2 parts, starting from whether Rejlers should go ahead with new digital services or not.

Research Question 1:

- Q1: What distinct benefits and potential risks would Rejlers encounter upon embracing digital transformation services?

Research Question 2:

- Q2: If Rejlers chooses to incorporate digital services, what strategies and approaches would be most effective for establishing the digital transformation sector within the organization?

By addressing these research questions, this thesis aims to provide comprehensive insights and evidence-based recommendations to guide Rejlers in the successful establishment of the digital transformation sector. These findings will support informed decision-making, strategic planning, and the integration of digital solutions into the company's core operations, enhancing its overall performance and market position.

2 Literature Review

In the age of digital transformation, businesses across industries are compelled to adapt and integrate emerging technologies into their operations to remain competitive. This section delves into the pertinent literature, theories, and models that form the foundation for understanding the dynamics of digital transformation in the engineering consultancy sector. We will try to understand what experts are saying regarding digital transformation and then we will analyze whether it is a promising idea to build a digital transforming sector within Rejlers or not.

2.1 The Digital Transformation Landscape

Digital transformation is not merely an option but a necessity in the contemporary business environment (Westerman, Bonnet, & McAfee, 2014). It encompasses a wide range of technological advancements, including the Internet of Things (IoT), Artificial Intelligence (AI), and Machine Learning (ML) which have the potential to revolutionize the way organizations operate. Embracing these technologies can lead to improved efficiency, cost-effectiveness, and enhanced customer experiences.

2.2 The Impact of Emerging Technologies

The rapid evolution of technology has significant implications for industries rooted in traditional practices, such as engineering consultancy. Brynjolfsson and McAfee (2014) argue that emerging technologies have the potential to disrupt established business models, creating both challenges and opportunities. Understanding these technologies and their applications is vital for organizations seeking to leverage them effectively.

2.3 The Strategic Importance of Digitalization

Davenport and Harris (2007) emphasize the strategic significance of digitalization. They argue that adopting digital solutions is not solely a matter of technological upgrade but a fundamental shift in business strategy. Organizations that successfully navigate this shift can gain a competitive advantage, whereas those that lag may find themselves at a considerable disadvantage.

2.4 Framework for the Study

To comprehensively investigate the establishment of a Digital Consultancy Department within Rejlers, this study employs a mixed-methods approach (Creswell & Creswell, 2017). Qualitative interviews will be conducted to gain insights into stakeholder perspectives, while quantitative surveys will provide empirical data for analysis. This combination of methods allows for a holistic understanding of the subject matter and enhances the robustness of the study.

2.5 Identification of Gaps in Existing Research

Despite the growing body of literature on digital transformation, there exists a notable gap in research specific to the engineering consultancy sector. While general principles of digitalization are applicable, the unique challenges and opportunities faced by engineering consultancy firms have not been extensively explored. This study aims to bridge this gap by offering insights and recommendations tailored to Rejlers's context.

2.6 How Rejlers can impact being part of the New World

The Forbes article, "Launching a business in a new industry? June 2021," highlights the challenges of entering a new industry without prior expertise. Conducting market research is recommended to target the sector effectively and avoid surprises. Considering competitors in advance is essential for strategic planning. Care should be taken to ensure that establishing a new sector does not disrupt the organization's current ongoing services. The article also prompts leaders to weigh the benefits of forming a new sector from scratch versus partnering with experienced companies in the industry.

The research will draw insights from various sources, including books such as "Industrial Digital Transformation" by Shyam Varan Nath and "Digital Transformation of the Consulting Industry" by Nessen, along with articles related to engaging in a new industrial sector. Additionally, references will be made to works like "Buying and Selling a Business" by Garret Sutton, and articles from Forbes that offer valuable considerations when buying an existing business.

As per the World Economic Forum article," 7 charts on the future of Automation". Over the last ten years, the idea of machines doing many jobs has become increasingly real. Even though it is still hard to know exactly how much machines and smart systems will change the way we work, experts are starting to agree on a few things.

About half of the time people spend working in factories is for jobs that involve using their hands a lot. But by 2030, it is predicted that only around 35% of work time will be for these kinds of tasks. This means machines might take over some of the jobs that are more routine and repetitive. For this robotic job, IOT, Rejlers consultancy will be required. (Weforum.org, 2019.)

For example, by 2025, 10-15% of jobs in areas like making things, moving stuff around, and selling things could be done by machines. And by 2035, this could go up to 35-50% for those areas. A lot of factories are buying robots because they are getting cheaper. It is expected that between 2015 and 2025, the cost of robots could drop by 65%. This makes it harder to keep jobs that do not need

a lot of exceptional skills, especially when paying people gets more expensive. (Weforum.org, 2019.)

In the past, when modern technology came, it usually made more jobs than it took away. By 2030, AI alone could have a huge effect on the economy, around $15.7 trillion. (Weforum.org, 2019.) Hence, I think Rejlers should be prepared for such changes in the coming future.

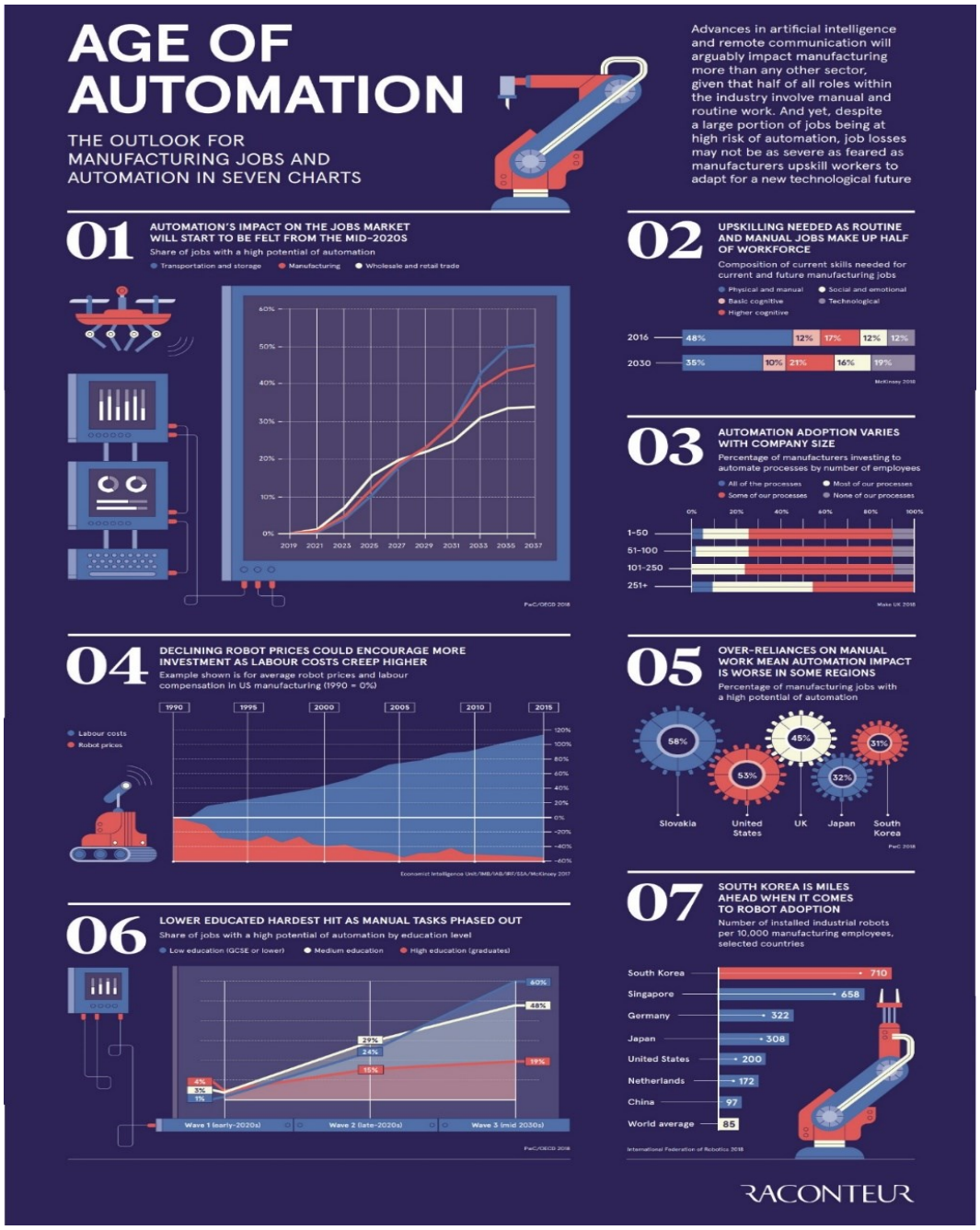

Figure 1. Age of Automation (Image: Visual capitalist, 7 charts on the future of automation, 2019)

Let us understand using an example of Visual AI used in the manufacturing Industry, similarly, Rejlers can propose the solution to their clients and provide consultancy services for the same.

Examples where Rejlers can help:

As per the article, Mapping process to productivity, 2023 by Automation.com, Visual AI in Manufacturing was used to see the manufacturing process and find better ways to manufacture a product along with detecting the defects in the produced material in the factories.

With this technology, we can improve the collaboration between machines and humans which ultimately results in better productivity. In contrast to traditional methods prone to human errors, Visual AI excels in precision and accuracy.

As highlighted in the earlier article, cameras in factories were primarily focused on inspecting finished products. However, with the advent of innovative tools employing Visual AI, the focus has shifted to monitoring the entire manufacturing process, not just the results. This type of observation proves invaluable for factories, leading to time and cost savings by identifying more efficient work methods. (Cyrus Shaoul, 2023.)

Picture this: Imagine strategically placing advanced cameras in the vicinity where components come together for assembly. These cameras capture images and relay them to intelligent computer programs equipped with the ability to comprehend these visuals. Once trained to identify people, machines, and their respective actions, these programs can systematically monitor operations, generating graphs and numerical data that vividly illustrate the dynamics of the process. (Cyrus Shaoul, 2023.)

Some of these intelligent tools are crafted to assist workers on the spot, ensuring precision in their tasks. Think of them as real-time helpers, guiding as needed. Meanwhile, others play the role of detectives, observing and analyzing the intricate dance between human workers and machines along the entire factory assembly line.

These tools provide crucial information, such as the time needed to complete a task, the overall efficiency of operations, and even the safety conditions for everyone involved. They offer insights into workforce dynamics, detailing the number of people dedicated to a task and how they allocate their time - whether standing, walking, or engaged in various activities. Importantly, they are designed with privacy in mind, often blurring faces and bodies or refraining from recording together.

These insightful observations empower factories to compare different times of the day and various work areas, identifying what functions optimally and where improvements can be made. These

intelligent programs serve as invaluable allies to factory experts, offering insights that prompt adjustments in operational processes based on visual data.

By sharing these constructive findings from management to workers, a collaborative effort ensues to enhance operations further. A notable advantage is the ability of these intelligent programs to archive promising ideas, creating a repository that can be used for training purposes. (Cyrus Shaoul, 2023.)

Moreover, the applications of these smart tools extend beyond factories to areas like warehouses and construction sites. The trajectory suggests continued growth and the discovery of novel ways to aid. (Cyrus Shaoul, 2023.)

Similarly, Rejlers can dig out into the current customer area and help customers make their process easier and cost-efficient by finding out time-consuming areas or ways to make the process easier.

Beyond the immediate scope of providing services like Machine Learning models, IoT, AI, and Robotic Automation, Rejlers' innovative Digital Consultancy Department holds immense potential to gain advantages and make a significant impact across various fronts:

- **Predictive Maintenance in Manufacturing:** The department could delve into predictive maintenance solutions by leveraging IoT sensors and data analytics. This would help industries anticipate machinery failures, thereby reducing downtime and optimizing maintenance schedules.
- **Supply Chain Optimization:** Utilizing data-driven insights, the department can assist clients in optimizing their supply chains. By forecasting demand and identifying potential bottlenecks, efficiency can be enhanced.
- **Energy Management:** Digital solutions can play a pivotal role in energy management. The department could develop tools to monitor energy consumption, identify wastage, and propose energy-efficient solutions to clients, contributing to sustainability goals.
- **Customer Experience Enhancement:** Employing AI-powered chatbots and virtual assistants, the department can help clients enhance their customer service. These tools could provide immediate responses to customer queries, improving user satisfaction.
- **Smart Cities and Infrastructure:** The Digital Consultancy Department can contribute to building smart cities by integrating technologies such as IoT, data analytics, and AI to enhance infrastructure management, traffic flow, waste management, and public services.
- **Healthcare Transformation:** The application of AI and data analysis in healthcare can optimize patient care, improve diagnostics, and streamline administrative tasks. The department

could provide solutions to healthcare institutions seeking to modernize their operations. Rejlers can use AI for the new customers they currently have.

- **Environmental Monitoring:** Developing IoT-based systems for environmental monitoring can aid industries in tracking pollution levels, air quality, and resource consumption, aligning with environmental sustainability.
- **Educational Technology:** The department could venture into creating e-learning platforms with personalized content delivery using AI. Such platforms can reshape education and training methods for various sectors. In the future, they may consider establishing their educational foundation to educate individuals and subsequently recruit them after they complete their training.
- **Virtual Reality (VR) and Augmented Reality (AR) Solutions:** By exploring VR and AR technologies, the department can develop immersive training, simulation, and visualization tools for various industries.
- **Data Security and Privacy Consulting:** With the rise of digital operations, ensuring data security and privacy becomes paramount. The department can offer consultancy services to clients to safeguard their digital assets and comply with regulations.
- **Crisis Management and Disaster Response:** Leveraging AI and data analysis, the department could develop tools to aid in crisis management and disaster response, providing real-time insights for informed decision-making.

By exploring these diverse avenues, Rejlers' Digital Consultancy Department can position itself as a versatile partner in the digital transformation landscape, catering to a wide array of industries and propelling them toward innovation, efficiency, and growth.

This thesis aims to explore the most effective approach for facilitating Rejlers' expansion into the developing world. It will cover key areas such as digital transformation in engineering consultancy, the establishment of a new department, organizational alignment, budgeting considerations, and market research. While the thesis will not delve deeply into highly technical details of specific digital tools or implementation plans, as these might be more suitable for a separate, more comprehensive study, it will provide valuable insights. Additionally, any analysis of organizations will be conducted without disclosing specific names, especially regarding Rejlers' potential acquisition plans.

2.7 Justification and Significance of the Study

The establishment of a Digital Transformation Department within Rejlers would be a strategic initiative that warrants comprehensive research and analysis. This section justifies and highlights the significance of the study, underlining its relevance and potential impact.

2.7.1 Justification:

Industry Transformation (Porter & Heppelmann, 2015): The engineering consultancy sector is undergoing a profound transformation, with digitalization becoming central to project execution. Failing to adapt to this transformation could result in a competitive disadvantage.

Client Expectations (Westerman, Bonnet, & McAfee, 2014): Clients increasingly expect holistic solutions that incorporate emerging technologies. Without a dedicated Digital Consultancy Department, companies may struggle to meet these expectations.

Market Dynamics (Brynjolfsson & McAfee, 2014): Market dynamics are evolving rapidly. Not adapting to technological trends like IoT and AI may result in missed opportunities and challenges in staying relevant.

Efficiency Gains (McKinsey & Company, 2018): IoT and AI can optimize operations and reduce costs. The absence of a digital solutions department may hinder clients from leveraging these efficiency gains.

2.7.2 Significance:

Strategic Decision-Making: The study provides valuable insights for the company's leadership to make informed decisions regarding establishing the Digital Consultancy Department. It guides strategic planning aligned with industry trends (Christensen, 1997.).

Competitive Advantage: A well-structured Digital Consultancy Department can give any company an edge over competitors by offering comprehensive services and staying innovative (Davenport & Harris, 2007).

Client Satisfaction: By aligning with client expectations, the department can enhance client satisfaction and loyalty (Reichheld, 2003).

Efficiency and Innovation: The department can drive efficiency and innovation, supporting growth and profitability (Christensen, 1997).

Industry Leadership: Establishing this department positions as a leader in embracing digital solutions in the engineering consultancy sector, enhancing its reputation and attractiveness to clients and talent (Porter & Heppelmann, 2015).

Futureproofing: As industries become more digitized, the study helps any company future-proof itself by being prepared for upcoming industry shifts (McKinsey & Company, 2018). So, it will help Rejlers too.

In conclusion, this study's justification lies in the rapidly changing industry landscape and client expectations, while its significance is underlined by its potential to inform strategic decisions, enhance competitiveness, drive efficiency, foster innovation, and secure Rejlers's position as a forward-looking industry leader.

In the exploration of establishing a new sector within Rejlers, a pertinent question arises: What potential harm or risks might be associated with this venture? The forthcoming sections will meticulously unravel these intricacies. Despite this, for a comprehensive analysis, let's temporarily adopt the perspective that the formation of a new digital transformation sector within Rejlers is underway. This approach will allow us to delve deeper into identifying risks and assessing their impacts. Thus, with this assumption in place, we embark on an insightful journey to understand the complexities and challenges inherent in the establishment of this innovative sector within the organizational framework of Rejlers.

3 Research Methodology

The research methodology outlined in this study aligns with a case study with a proposal approach rather than an action plan. This approach combines in-depth exploration with practical planning, making it well-suited for addressing the complexities of establishing a digital transformation department within Rejlers.

The case study methodology adopted in this research draws upon a rich tradition of qualitative research. It is rooted in the idea of conducting an in-depth investigation of a specific real-world entity to gain a profound understanding of the complexities and nuances associated with the establishment of a digital transformation department. This methodology allows for a holistic exploration of the organization, considering both internal dynamics and external factors that might influence the decision-making process. (Yin, R. K. 2017.)

A mixed-methods approach, which combines qualitative and quantitative research techniques, is essential for conducting a comprehensive investigation. Qualitative interviews are employed to capture the subjective experiences, perceptions, and insights of stakeholders. This qualitative component adds depth and context to the case study, allowing for a nuanced understanding of the challenges and opportunities. Additionally, quantitative surveys complement the qualitative data by providing a broader perspective, enabling the identification of trends, patterns, and correlations within a larger sample. (Creswell, J. W., & Creswell, J. D. 2017.)

3.1 Data Collection Methods

Data collection is the process of gathering information from various sources, comprising facts, figures, objects, symbols, and events. Organizations employ different data collection methods to make informed decisions, and this process is essential for understanding product demand, customer preferences, and market dynamics. (Adi Bhat, 2022)

Below are the types of Data collection methods:

3.1.1 Quantitative Methods:

- **Surveys:** Structured questionnaires used to gather data from a large sample. Surveys are valuable for obtaining numerical data on preferences, opinions, and behaviours (Jones, 2010).
- **Experiments:** Controlled studies manipulating variables to observe their effects, providing statistically significant results (Trochim, 2006).

3.1.2 Qualitative Methods:

- **Interviews:** In-depth conversations with participants to gather detailed insights into experiences, attitudes, and behaviours (Rubin & Rubin, 2012).
- **Focus Groups:** Group discussions led by a facilitator to explore participants' perspectives on a specific topic (Krueger & Casey, 2009).
- **Observations:** Systematic recording of behaviours in natural settings, providing rich contextual data (Fetterman, 2010).

3.1.3 Mixed Methods:

- **Definition:** Combining both quantitative and qualitative methods in a single study to gain a comprehensive understanding of the research question (Creswell & Plano Clark, 2011).
- **Sequential Exploratory Design:** Begins with qualitative data collection and analysis, followed by quantitative data collection for corroboration (Creswell, 2014).
- **Convergent Design:** Simultaneous collection of both types of data, with integration during analysis to provide a more holistic understanding (Tashakkori & Creswell, 2007).

3.1.4 Rationale for Choosing Mixed Methods:

- **Enhanced Validity:** By utilizing both quantitative and qualitative approaches, the research can benefit from the strengths of each method, enhancing the overall validity of the findings (Creswell & Creswell, 2017).
- **Comprehensive Understanding:** Some research questions require a deeper exploration which qualitative methods offer, along with the statistical rigor provided by quantitative methods. Combining both approaches provides a more comprehensive understanding of complex phenomena (Teddlie & Tashakkori, 2009).
- **Triangulation:** The use of multiple methods allows for the triangulation of data, where findings from one method can be corroborated or complemented by findings from another, increasing the robustness of the study (Denzin, 1978).
- **Sequential Insights:** In a sequential mixed-methods design, qualitative data can guide the development of quantitative measures, providing a nuanced understanding that informs subsequent quantitative analysis (Creswell & Creswell, 2017).

In conclusion, the choice of mixed methods is driven by the aim to capitalize on the strengths of both quantitative and qualitative approaches, ensuring a more comprehensive, valid, and nuanced exploration of the research question.

Qualitative data collection methods, such as interviews and focus groups, will play a crucial role in this research. It focuses on exploring and understanding underlying motivations, opinions, or behaviours. This approach relies on non-numerical data such as interviews, focus groups, or open-

ended surveys. An example of qualitative data collection could involve conducting in-depth interviews with employees to explore their perceptions of workplace culture after a restructuring process (Jones & Brown, 2018).

This method is well-suited for gaining a deep understanding of stakeholders' perceptions, attitudes, and experiences related to digital transformation and the establishment of the new department within Rejlers.

Semi-structured interviews will be conducted with key stakeholders, including top management, department heads, employees, and clients of Rejlers. These interviews will allow for open-ended conversations, enabling participants to share their insights, concerns, and visions for the digital transformation initiative.

Focus group discussions will involve small groups of employees from various departments within Rejlers. These discussions will encourage participants to exchange ideas, engage in group dynamics, and provide a collective perspective on the challenges and opportunities associated with digital transformation. These qualitative data collection methods are deeply rooted in the interpretive tradition and will facilitate the exploration of nuanced viewpoints and rich narratives. (Rubin, H. J., & Rubin, I. S. 2011 & Krueger, R. A., & Casey, M. A, 2014).

Secondly, I will use quantitative methods, which involve the collection of numerical data, typically through structured surveys, experiments, or statistical analysis of existing datasets. This method aims to quantify phenomena and establish patterns, relationships, or trends.

For instance, a study assessing the impact of new software on productivity may gather quantitative data by measuring the time taken to complete tasks before and after the software implementation (Smith et al., 2020).

This method including surveys and statistical analysis, will complement the qualitative data by providing a broader perspective and enabling the identification of patterns, trends, and correlations within a larger sample.

A structured survey questionnaire will be administered to a representative sample of Rejlers’s employees. The survey will include questions that assess the level of familiarity with digital transformation, years of experience in the industry, perceptions of the most beneficial digital solutions, factors critical for the department's success, and the potential impact of the new sector on the company's growth.

Quantitative data collected from the surveys will be subjected to statistical analysis. Descriptive statistics will be used to summarize survey responses, providing an overview of participants' opinions. Inferential statistics and cross-tabulation will help identify relationships between variables and explore factors influencing decision-making. (Dillman, D. A., Smyth, J. D., & Christian, L. M, 2014.)

The mixed-methods approach is ideal for addressing real-world problems effectively. It provides both theoretical insights from qualitative data and empirical evidence from quantitative data. This approach allows for a comprehensive understanding of the challenges and opportunities related to digital transformation within Rejlers.

As the research progresses, the flexibility of the mixed-methods approach will enable adjustments in data collection methods based on emerging findings and changes in the research landscape. This adaptability ensures that the thesis remains dynamic and well-aligned with the practical needs. (Creswell, J. W., & Plano Clark, V. L, 2017.)

This comprehensive data collection strategy, blending qualitative and quantitative methods, will provide a rich and well-rounded dataset for the thesis, supporting a thorough analysis of the challenges and opportunities associated with establishing a digital transformation department at Rejlers.

3.2 Data Analysis Methods

Below are the data analysis methods which are used to find out the results of this thesis or research topic.

3.2.1 Qualitative Data Analysis - Thematic Analysis

For the qualitative component of this research, which includes data from interviews and focus groups, thematic analysis will be the primary method of investigation. Thematic analysis is a widely recognized qualitative data analysis technique that assists in identifying, analyzing, and reporting patterns, or "themes," within the data (Braun & Clarke, 2006). This method has been selected for its compatibility with the research objectives and its ability to systematically explore the perspectives, attitudes, and experiences of stakeholders concerning digital transformation and the creation of the digital transformation department.

The thematic analysis begins with a systematic process of coding, where the researcher identifies recurring ideas, phrases, and concepts within the qualitative data. These codes are then grouped into themes that encapsulate the key findings and insights from the data. The themes are

supported by relevant quotes or excerpts from the interviews and focus groups, which provide concrete examples of participants' perspectives.

Thematic analysis ensures a comprehensive understanding of the rich and varied insights shared by the participants. It allows for a deep exploration of the research topic by capturing the essence of stakeholders' experiences and perceptions. Conducting thematic analysis in a structured manner enhances the rigour and validity of the findings, contributing to the credibility of the qualitative data and the subsequent interpretations.

3.2.2 Quantitative Data Analysis - Statistical Analysis:

For the quantitative component of the research, involving data from surveys, various statistical analysis techniques will be applied to explore relationships, patterns, and trends within the data. This analysis will encompass:

- **Descriptive Statistics:** Descriptive statistics will be employed to summarize and present the survey responses in a meaningful way (Hair et al., 2019). This includes measures of central tendency (e.g., means, medians), measures of dispersion (e.g., standard deviations, ranges), and graphical representations (e.g., bar charts, histograms) to provide an overview of participants' opinions and characteristics.
- *Example:* One of the survey questions asks employees to rate their level of familiarity with digital transformation on a scale from 1 to 10. Descriptive statistics can be used to calculate the mean (average) familiarity score, and the standard deviation (to measure the variability in responses) and create a histogram to visualize the distribution of scores. This provides an overview of employees' current familiarity levels regarding digital transformation within the organization.
- **Inferential Statistics:** Inferential statistics will help examine relationships and draw conclusions from the data. This may involve hypothesis testing to determine if there are significant differences or associations among variables (Field, 2017). E, g, chi-squared tests. Chi-squared tests are used to examine the association between two categorical variables. It helps determine if there is a significant relationship between them. (Alan Agresti,2013)
- *Example:* The survey includes a question about whether employees believe that implementing a digital transformation department will contribute to the company's growth. Inferential statistics, such as a chi-squared test, can be used to determine if there is a significant association between employees' years of experience and their beliefs about growth. This analysis can help identify whether the opinions of more experienced employees differ significantly from those with less experience.

- **Cross-Tabulation:** Cross-tabulation or contingency tables will be employed to explore relationships between categorical variables. This technique allows for an examination of how variables interact and whether there are dependencies or associations between them (Creswell & Creswell, 2017).
- Example: Suppose the survey includes a question asking employees to select their department (e.g., Engineering, IT, Finance) and their preference for specific digital solutions (e.g., IoT, AI, Cloud-based tools). Cross-tabulation can create a table that shows how preferences for digital solutions vary across different departments. This can reveal whether certain departments have a stronger preference for specific technologies, helping the organization tailor its digital transformation strategies to each department's needs.

In summary, descriptive statistics provide an overview of survey responses, inferential statistics help in making predictions and drawing conclusions about the population, and cross-tabulation assists in exploring relationships between categorical variables. By applying these statistical methods to the survey data, Rejlers can gain valuable insights into its employees' perceptions, needs, and preferences regarding digital transformation and the establishment of a digital transformation department. These insights, in turn, can inform strategic decision-making and the development of tailored digital solutions.

The combination of thematic analysis for qualitative data and statistical analysis for quantitative data will allow for a comprehensive and well-rounded analysis of the data collected in this research, providing valuable insights into the challenges and opportunities of establishing a digital transformation department at Rejlers.

3.3 Ethical Considerations

Conducting research involving human participants necessitates a commitment to ethical standards to safeguard their rights and well-being. This section outlines the ethical considerations that will be upheld throughout the research process.

Before data collection, all participants will be provided with a clear and comprehensive explanation of the research objectives, procedures, potential risks, and benefits specific to Rejlers. Informed consent will be obtained from each participant, ensuring they voluntarily agree to participate in the study. The informed consent process will adhere to established ethical principles relevant to corporate research (Emanuel et al., 2000).

The protection of participants' confidentiality is paramount. All collected data will be de-identified and stored securely, accessible only to authorized researchers. Any corporate or sensitive

information that could potentially identify participants will be kept confidential, adhering to corporate data protection policies (Polit & Beck, 2017).

Participants will have the option to remain anonymous in reporting their responses, particularly in qualitative data collection through interviews and focus groups. This will ensure that their identities are protected and not linked to their corporate roles (Bryman, 2016).

Respect for participants' privacy is essential. During interviews within Rejlers' premises, private and comfortable settings will be chosen to encourage open and honest responses. Participants will be assured that their input will not be shared beyond the research context (Hennink et al., 2010), respecting Rejlers' corporate culture.

Every effort will be made to minimize any potential harm or discomfort to participants within the corporate environment. Surveys and interviews will avoid intrusive or distressing questions related to the company’s operations. Participants will have the freedom to decline to answer any question they find uncomfortable, ensuring a positive corporate experience (Kumar, 2019).

To protect the integrity and confidentiality of corporate data, secure storage methods will be employed, in alignment with the company’s data security policies. Access to data will be restricted to the research team. After the research is completed, corporate data will be retained for the specified period and then securely disposed of following the company’s policies (Creswell & Creswell, 2017).

This research will adhere to the ethical guidelines and protocols of the academic institution and align with Rejlers' corporate ethics. If required, institutional review board (IRB) or ethics committee approval specific to corporate research will be sought and obtained before data collection commences.

Throughout the research process, transparency will be maintained. Any conflicts of interest or sources of funding will be disclosed in the corporate context. The research findings will be reported honestly and accurately, without manipulation or selective reporting, to ensure trust and confidence in the research process (Bryman, 2016).

By addressing these ethical considerations, this research aims to uphold the highest standards of ethical conduct and protect the rights and dignity of all participants involved in the study within the corporate environment. Adherence to these principles ensures the research's credibility and contributes to the responsible conduct of research in alignment with ethical guidelines and corporate values (Polit & Beck, 2017).

4 Overview of consultancy company

The engineering consultancy industry is a dynamic and multifaceted sector that employs specialized professionals to provide technical expertise and solutions across various domains. Consulting engineers play a pivotal role in addressing complex challenges and delivering innovative and sustainable engineering solutions. These services encompass diverse engineering disciplines, including civil, mechanical, electrical, structural, environmental engineering, Instrumentation, and Automation. Consulting engineers are renowned for their technical excellence and are at the forefront of utilizing advanced technologies. Moreover, the industry is committed to sustainability, actively focusing on energy-efficient designs and environmentally responsible practices. Adhering to stringent safety and environmental standards while navigating complex regulatory landscapes is fundamental. While the industry faces challenges related to economic sensitivity and talent acquisition, it presents significant opportunities for delivering sustainable, digitally integrated solutions and leveraging infrastructure investments (TWI Global, 2023.)

4.1 Background information about Rejlers

Rejlers stands as a pioneering force in the field of engineering consultancy, firmly establishing its presence as a respected industry leader within the Nordic region. With a profound commitment to progress and innovation, Rejlers diligently collaborates with enterprises, governmental bodies, and various organisations to address the forthcoming societal challenges. The array of services provided by Rejlers functions as vital components in the endeavour to construct a sustainable society. (Rejlers annual report, 2022.)

With expansive operations spanning Sweden, Finland, Norway, and the United Arab Emirates, Rejlers leverages a talent pool of 2,800 experts, each well-versed in key technological domains, including energy, industry, infrastructure, and construction. (Rejlers annual report, 2022.)

Rejlers' rich history traces its roots back to its inception in 1942. From that point onward, the organization's success story has been fundamentally defined by its unwavering dedication to embracing new knowledge. Underpinning its mission and aspirations, the visionary tagline, "Home of the Learning Minds," serves as a perpetual compass, steering Rejlers towards a path of unceasing learning, evolution, and expansion. (Rejlers annual report, 2022.)

In 2022, Rejlers experienced remarkable success across various countries and business sectors. The company achieved consolidated annual sales of SEK 3,513 million, marking a substantial growth of over 21%, including a robust organic growth of 12%. This growth extended to profitability as well, with an EBITA of SEK 287.3 million and an EBITA margin of 8.2%. Notably, Rejlers is

progressing steadily towards its 2025 target of achieving a 10% EBITA margin. (Rejlers annual report, 2022.)

Throughout its history, Rejlers has consistently operated at the forefront of delivering technical solutions to address pressing societal challenges. Presently, the green transition stands out as a paramount concern for both public and private sectors. Established companies are making substantial investments in climate-neutral technology, while innovative newcomers are reshaping the industry landscape. Given Rejlers' alignment with the prevailing trends, its market remains robust, with sustained demand. (Rejlers annual report, 2022.)

Rejlers' financial success has grown more than tenfold in the last five years, signalling that the strategic efforts put into effect are bearing fruit. Over this period, the company has concentrated on leadership development, enhancing operational quality, and bolstering its brand recognition among customers and the workforce. (Rejlers annual report, 2022.)

Based on the information provided in the annual report, Rejlers' customer segments and how they help their customers are outlined as follows:

Energy Transition: Rejlers is actively involved in the energy transition, offering a wide range of services and digital solutions throughout the energy supply chain. They assist both new and established market players in creating a fossil-free energy landscape for the future. Rejlers contribute to modernizing, streamlining, automating, and optimizing existing energy installations and networks. Their expertise also extends to developing new power systems, production sources, and energy storage. Rejlers collaborate across borders to ensure that the best expertise is available for their clients. They are deeply committed to addressing the challenges posed by the need to reduce greenhouse gas emissions by transitioning to fossil-free energy sources.

Industrial Transformation: Rejlers provides extensive expertise in the latest technologies and innovative digital solutions like AOS 360 to assist their customers in the industrial sector. They support the industry's transformation towards fossil-free production, hydrogen solutions, carbon capture, circularity, and waste utilization. Rejlers helps with complete solutions, project management, and technical and expert services. They also adapt to the changing industry landscape, including the trend towards localized production.

Future-Proof Communities: In a rapidly changing society, Rejlers assists its customers in creating efficient, innovative, smart, and sustainable solutions. They focus on critical components like energy efficiency, circularity, digitalization, cybersecurity, automation, and electrification. Rejlers plays a pivotal role in laying the foundations, rebuilding, renovating, adapting, and securing cities and communities for a sustainable future.

Rejlers offers services and digital solutions throughout the entire energy supply chain, from power generation to electricity distribution and storage. They work on projects that reduce greenhouse gas emissions and transition to fossil-free energy sources, with expertise in hydro, wind, solar, nuclear power, and digital solutions. Rejlers helps customers in the initial stages, developing technical solutions, providing project engineering, and optimizing facility management. The range of their services includes power plant development, power line expansion, and electricity flow optimization. Rejlers has a strong commitment to staying at the forefront of technology and aims to take full responsibility for projects. (Rejlers annual report, 2022.)

Through their dedication to building a sustainable society and their culture of continuous learning, Rejlers ensures they are equipped with the necessary expertise. They help their customers address the challenges of the energy transition and are eager to lead projects from start to finish. Rejlers' focus extends to both traditional energy companies and new market entrants who need to expand their electricity production, enhance control, and reduce electricity costs. They aim to be part of the transition to electrified industrial production and hydrogen applications. (Rejlers annual report, 2022.)

Their strategy is to continue growing and developing their offerings linked to the energy transition, particularly in areas like nuclear power. Rejlers is actively engaged in studies related to hydrogen solutions and emphasizes the importance of finding synergies and cross-border cooperation.

4.2 Rejlers Offering

Figure 2 Rejlers offering.

Rejlers caters to an expansive spectrum of customers seeking comprehensive support across the lifecycle of projects, from the inception stages through to full operational deployment. This encompasses an array of services spanning civil, electrical, mechanical, instrumentation, process engineering, project services, EHS and automation. For instance, consider a scenario in the oil and gas sector. If a company operating in this industry aims to enhance and automate specific aspects of its plant operations, it can readily engage Rejlers for their expertise.

Upon reaching out to Rejlers, an in-depth consultation follows. This crucial phase allows for a nuanced understanding of the customer's requirements, challenges, and objectives. Post these deliberations, Rejlers promptly assembles a dedicated team of top experts. These professionals are carefully selected to ensure they possess the right blend of skills and knowledge necessary to craft the most optimal and tailored solutions for the customer.

In the case of the oil and gas company seeking automation, Rejlers' team would delve into the specific area earmarked for automation within the plant. This could involve aspects like process optimization, machinery automation, or the implementation of cutting-edge technologies to streamline

operations. Their experts collaborate closely with the client, seeking to understand the existing infrastructure, operational methodologies, and the desired outcomes sought by the company.

The goal is to provide a comprehensive and bespoke automation solution that not only aligns with the unique needs of the customer but also enhances their operational efficiency, reliability, and safety standards. The solutions designed by Rejlers' team are finely tuned to harmonize with the existing systems and seamlessly integrate into the operational framework. This process is marked by a strong emphasis on innovation, quality, and cost-efficiency.

Rejlers' end-to-end service isn't just about the technical implementation of solutions but also includes robust project management. This involves overseeing the project from its conceptualization through execution, deployment, and post-implementation support. The company maintains an unwavering commitment to the success and satisfaction of its customers, ensuring that the delivered solutions are not only functional and efficient but also future-proof, scalable, and adaptable to the evolving needs of the client.

As per Rejlers Finland website below is how the process takes place in different areas:

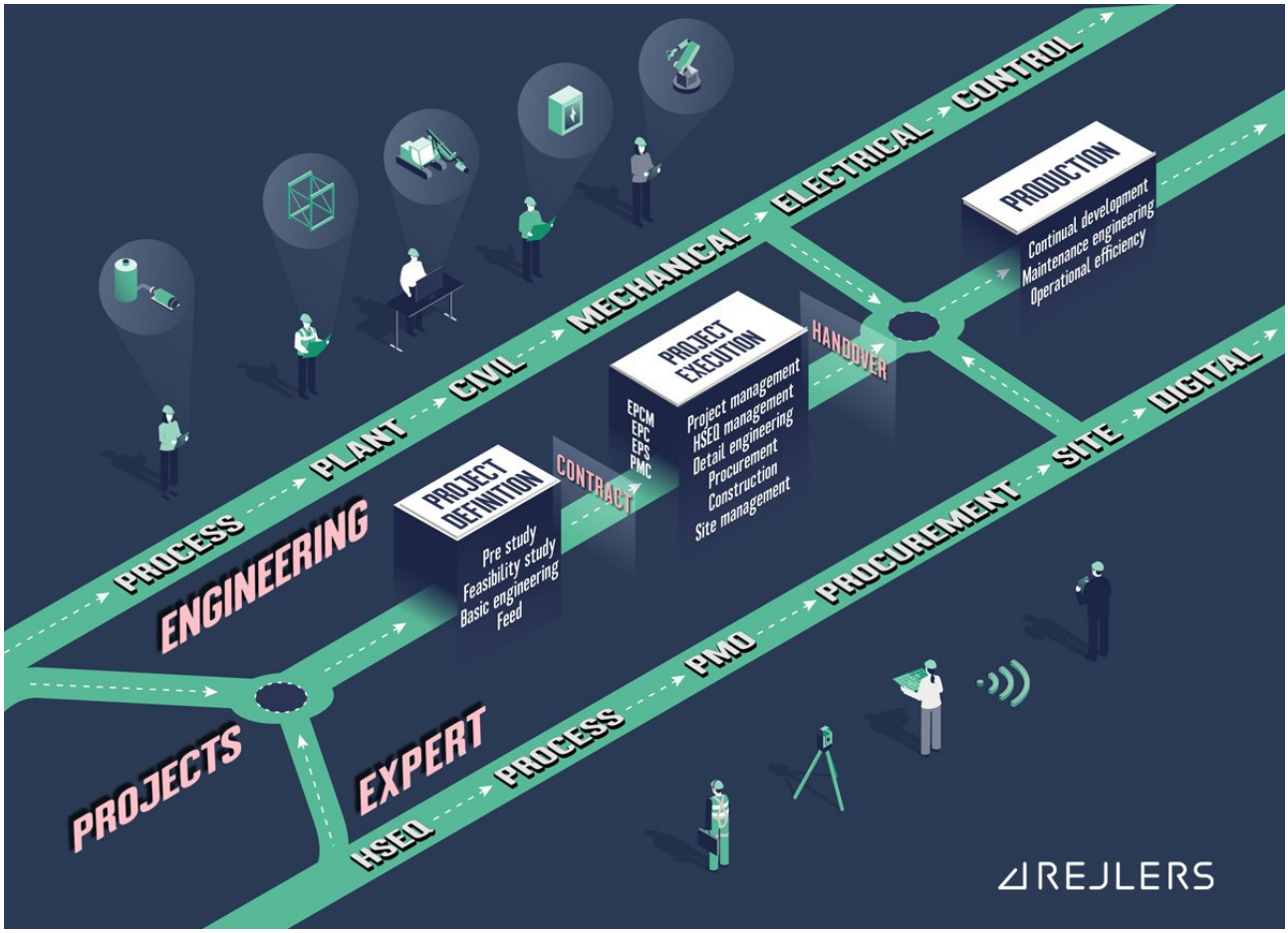

Figure 3 End-to-end industry process (Rejlers official website)

Rejlers' customer examples 2022 as per the annual report 2022:

- **Hydrogen Solutions Study:** Rejlers conducted a comprehensive technology study on behalf of Kemin Digipolis Oy to investigate the conditions for a hydrogen economy in Sea Lapland. The study covered the entire hydrogen value chain, emphasizing the importance of synergies between companies and cross-border cooperation.
- **Hydrogen Implementation Proposal:** Rejlers has been engaged by Trelleborg to develop a proposal for implementing hydrogen in the energy system of the new district, Västra Sjöstaden. This initiative aims to make Trelleborg a pioneer in sustainable housing with hydrogen integration.

Rejlers' commitment to addressing environmental challenges and their expertise in the energy transition makes them a valuable partner for customers seeking sustainable solutions in the energy and industrial sectors.

Rejlers competitors are those who are in a similar kind of field providing consulting services in Energy, Industries, Infrastructure, Building automation, Mining and Metals.

Customers:

Figure 4 A Few customers of Rejlers

4.3 Risks of not implementing digital transformation sector within Rejlers

The decision not to implement a digital transformation sector within Rejlers comes with several inherent risks:

- Competitive Disadvantage: The engineering consultancy industry is rapidly evolving, with digitalization playing a vital role in project execution. By not adopting digital transformation, Rejlers may lag competitors who offer more advanced digital solutions. This could lead to a competitive disadvantage in the market.
- Loss of Market Share: As digital technologies become increasingly important in various industries, clients may seek services from providers that offer comprehensive digital solutions. Without a digital transformation sector, Rejlers may lose market share to competitors who can address clients' digital needs.
- Inefficiency: Digital transformation can significantly enhance operational efficiency and effectiveness. Without it, Rejlers might miss the opportunity to streamline processes, automate tasks, and optimize their services. This inefficiency could lead to higher costs and reduced profitability.

- Limited Innovation: Digital transformation often fosters innovation. Without embracing these technologies, Rejlers may miss opportunities to develop innovative solutions for clients and remain at the forefront of the industry.
- Client Expectations: Clients increasingly expect engineering consultancy firms to provide digital solutions that can improve project outcomes. Not having a digital transformation sector could result in clients seeking services elsewhere, as they look for firms that align with their expectations.
- Talent Attraction and Retention: Skilled professionals in digital technologies are in high demand. Without a digital transformation sector, Rejlers may struggle to attract and retain talent with expertise in AI, machine learning, and other digital fields.
- Reputation Impact: In a rapidly evolving industry, a lack of focus on digital transformation could impact Rejlers' reputation. Clients and partners may view the firm as less innovative and adaptable, potentially leading to a loss of trust.
- Missed Growth Opportunities: Digital transformation offers opportunities for diversification and growth. By not embracing this sector, Rejlers may miss expanding its service portfolio and tapping into new markets.
- Loss of Existing Clients: Clients who require digital solutions may choose to discontinue their relationships with Rejlers if the firm cannot meet their evolving needs.
- Resilience to Change: The engineering consultancy sector is experiencing continuous change. Failing to adapt through digital transformation could make Rejlers less resilient in the face of market shifts, economic challenges, and disruptions.

In summary, not implementing a digital transformation sector within Rejlers exposes the company to the risk of losing competitiveness, market share, and efficiency, as well as missing opportunities for innovation and growth. Adapting to the digital age is essential to staying relevant and thriving in the engineering consultancy industry.

4.4 Risks and challenges of implementing the digital transformation sector within Rejlers.

Implementing a digital transformation sector within Rejlers offers numerous benefits but comes with certain risks and challenges. Here are some potential risks associated with introducing digital transformation:

- Financial Investment: Building a digital transformation sector requires a significant financial investment. There are costs associated with acquiring advanced technologies, hiring skilled professionals, partnering with a company, and providing training. If not managed properly, these investments can strain the company's financial resources.

- Integration Challenges: Integrating digital solutions into existing operations can be complex. Incompatibilities between legacy systems and innovative technologies may lead to operational disruptions and delays. Ensuring a seamless integration is crucial.
- Cybersecurity Vulnerabilities: Digital transformation exposes the company to increased cybersecurity risks. The more digital systems and data are in use, the greater the potential for security breaches, data leaks, and cyberattacks.
- Talent Scarcity: Recruiting and retaining skilled professionals in AI, machine learning, and other digital fields is a competitive challenge. The high demand for such talent can result in talent shortages and increased labour costs.
- Change Management: Employees may resist or struggle with the adoption of digital technologies. Resistance to change can hinder the successful implementation of digital transformation initiatives.
- Overwhelming Data: The proliferation of data generated by digital systems can be overwhelming if not managed effectively. The company needs robust data management and analytics capabilities to derive insights from data.
- Regulatory Compliance: Data privacy and compliance regulations are becoming more stringent. Ensuring that digital transformation efforts comply with these regulations is essential to avoid legal and financial repercussions.
- Vendor Dependence: Depending on third-party vendors for digital solutions can create dependency. Vendor issues, such as price increases or service interruptions, can impact operations.
- Technology Obsolescence: Rapid technological advancements mean that digital solutions can quickly become outdated. The company needs to plan for regular updates and technology refreshes.
- Competitive Catch-up: While implementing digital transformation, there is a risk of competitors advancing further in their digital capabilities, potentially widening the competitive gap.
- Project Failures: Digital transformation projects can be complex and may not always deliver the expected results. Project failures can lead to financial losses and operational disruptions.
- Employee Training: Training employees to use new digital tools and systems effectively is a critical but often overlooked aspect. Inadequate training can hinder the adoption of digital technologies.
- Reputation Risk: If digital initiatives encounter high-profile failures or data breaches, they can harm the company's reputation, eroding trust with clients and partners.
- Balancing Innovation and Stability: Striking the right balance between adopting innovative digital technologies and maintaining the stability of existing operations can be challenging.

- Unproven ROI: The return on investment for digital transformation initiatives may not be immediate or guaranteed. It can take time to see substantial benefits, and there is a risk that expected returns may not materialize.
- To mitigate these risks, Rejlers should conduct thorough planning, risk assessments, and continuous monitoring of its digital transformation efforts. A well-executed digital transformation strategy can lead to significant rewards, but careful management is essential to navigate these challenges successfully.

In the grand scheme, the benefits far outweigh the potential risks and challenges. Moreover, by implementing thoughtful strategies to mitigate these challenges, we can navigate the research process with a judicious approach. Let's proceed with cautious optimism as we delve into the next phases of our study.

5 Data collection

As explained earlier data collection will be done in 2 diverse ways, one with the interviews and the other with the survey. Interviews were taken internally with the Rejlers employees and the customers. Interviews can be taken face-to-face or via email as per the preference of the customer.

Survey questions were sent to more than 500 employees in Rejlers Finland, Sweden, Norway, and Abu-Dhabi.

5.1.1 Interviews from Rejlers:

In interviews with key personnel from Rejlers, valuable insights emerged regarding the company's digital transformation journey:

a. Interviewee 1

Designation: Rejlers Finland employee from Life Science

Question: Could you please give some background data on Rejlers as I am doing my thesis related to digital services at Rejlers?

Answer:

- The company once had an IT department that provided standard IT services. However, this department no longer aligned with the evolving business strategy and was consequently closed. Financial considerations also contributed to this decision.
- Rejlers had previously offered IoT services, but the reason for discontinuing this service was not disclosed. The IT department was closed in 2018.
- According to Interviewee 1, now is the opportune moment to re-enter the digital business domain, suggesting that it is better to start late than never.

b. Interviewee 2

Designation: Project head

Question: Could you add to what Interviewee 1 is saying as you have been long time in Rejlers and have been involved in the activities when Rejlers had an IT sector?

Answer:

- Interviewee 2 provided insights into the closure of the IT department. This decision was mutually taken in Norway to shift the company's focus to providing consultancy services in the fields

of Industry, Energy, Buildings, and Automation, encompassing specialities such as Electrical, Instrumentation, Civil, and Mechanical engineering.
- Rejlers currently offers Accelerated Operations 360 image model service (AOS), a digital twin solution. AOS enables remote access to construction sites, reducing the need for travel and streamlining information retrieval.
- Despite utilizing AOS, Rejlers has yet to harness its full potential. Interviewee 2 emphasized the need to explore data utilization possibilities associated with AOS.
- Interviewee 2 mentioned the completion of a machine vision proof of concept for one of our customers but revealed that the project has not progressed further.

Both interviewees expressed optimism about Rejlers' venture into the digital domain and recommended further research. They also provided leads for contacting potential customers to gather additional insights.

c. **Interviewee 3**

Designation: Automation manager

Question: I understand that you have experience working on IoT, Digital Twin, and other related technologies within Rejlers. Could you please provide more details on your experience in these areas?

Answer: While I do not have extensive experience in these technologies, I have had the opportunity to work on several projects involving IoT, AI, and Digital Twin technologies at Rejlers:
- **IoT:** In collaboration with our design team, we conducted various tests involving cloud services and IoT data transfer protocols. Notable examples include:
- Using MQTT communication to establish a connection between Siemens S7-1500 and MS Azure DB.
- Implementing OPC UA data transfer to facilitate data exchange between different systems.
- Creating a link in the WWW environment through REST data transfer, utilizing JSON files to connect Beckhoff and JIRA systems.
- **AI:** One of our projects involved the interpretation of PLC software code using ChatGPT, an AI-powered solution.
- **Digital Twin:** We conducted a test for the AOS360 application, where we imported PLC measurement data into a digital twin environment alongside relevant photographs.

While my experience in these areas may be limited, these projects have provided valuable insights into the potential applications and benefits of IoT, AI, and Digital Twin technologies within our organization.

Rejlers has encountered opportunities to engage with advanced technologies, and we are fortunate to have a few team members within our organization who have already gained experience with these technologies. Consequently, these experienced employees can play a pivotal role in spearheading the development of our new service sector.

5.1.2 Interviews from Expertise Outside Rejlers but from Competitor Organizations.

a. Interviewee 1

Designation: Management position employee at IBM

Question: How do you understand customers' problems and how do you deal with them? do you have any examples for the same?

During the interview, Interviewee 1, who works for a competitor organization, highlighted the significance of approaching customers with a well-defined problem statement. According to the interviewee, this approach is highly effective. In their company, they consistently engage with customers by thoroughly understanding their challenges and needs. Subsequently, they leverage advanced technologies to tailor solutions that directly address these problems. This problem-centric approach not only resonates with clients but also significantly enhances their ability to persuade potential customers.

To illustrate the effectiveness of this strategy, Interviewee 1 referenced a specific instance involving IBM. IBM's approach is to engage customers by comprehensively grasping their issues and based on this understanding, present solutions that use cutting-edge technologies. This method has proven to be compelling, and it helps foster strong client relationships.

Below 2 case studies were explained by Interviewee 1.

Case study 1: (IBM, 2013)

The case study titled "Smart City Infrastructure" from IBM is an illustrative example of how the company applied a problem and statement approach in a real-world scenario. In this project, IBM created a smarter infrastructure for a city, which is often referred to as a "smart city."

Key Takeaways from the Case Study:

- **Problem Identification:** IBM began by identifying specific challenges and issues faced by the city in question. These problems may include issues like outdated infrastructure, inefficiencies in public services, or the need for improved urban planning and maintenance.
- **Data-Driven Insights:** IBM used data and analytics to gain deep insights into the city's existing infrastructure and services. They analyzed data to understand where problems existed and how they could be addressed more efficiently.
- **Predictive Maintenance:** A crucial aspect of this project was implementing predictive maintenance strategies. Instead of reacting to issues as they arose, IBM used data analytics to predict when infrastructure elements like bridges, roads, or utility systems would require maintenance or repair. This proactive approach aimed to reduce service interruptions and improve overall infrastructure quality.
- **Tailored Solutions:** Armed with a clear understanding of the city's problems, IBM provided custom solutions that specifically addressed the identified issues. These solutions often involved the use of advanced technologies, such as the Internet of Things (IoT) devices and sensors to collect real-time data for better decision-making.
- **Efficient Resource Allocation:** By addressing problems directly and proactively, IBM was able to allocate resources more efficiently. They could focus efforts and budgets on areas that needed immediate attention, rather than implementing costly and often unnecessary blanket maintenance or replacement strategies.
- **Smart City Benefits:** The project aimed to transform the city into a "smart city." This meant not only addressing existing issues but also creating an environment that was more efficient, sustainable, and responsive to citizens' needs. A smart city often involves improving urban living conditions, transportation, safety, and public services through data-driven technologies.

In essence, this case study highlights how IBM embraced the problem and statement approach. They did not just offer generic solutions; instead, they meticulously understood the city's problems and provided tailored data-driven solutions. This approach was effective in convincing customers, as it demonstrated a clear understanding of the issues and a concrete plan to address them. (IBM,2013.)

Drawing insights from this case study, Rejlers can adopt a problem and statement approach for enhanced effectiveness. Instead of providing generic solutions, the focus should be on a meticulous understanding of the specific challenges faced by clients. This approach demonstrates a clear comprehension of the issues at hand and highlights a concrete plan for addressing them. By tailoring data-driven solutions to the unique problems of their clients, Rejlers can foster a deeper connection with customers and strengthen their value proposition.

Case Study 2: Enhancing Safety and Efficiency in Coal Mines through Advanced Sensor Technologies (Encardio-Rite, 2023)

Problem Statement:

The coal mining industry is not only vital for energy production but also poses unique challenges in terms of safety, environmental impact, and operational efficiency. With the increasing demand for coal worldwide, there is a pressing need to address these challenges. One significant challenge is ensuring the safety and well-being of mine workers while optimizing mining processes. Traditional mining methods are associated with high risks and inefficiencies. To tackle these issues, coal mining operations must incorporate advanced technologies, such as sensor systems, to enhance safety, productivity, and environmental sustainability.

Case Study Approach:

Introduction

Coal mining plays a crucial role in meeting global energy demands. However, it presents inherent challenges in terms of safety, efficiency, and sustainability. The implementation of advanced sensor technologies can revolutionize coal mine operations, mitigating these challenges while ensuring a safer and more productive work environment. This case study explores the application of sensor technologies in coal mines, examining their impact on safety, operational efficiency, and sustainability.

Challenges in Coal Mining

The coal mining industry faces several significant challenges. Safety concerns are paramount, with the risk of accidents, health issues, and fatalities ever-present. Traditional mining practices involve physical labor in dangerous environments. Additionally, coal mining has a substantial environmental footprint, affecting air and water quality and contributing to greenhouse gas emissions. These challenges necessitate innovative solutions that enhance safety and minimize the environmental impact of mining.

Sensor Technologies in Coal Mines

Advanced sensor technologies are poised to address the challenges faced by the coal mining industry. These sensors encompass a range of capabilities, including gas monitoring, structural integrity assessments, and worker safety systems. Encardio-rite's blog on "Sensors and Technologies in Coal Mines Monitoring" highlights the potential of these technologies in providing real-time data, enabling timely decision-making, and improving safety.

The Role of Sensors in Enhancing Safety

One of the primary applications of sensor technologies in coal mines is the continuous monitoring of the underground atmosphere. Gas sensors, for instance, can detect hazardous gases, providing early warnings to mine operators and workers. By swiftly identifying gas leaks or concentration shifts, the risk of explosions and health issues can be reduced.

Improving Operational Efficiency

In addition to safety benefits, sensor technologies offer opportunities to optimize mining operations. Monitoring equipment health and performance with sensors can prevent costly downtime. Real-time data on the structural integrity of mines can minimize the risk of collapses and extend the lifespan of mining infrastructure. Through sensors, mining companies can better plan, manage, and execute their operations.

Sustainability and Environmental Impact

The environmental impact of coal mining has been a longstanding concern. However, sensor technologies can help reduce this impact. Monitoring and controlling emissions through real-time data can improve air and water quality around mining sites. Furthermore, sensors can aid in the efficient use of resources, reducing waste and energy consumption.

These examples demonstrate the approaches and methods that other companies have employed, utilizing a problem-and-solution approach to effectively engage customers. Similarly, Rejlers can engage with customers to comprehensively understand their existing challenges and subsequently provide tailored solutions. This can be accomplished through our in-house expertise or by exploring collaboration with specialized companies dedicated to digital transformation.

b. Interviewee 2

Designation: NA (The interviewee requested not to reveal the designation or name)

Question: Given your expertise in Digital Transformation services, could you share some specific examples or approaches your company has employed?

Answer: Interviewee 2 shed light on their organization, a startup founded in 2019, with a primary focus on digital twins. In the realm of product development and market introduction, manufacturing industries traditionally embark on a series of physical trial-and-error iterations, incurring substantial costs. Even a simple trial necessitates extensive planning, procurement, process execution, repeated attempts, product analysis, and, in the event of unsatisfactory results, a complete restart.

This exhaustive process consumes a significant amount of time, financial resources, and organizational assets. Digital twins, on the other hand, serve as virtual replicas of machinery, enabling multiple trial-and-error scenarios without the burden of substantial losses.

Let us say for example in the oil and gas industry, which is the biggest customer of Rejlers:

Asset Performance and Maintenance: In the oil and gas sector, digital twins are employed to monitor and manage complex assets like drilling rigs, pipelines, and refineries. By creating a digital twin of a physical asset, companies can simulate its behaviour and track its performance in real time.

For instance, consider a scenario where a digital twin represents an offshore drilling rig. Sensors on the rig continuously collect data related to temperature, pressure, equipment status, and more. This real-time data is used to update the digital twin. If the digital twin detects anomalies or predicts potential issues, it can trigger alerts or automated maintenance requests.

This approach is particularly valuable in remote or harsh environments. Instead of sending personnel to offshore rigs for routine checks, the digital twin helps in predictive maintenance. By identifying when equipment needs maintenance, oil and gas companies can reduce downtime, enhance safety, and optimize operations.

Moreover, digital twins allow companies to conduct simulations for scenarios such as oil reservoir management. By creating a digital replica of an underground reservoir and simulating its behaviour under various conditions, companies can make informed decisions about drilling strategies and reservoir management, thereby improving production efficiency and reducing risks.

In summary, digital twins in the oil and gas industry play a crucial role in optimizing asset performance, predictive maintenance, and reservoir management, which contributes to cost reduction and improved safety.

Similarly, Rejlers, as an engineering consultancy firm, can offer valuable services to its current oil and gas customers by implementing digital twin solutions. Here's how Rejlers can assist its oil and gas clients in adopting digital twins:

- **Assessment and Consultation:** Rejlers can begin by conducting a comprehensive assessment of the client's existing infrastructure, operations, and specific challenges. By understanding the client's needs and objectives, Rejlers can provide tailored recommendations for implementing digital twin technology.
- **Digital Twin Development:** Rejlers can assist in the creation of digital twin models for the client's critical assets and processes. This involves using data from sensors and IoT devices to

replicate physical assets in a virtual environment. For the oil and gas industry, this may include replicating offshore rigs, pipelines, or even entire refineries.

- **Data Integration:** Rejlers can help clients integrate data sources, ensuring that real-time data from various sensors and operational systems is collected, processed, and made available for the digital twin. This data integration is crucial for accurate modelling and monitoring.
- **Simulation and Analysis:** Rejlers can develop simulation capabilities within the digital twin. This allows clients to model different operational scenarios and analyze the impact of numerous factors on performance. For the oil and gas sector, this could include simulating drilling operations, pipeline flow, or equipment maintenance.
- **Predictive Maintenance:** Rejlers can help clients implement predictive maintenance strategies by using digital twins to monitor the condition of equipment and predict when maintenance is required. This can reduce downtime and prevent costly equipment failures.
- **Reservoir Management:** In the case of oil reservoirs, Rejlers can assist in creating digital replicas of underground reservoirs. These digital twins can be used to simulate the behaviour of the reservoir under different conditions, helping clients optimize drilling strategies and production rates.
- **Visualization and Control:** Rejlers can provide user-friendly interfaces for clients to interact with the digital twin. This can include 3D visualizations of assets and processes, as well as control interfaces for making real-time adjustments to operations.
- **Training and Support:** Rejlers can offer training and ongoing support to ensure that the client's personnel can effectively use and benefit from the digital twin technology.
- **Security and Compliance:** Rejlers can address cybersecurity and data privacy concerns, ensuring that sensitive data used in the digital twin is protected and compliant with industry regulations.
- **Continuous Improvement:** Rejlers can collaborate with clients on an ongoing basis to refine and enhance their digital twin solutions, keeping them aligned with evolving business goals and industry advancements.

By offering these services, Rejlers can empower its oil and gas clients to harness the power of digital twins for improved asset management, operational efficiency, and cost savings in a rapidly evolving industry.

5.2 Customer Interviews:

After conducting interviews both within our organization and with competitors, I adopted a fresh approach when engaging with our customers. My inquiries centred on understanding the challenges they currently face with advanced technologies. One of these interviews, with Interviewee 1, revealed critical insights into their predicaments and potential solutions.

a. Interviewee 1

Title: Digital industry head

Question: What are the problems that you are currently experiencing with advanced technology, and how do you envision Rejlers assisting in overcoming them?"

Answer: Interviewee 1 shed light on the existing Internet of Things (IoT) system implemented in their factories. This system collects data from various devices via the Internet and conducts thorough statistical analyses. These analyses provide data points such as standard deviation and mean, enabling experts to determine when a device requires maintenance. However, a significant challenge arises from the fact that the information indicating which specific device needs maintenance or is soon to require it is not easily accessible. Experts must navigate through complex statistical data before concluding.

Interviewee 1 emphasized the need for a system that provides clear and concise notifications, such as "Transmitter 301 should be replaced within 1 month," in language that even non-experts can readily comprehend. This would enhance the maintenance process and the overall efficiency of their operations.

b. Interviewee 2

Title: Competence Manager, Innovation & Technology. PhD

Question 1: With your background in Chemical Engineering and Technology, how do you envision Rejlers or any such company assisting in digital business streamlining your company's work processes?

Answer 1: In our daily operations, we heavily rely on polymerization to produce key elements such as polyethene (PE) and polypropylene (PP). This complex process involves merging small monomers chemically to create polymer chain molecules, which ultimately lead to the creation of PE and PP. These end products are extensively used in various sectors like advanced packaging, fibre production, and manufacturing appliances. However, the inherent complexity of the base process

can sometimes lead to deviations or irregularities. A company adept in digital technologies can significantly assist our operations by pinpointing these deviations from the standard process or aiding us in improving our overall process. Such digital expertise could not only save valuable time and resources but also substantially enhance the efficiency of our processes.

Question 2: How do you foresee Rejlers contributing as it develops its digital expertise?

Answer 2: To begin, Rejlers should first engage in discussions with the current team they are collaborating with. By understanding the specific areas where Rejlers consultants are already involved in our processes, we can collectively explore opportunities for initiating digital enhancements. This could involve the gradual collection of data, utilizing Rejlers' products like AOS 360 or alternative methodologies. In my opinion, there's tremendous potential in constructing process models through AI. The computational environment enables the running of diverse process models, potentially providing invaluable insights. However, it's critical to assess the actual utility of these models before investing significant time and resources, ensuring they genuinely contribute to saving time and costs.

Question 3: Given the high daily production rates in your factories, particularly with frequent machine usage, would Rejlers' focus on Predictive Maintenance be a feasible initiative? How would you recommend proceeding in this domain?

Answer 3: While I've never personally witnessed Predictive Maintenance in action, I firmly believe that implementing this strategy could be immensely beneficial for our operations. Our daily high-volume production necessitates continuous machine use, and any halt or failure can significantly impact our output. If Rejlers could assist us in implementing predictive maintenance systems, alerting us to potential wear and tear or an impending component's expiry before it occurs, it would be a significant advantage. However, it's crucial to strike the right balance in the prediction timeline—neither too premature nor too late—ensuring timely intervention for maintenance, avoiding any costly downtimes.

5.3 Surveys

As per the responses from the survey sent to Rejlers Finland, Sweden, Norway and Abu-Dhabi below results were found.

5.3.1 Years of experience in the survey and designation

Rejlers experience ranged from 0 to 40 years of experience in the current industry which has helped me to know more about the opinion as per years of experience.

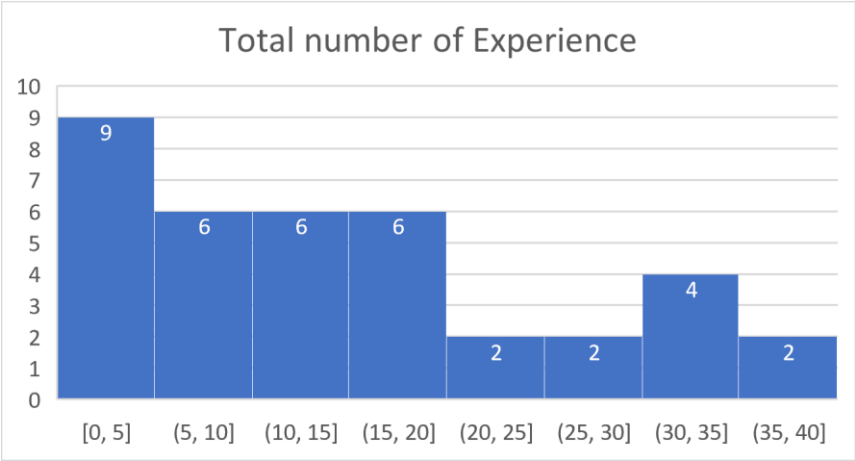

Figure 5. Graph of the total number of experiences at Rejlers who participated in the survey.

People ranged from Junior to senior management who participated in the survey.

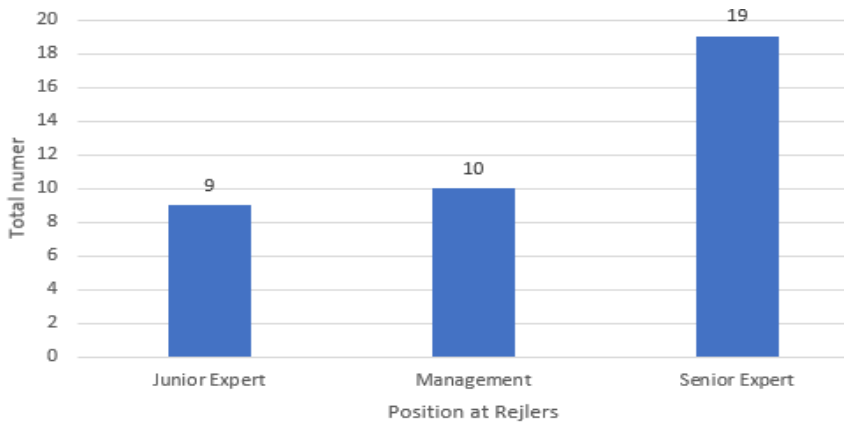

Figure 6. Graph of the number of experts who participated in the survey.

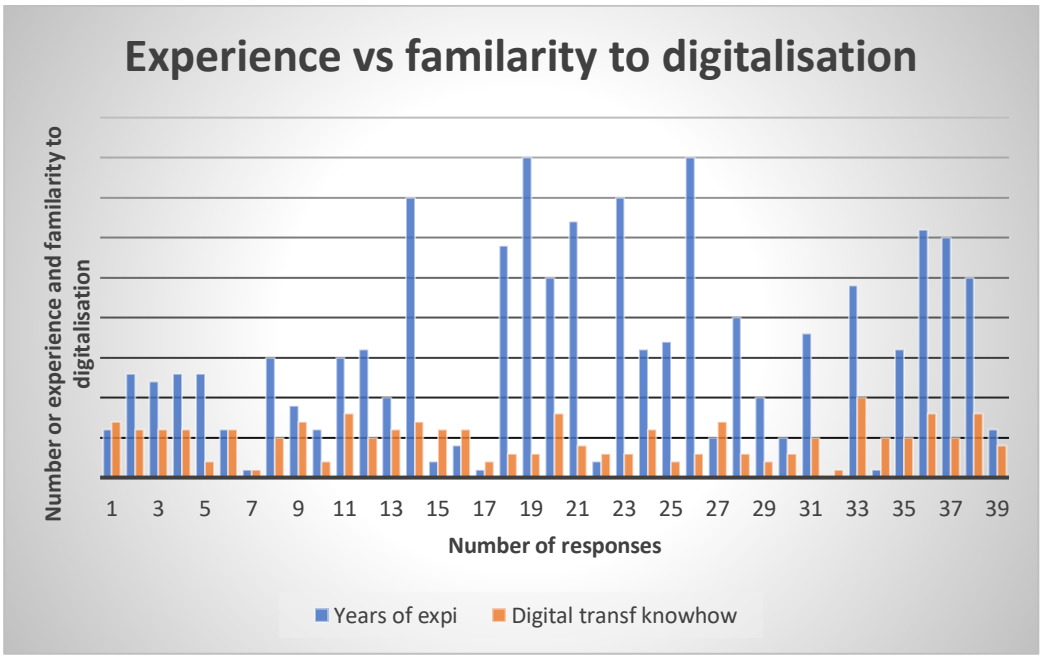

Figure 7. Level of familiarity with digitalization as per experience per survey data

Analysing the data above reveals a notable trend: the level of experience in the current industry doesn't necessarily correlate with proficiency in digital transformation. Considering the rapidly changing landscape, it would be prudent to consider implementing training programs in the future to ensure continuous knowledge updates. Please note orange line is on a scale of 1 to 10, 1 being the lowest level of familiarisation with digitalisation.

At Rejlers, different people have different views, and these views seem to be influenced by where they stand in the company. If the survey answer is from management, their answer was about money – budgets, quarterly results, and making more profit. It's like a financial story where the focus is on being financially responsible and finding ways to grow the bottom line.

On the other hand, if there is an engineer in a leadership role in the survey, his/her talk is about adapting to changing needs and finding high-tech solutions. It's not just about money; it's also about keeping up with the latest technology at Rejlers. These voices are all about being adaptable, innovative, and staying ahead in the tech game.

This mix of financial smarts and tech-savvy is what makes Rejlers unique. It's not a clash of ideas; it's more like a harmony where each group contributes to the overall story of how the company is evolving. The managers, dealing with the financial side, and the engineers, navigating the tech world, together create a picture of where Rejlers is headed.

So, in this mix of different opinions, there's strength. The combination of financial practicality and tech innovation is shaping what Rejlers will be in the future. It's not a conflict of ideas; it's a collaboration, each viewpoint adding something valuable to the story of a company finding the right balance between financial responsibility and tech progress.

Now let's have a look at what people think about technologies and what should be considered 1st.

5.3.2 Navigating Priorities: Group Consensus on Implementation Focus

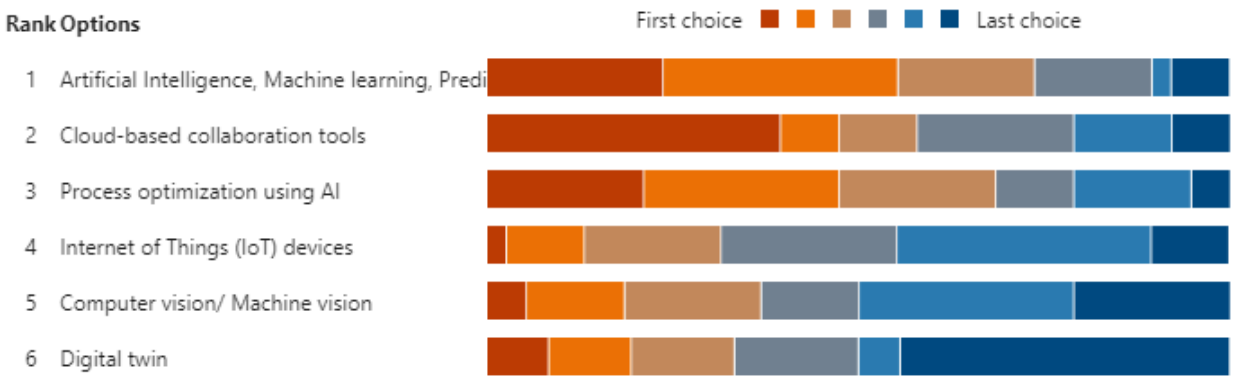

Figure 8. Ranking of the preferred digital solution as per survey.

Below are the comments from the employees when I asked in the survey: "Or do you have something else in your mind, that I have not listed above?"

Response 1: I think cyber security has not been taken seriously enough in many automation systems (previously), but the world has changed a lot over a few years. That's why I see there might be good possibilities for us, too.

My view: Acknowledging the changing landscape, especially the increasing significance of cybersecurity, aligns with my perspective. In the evolving world of automation, a heightened focus on cybersecurity is not only necessary but also presents new opportunities for us.

Response 2: Using the database to help in design work is the next step in Rejlers. Now we are using Excel. Cloud-based layouts and 3D are underway.

My view: Transitioning from traditional tools like Excel to more advanced database-driven design processes, especially cloud-based layouts, and 3D, resonates with my vision for Rejlers. Embracing modern technologies for design work can significantly enhance efficiency and output.

Response 3: Virtual reality

My view: Exploring the potential of virtual reality aligns with my view of adopting innovative technologies. Virtual reality has diverse applications, and its incorporation could lead to enhanced project visualization and collaboration.

Response 4: Our goal is bigger projects and the intelligence related to them is interesting. In addition, in the infrastructure division, we are currently interested in what we could offer in the areas of ETCS and cyber security.

My View: Expressing an interest in larger projects and the associated intelligence, especially in areas like ETCS (European Train Control System) and cybersecurity within the infrastructure division, corresponds with my goal for Rejlers. Pursuing significant projects and leveraging intelligence in these domains can contribute to our growth and relevance.

When asked in the survey, are you familiar with any Rejlers' projects involving IoT, Digit Twin, or past Digital/IT solutions? If so, could you share some details, below answers were found out

Response 1: I know some of our projects like AOS360, DMS 3d

Response 2: Maybe not digital twins precisely, but in industrial projects we use a lot of laser scanning and 360 photography. Through laser scanning, we can create a point cloud model (a sort of digital twin) of the object.

The previous responses indicate that we possess foundational software for data retrieval. The next crucial step involves refining this software for more robust data collection. Subsequently, leveraging machine learning or AI applications can significantly elevate customer experiences and streamline process optimization.

5.3.3 How to form a new sector: Rejlers employees' response

When queried about the foremost priority for Rejlers in venturing into the digital realm, the unanimous consensus pointed toward prioritizing the skilled workforce. In Rejlers case it might be to have a partner.

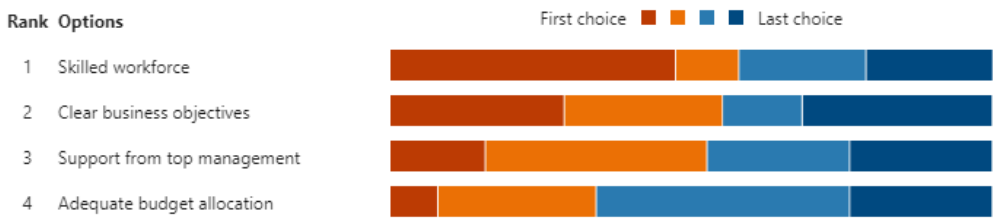

Figure 9. Ranking of preferred options in terms of formation of the new sector as per the survey.

When asked whether Rejlers should Buy or partner with a company with ready expertise or build the competence from scratch in Rejlers, Buy or partner with a company with ready expertise got more points.

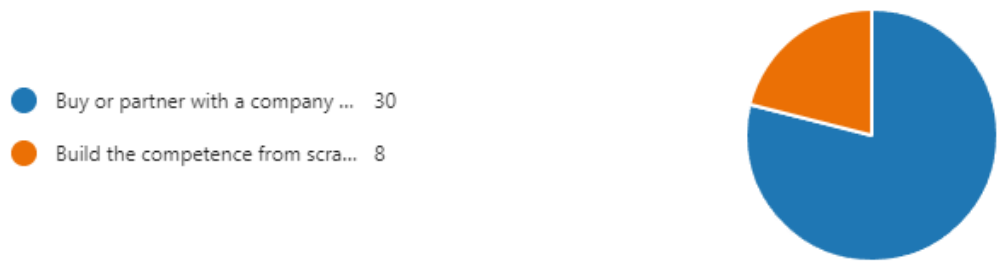

Figure 10. The preferred option for buying or building a company as per survey.

5.3.4 Whether to form it or not, if not, then WHY

When asked whether Rejlers should go ahead and expand their expertise in digital business such as AI, Machine learning, IoT, Predictive analysis using AI, computer vision or different digital solutions, below was the result.

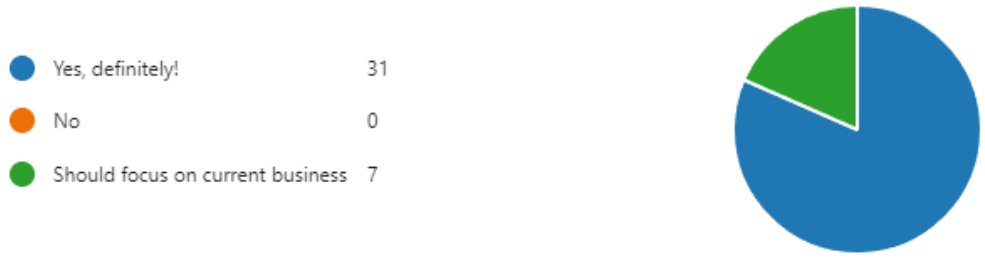

Figure 11. Opinion regarding whether to go ahead or should focus on current business as per the survey.

When asked the reason for answering whoever said should focus on current business, below were the answers.

Response 1: (Manager) Business commercials are different from reality. The main focus in leadership is "Profit must come in quarterly". That is why a ready-made skilled partner is the only possible solution.

My view: Response 1 emphasizes the practicality of prioritizing profit in the short term, highlighting the prevalent business norm that often leans toward immediate gains. It underscores the importance of having a skilled partner readily available, aligning with the notion that an external expert can efficiently contribute to achieving short-term business objectives.

Response 2: (Manager) Focusing on current business must be a priority for now. However, acquiring a company with ready expertise I think would be an economical choice in the long run. After acquiring more insight into the realms of digital solutions, only then it would be wise to decide whether to venture into that corridor.

My view: Response 2 takes a more strategic approach, acknowledging the importance of focusing on the current business landscape. However, it advocates for a long-term vision by considering the acquisition of a company with established expertise in digital solutions. This approach suggests a commitment to sustained growth and competitiveness, with a decision to venture into the digital realm contingent on a deeper understanding of its potential benefits and challenges.

In summary, both responses recognize the need for a strategic approach, with Response 1 emphasizing the urgency of profit and Response 2 favouring a more measured, insight-driven entry into the digital domain. The ultimate decision might depend on finding a balance between immediate business needs and long-term sustainability.

There were few responses where they mentioned moving forward and buying a company and being ahead of the competition before losing it to the competitors, see below:

Response 1: I think it's mandatory to move a bit towards new fields and outwards from the main focus area (however not too much / too soon). Then it would be best to buy some company (get the service up and running quickly) and start developing/implementing it best possible ways to our current functions.

Response 2: I have only minor knowledge of digital solutions. But in my previous workplace, we had co-operated with Oulu University about how to use "big data" and AI to operate a biorefinery. We did only "basic engineering" for that project. That project never started because everybody of our people understood too little about digital solutions like AI and we never got a clear picture of what advantages would be possible to reach. This happened about 6 years ago. Maybe now people in Rejlers and also in factories understand this kind of process optimization better and this can be a business possibility for Rejlers.

Response 3: If Rejlers does not work with digital business solutions, Rejlers will be outdated and lose business opportunities.

Response 4: Resources are limited so we should focus on one or two topics, not all that was listed. One option would be to power up the AOS360 tool with AI. Our big customer is a huge user of the tool in maintenance planning. In this area, there could be opportunities for AI.

My opinion of the above responses is as below

Responses highlight a spectrum of perspectives on Rejlers' approach to digital solutions:

- **Strategic Expansion Advocate (Response 1):** This opinion suggests a cautious yet progressive move into new fields. It emphasizes the acquisition of a company to expedite the service launch and subsequent development. The focus is on a balanced approach that ensures quick implementation while optimizing current functions.
- **Past Experience Reflection (Response 2):** Drawing from past experiences, this opinion underscores the historical challenges of integrating digital solutions like AI. The hesitancy and lack of understanding in a previous project serve as a cautionary tale. However, there's a

sense of optimism, suggesting that with evolving awareness, digital process optimization could present new business opportunities.

- **Digital Transformation Advocate (Response 3):** This opinion takes a more assertive stance, stating that without engagement in digital business solutions, Rejlers risks becoming outdated and missing out on potential business opportunities. It strongly advocates for the incorporation of digital solutions as a strategic imperative.
- **Resource-Optimization Advocate (Response 4):** This perspective acknowledges the constraints of limited resources and recommends a focused approach. The suggestion is to concentrate on one or two specific areas, proposing the augmentation of the AOS360 tool with AI. The emphasis is on optimizing resources and finding opportunities, particularly in maintenance planning with key clients.

In summary, these opinions collectively suggest a nuanced strategy, combining a measured approach to expansion, learning from past experiences, recognizing the urgency of digital transformation, and optimizing resources for strategic implementation. The key lies in finding a balanced path that aligns with Rejlers' capabilities and the evolving landscape of digital solutions.

To successfully implement the advanced technologies, it is a logical idea to secure an AI strategic partner or enlist the support of a company with expertise in this domain. Recognizing this need, I have organized two interviews with professionals in the relevant field.

6 Discussion with potential partners

After conducting a series of interviews, engaging in internal discussions with colleagues, and consulting with customers, it has become increasingly evident that partnering for digital transformation solutions would be a strategic move with minimal drawbacks for Rejlers. This approach simply entails that whenever Rejlers approaches a customer, the collaboration with a trusted partner should be prominently highlighted. These partners can significantly enrich the services we offer and ensure we remain at the forefront of the digital landscape.

During these deliberations, two potential partners were closely considered, and their value propositions were carefully assessed.

6.1 Potential Partner 1: Company based in Nordic.

The first potential partner, established in 2018, operates as a Nordic AI consultancy, specializing in tailored AI solutions, computer vision, and natural language processing. Their modus operandi closely aligns with Rejlers' ethos, focusing on delivering solutions that address specific business challenges. One of their primary offerings includes advanced analytics, a tool capable of gleaning profound insights from data, making predictions, and generating recommendations. Rejlers can leverage advanced analytics to unearth issues, identify deviations, and offer actionable insights to our customers. (Potential partner 1 website.)

For instance, if a problem arises, advanced analytics can help us pinpoint the root cause, predict the likelihood of a recurrence, and provide recommendations on mitigation strategies. This comprehensive approach to problem-solving was a focal point of the discussion.

The interview involved key representatives from both Rejlers and the potential partner, including Rejlers' CIO and the Head of Project and Engineering Systems, and the CEO of the partner company. The discourse commenced with introductions, where Rejlers articulated its interest in seeking partnerships that would enhance the range of AI-related services available to its existing customers. (Potential partner 1 website.)

A close examination of the potential partner's track record revealed their extensive experience in collaborating with companies resembling Rejlers' clientele. Notably, they had successfully undertaken projects in industries akin to those served by Rejlers. These projects encompassed predictive applications, such as forecasting equipment malfunctions, anticipating wastage, and facilitating predictive equipment maintenance. They had also pioneered ventures in computer vision, notably implementing projects related to automated image-based reporting and safety equipment monitoring.

When the topic of process optimization, computer vision, and predictive maintenance was broached, the CEO of the potential partner exuded confidence in their team's capabilities. He asserted that their team possessed the expertise to collaboratively address the challenges faced by Rejlers' customers.

In addition to their impressive track record, the potential partner had worked with Caruna, an electricity distribution company responsible for building, maintaining, and repairing electrical grids serving over 700,000 people. Their collaboration with Caruna resulted in the development of a computer vision application designed to detect damage to Caruna's electrical network, a testament to their expertise in this area. (Potential partner 1 website.)

Further strengthening the case for this partnership, the CEO of the potential partner provided a compelling case study. They had previously assisted a client operating an industrial process heavily reliant on raw water. The existing model was reactive, meaning problems with the water quality were only identified after they had already impacted the water negatively. In response, the potential partner developed a machine learning algorithm capable of predicting treated water quality and offered recommendations for process adjustments based on available data. (Potential partner 1 website.)

The potential applications of such solutions extend to areas such as wastewater management, making the partnership a highly attractive proposition for Rejlers and its customers.

6.2 Potential Partner 2: Exploration of Collaboration in Bucharest, Romania: Navigating Beyond First Impressions

In Bucharest, Romania, a company, initially thought to be a leader in digital solutions, revealed its true nature in a detailed discussion. It turned out to be a staffing firm with a unique angle—specializing in providing skilled resources mainly from the dynamic talent pool of Bucharest.

As they presented their various services, my interest was caught by their work in cloud computing, artificial intelligence, and the complex world of machine learning models—areas that align closely with what Rejlers focuses on and is good at.

As we delved into the conversation, we discovered a deep understanding of their clients, which surprisingly matched well with Rejlers' customer base. Rather than immediately dismissing the collaboration due to some differences in current needs, a strategic decision was made to keep this connection for future possibilities.

Looking ahead, we recognized that although staffing wasn't an urgent need, it could be valuable in the future. The idea of tapping into this network for specific skills, especially when facing challenges in Finland, was seen as a valuable resource waiting to be explored.

In essence, what was initially seen as a misunderstanding about their main business turned into an opportunity. Instead of cutting ties, we decided to carefully nurture the relationship, keeping this staffing firm in the background. The plan is to reach out when we need specific expertise, creating a story of flexible collaboration and strategic use of resources. This approach fits well with Rejlers' ambitions and the ever-changing nature of the digital landscape in which we operate.

Technologies

- Frontend and Backend
  - Java EE/Spring, PHP, Node.js, JS, Angular, jQuery, React
  - C / C++, embedded, Delphi
  - .NET, C#, Visual Basic, VBA, .Net framework and Visual Studio
- BI/ETL, DWH, Reporting, SQL
  - Informatica, ODI, PowerBI, Teradata, ClickView
- Cloud (Azure, AWS, O365)
- Scripting and Automation
  - Python, Shell/Bash, TCL
  - Selenium, Appium, Robot Framework, TestNG, TestRail
  - RPA (UIPath, BluePrism)
  - DevOps (Jira, Jenkins, Git, Kubernetes, Ansible, Docker, OpenShift)
  - Virtualization (Citrix, VMWare)
- Mobile
  - Android, iOS: React Native, Ionic, Xamarin
- AI / ML / CV / DL Research
  - TensorFlow, OpenCV, SciPy

Figure 11 Services provided by potential partner 2.

7 Analysis

In this pivotal chapter, the study transitions into an in-depth analysis, aiming to distil insights from a variety of sources including internal discussions with Rejlers employees, feedback from customers, survey results, and perspectives from the managerial echelon.

7.1 Analysis of Research Findings

I will conduct separate analyses for customer interviews, Rejlers interviews, surveys, and potential partner interviews. This approach aims to ensure a thorough and accurate understanding of the decision-making process.

7.1.1 Analysis of Customer Interviews done in Section 5.2

Interviewee 1: Digital Industry Head

- Challenge*:* Existing IoT systems face difficulties in providing easily accessible information on devices requiring maintenance.
- Implications*:* There's a need for a streamlined system with clear notifications to enhance the maintenance process and overall operational efficiency.
- Recommendation: Develop IoT systems that provide straightforward notifications, improving device maintenance visibility for efficient operations. Rejlers should focus on developing systems that provide clear and concise notifications in the IoT domain. This would involve creating interfaces that communicate maintenance needs in straightforward language, facilitating quick and informed decision-making for experts and non-experts alike.

Interviewee 2: Competence Manager, Innovation & Technology

- Challenge: Polymerization processes in daily operations encounter complexity and deviations.
- Implications: Rejlers, with digital expertise, can address deviations, significantly saving time and resources while enhancing overall process efficiency.
- *Recommendation:* Position Rejlers as a digital solutions provider for optimizing polymerization processes through AI-driven models and data analytics. Considering the complexity of polymerization processes, Rejlers should position itself as a digital solutions provider capable of optimizing these processes. The integration of AI-driven models and data analytics, such as AOS 360, can play a pivotal role in identifying and addressing deviations.
- Predictive Maintenance Implementation: The recommendation from Interviewee 2 regarding Predictive Maintenance indicates a potential area for Rejlers to explore. Initiatives focused on developing systems that predict wear and tear, coupled with timely notifications, align with customer needs, and can provide a competitive edge.

Incorporating these recommendations into Rejlers' digital transformation strategy will not only address specific pain points identified by customers but also position the company as a proactive and innovative partner in their journey towards enhanced operational efficiency.

7.1.2 Analysis of Survey Findings as per section 5.3

- Divergence in Perspectives:
  Managerial discussions revolve around fiscal responsibility, while engineers focus on technological needs, reflecting a harmonious blend of financial acumen and technological foresight.
- Navigating Priorities:
  Survey respondents emphasize cybersecurity, transitioning to advanced design tools, exploring virtual reality, and expressing interest in larger projects and intelligence.
- Forming a New Sector:
  The unanimous consensus from employees is to prioritize acquiring a skilled workforce for Rejlers' digital expansion.
- Buying or Partnering for Expertise:
  The majority suggests buying or partnering with a company possessing ready expertise over building competence from scratch.
- Opinion on Venturing into Digital Business:
  A majority favours Rejlers’s expanding expertise in digital business, such as AI, Machine Learning, IoT, Predictive Analysis, and Computer Vision.
- Reasons for Not Venturing:
  Highlight the practicality of focusing on current business for short-term gains or suggest acquiring a company with expertise for long-term economic growth.

The analysis underscores the need for Rejlers to strategically integrate digital solutions into its operations. Recommendations include focusing on clear notifications for IoT, AI, Machine learning, predictive maintenance, utilizing digital expertise for process optimization, and prioritizing the acquisition of a skilled workforce. The diverse opinions from employees provide a rich tapestry for Rejlers' future, balancing fiscal pragmatism and technological dynamism. This synthesis of insights forms the basis for a nuanced and effective digital transformation strategy.

7.1.3 Analysis of Potential Partner Interviews and Overall Analysis as per Whole Sections 5 & 6

Through interviews and surveys, it was found that Rejlers should initiate its foray into digital transformation by leveraging its existing customer base. The focus will be on selecting a specific process within the chemical industry, where Rejlers is currently involved.

AOS360 Integration

The data in the interviews and surveys suggests and I think that integrating Rejlers' proprietary product, AOS360 can be instrumental in streamlining the chosen process. AOS360, coupled with other sensors and data sources, can provide a comprehensive understanding of the operational dynamics.

Process Optimization in the Chemical Industry

An in-depth analysis indicates that targeting process optimization in the chemical industry aligns with Rejlers' existing expertise. By applying digital solutions, Rejlers aims to enhance efficiency, reduce operational costs, and deliver more value to its customers.

Leveraging Current Expertise

The research underscores the significance of leveraging Rejlers' current expertise in chemical industry processes. By capitalizing on existing customer relationships, Rejlers can introduce digital solutions seamlessly.

AOS360 as a Catalyst

The implications of incorporating AOS360 into the digital transformation strategy are profound. The product not only serves as a technological catalyst but also enhances Rejlers' value proposition, enabling a holistic approach to process optimization.

Predictive Maintenance Integration

The findings suggest that the phased approach, starting with process optimization and later integrating predictive maintenance, aligns strategically. This enables Rejlers to build a robust foundation before expanding into broader digital transformation initiatives.

Strategic Partnership with Potential Partner 1

The research highlights the potential benefits of collaborating with a strategic partner, such as the AI agency based in Nordic. Established in 2018, this partner specializes in tailored AI solutions, computer vision, and natural language processing. Their experience in predictive applications, computer vision, and successful collaborations with companies like Caruna demonstrates a strong alignment with Rejlers' goals.

Enhanced Capabilities Through Collaboration

The interview with Potential Partner 1's CEO revealed their confidence in addressing challenges faced by Rejlers' customers. The case studies presented, especially in computer vision applications for electrical network monitoring and industrial process optimization, showcased the partner's ability to deliver impactful solutions.

Widening Scope of Applications

The partnership extends Rejlers' capabilities to areas like wastewater management, presenting a mutually beneficial opportunity for innovation and value creation.

This analysis lays the groundwork for Rejlers' entry into the digital transformation landscape, emphasizing a customer-centric, phased approach with a focus on process optimization and predictive maintenance in the chemical industry, coupled with strategic collaboration with Potential Partner 1.

7.1.4 Analysis of Internal interviews findings as per section 5.1.1:

a. Analysis of Interviewee 1 - Rejlers Finland Employee from Life Science:

- The interviewee reveals that Rejlers once had an IT department offering standard services, which was later closed due to misalignment with the evolving business strategy and financial considerations.
- Rejlers had previously offered IoT services, but the reasons for discontinuation remain undisclosed. The IT department closure occurred in 2018.
- The interviewee suggests that the current moment is opportune for Rejlers to re-enter the digital business domain, emphasizing the importance of embracing it now.

b. Analysis of Interviewee 2 - Project Head:

- Interviewee 2 adds that the closure of the IT department was a strategic decision taken in Norway. The focus shifted to providing consultancy services in various engineering fields.
- Rejlers currently offers AOS, a digital twin solution, which allows remote access to construction sites, reducing the need for travel. However, Interviewee 2 emphasizes that the full potential of AOS is yet to be harnessed.
- A machine vision proof of concept for one of our customers was completed, but the project hasn't progressed further.
- Both interviewees express optimism about Rejlers' venture into the digital domain, emphasizing the need for further research. They also provide leads for contacting potential customers for additional insights.

c. Analysis of Interviewee 3 - Automation Manager:

- The interviewee, while not having extensive experience, has worked on projects involving IoT, AI, and Digital Twin technologies at Rejlers.
- Various tests involving cloud services and IoT data transfer protocols were conducted, including using MQTT for connecting Siemens S7-1500 and MS Azure DB, implementing OPC UA for data exchange, and creating a link through REST data transfer.
- Interpretation of PLC software code using ChatGPT, an AI-powered solution.
- A test for the AOS360 application involved importing PLC measurement data into a digital twin environment.
- The interviewee acknowledges limited experience but highlights valuable insights gained from these projects into the potential applications and benefits of IoT, AI, and Digital Twin technologies within Rejlers.

Overall, the interviews paint a picture of Rejlers' history in digital services, the closure of the IT department, current digital initiatives, and the optimism and recommendations from key personnel for further exploration in the digital domain.

7.2 Discussion of Implications for Rejlers

The synthesis of findings underscores the need for Rejlers to adopt a nuanced and effective digital transformation strategy. Recommendations positioning as a digital solutions provider in polymerization processes, exploring predictive maintenance, cyber security, acquiring a skilled workforce, and strategic integration of digital solutions in Rejlers' operations. This comprehensive approach positions Rejlers as an innovative, customer-centric, and technologically adept player in the evolving landscape of digital transformation.

The analysis suggests a strategic integration of digital solutions into Rejlers' operations, covering areas like AI, Machine Learning, IoT, Predictive Analysis, and Computer Vision. The emphasis on cybersecurity, advanced design tools, and interest in larger projects provides a roadmap for Rejlers' digital expansion.

The unanimous consensus from surveys points toward the prioritization of acquiring a skilled workforce for Rejlers' digital expansion. This aligns with the need for expertise in digital business and supports the idea of strategic partnerships or acquisitions for gaining ready-made skilled capabilities. The overall discussion underscores the importance of leveraging Rejlers' current expertise in the chemical industry. This involves seamlessly introducing digital solutions and capitalizing on existing customer relationships. A customer-centric, phased approach is recommended, focusing on

specific processes within the chemical industry. AOS360 integration is identified as instrumental in streamlining processes and providing a comprehensive understanding of operational dynamics.

8 Proposed Digital Consultancy Department

The proposed Digital Consultancy Department within Rejlers is designed to be a dynamic and integrated hub, strategically positioned to lead the organization into the digital era. The structure of this department is characterized by its adaptability and customer-centric focus. It comprises cross-functional teams, each dedicated to specific aspects of digital transformation.

8.1 Description of the proposed department's structure

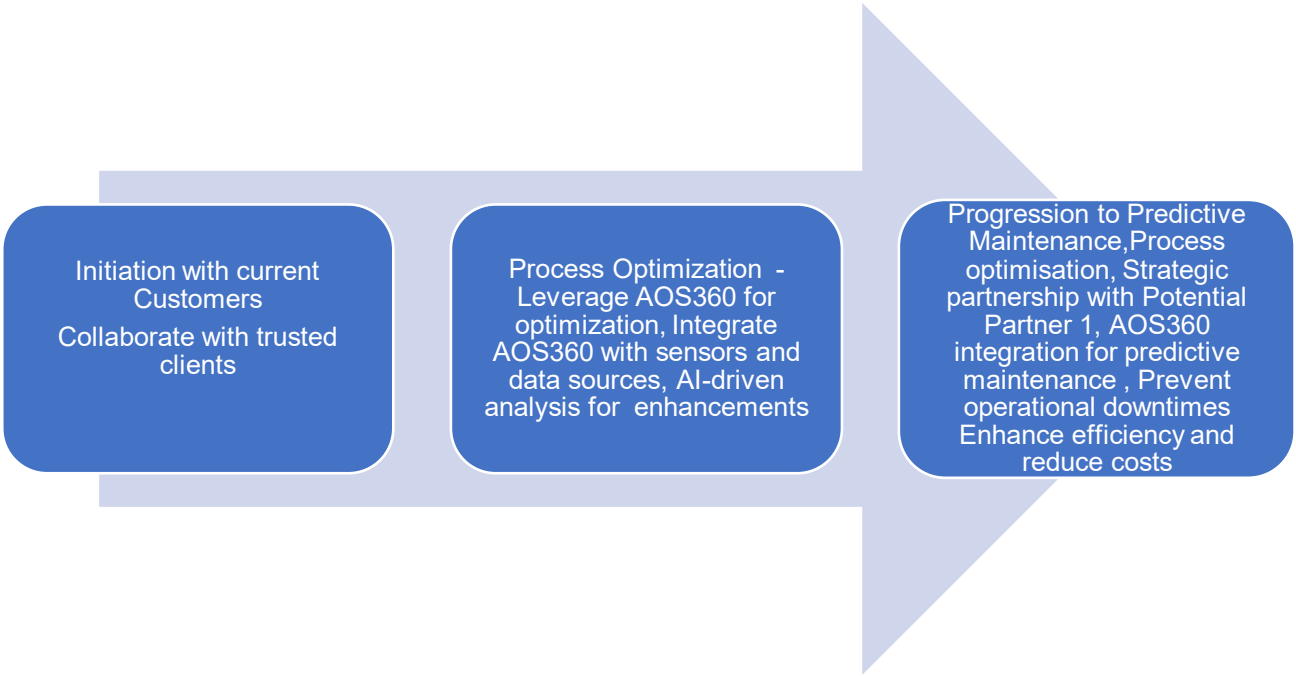

Figure 12. Process of implementation of the 1st project

The envisioned Digital Consultancy Department represents a transformative leap for Rejlers into the digital era. This strategic initiative is anchored in a phased approach that commences with our valued customers, leveraging our existing relationships to pioneer innovative solutions. The primary focus will be on process optimization within the chemical industry, a sector where Rejlers has a robust presence.

8.1.1 Initiation with Trusted Customers

The department's foundation rests on collaboration with our trusted customers. By understanding their unique challenges and requirements, we aim to co-create digital solutions that bring tangible value to their operations. This collaborative approach not only strengthens our existing partnerships but also positions Rejlers as a proactive and responsive digital solutions provider.

8.1.2 Process Optimization using AI and AOS360

Our proprietary product, AOS360, will play a pivotal role in the initial phase. We propose leveraging AOS360 to optimize specific processes within the chemical industry. This involves integrating AOS360 with other sensors and data sources to provide a comprehensive understanding of operational dynamics. The department will harness the power of artificial intelligence (AI) to drive process optimization. AI algorithms, embedded in AOS360, will analyse data patterns, identify inefficiencies, and propose enhancements. This approach ensures a data-driven and intelligent optimization process tailored to the intricacies of the chemical industry.

8.1.3 Progression to Predictive Maintenance with Potential Partner 1

In the subsequent phase, we envision a strategic partnership with Potential Partner 1, an AI agency specializing in tailored AI solutions, computer vision, and natural language processing. This collaboration aligns seamlessly with Rejlers's vision for predictive maintenance and advanced digital capabilities. Building on the success of the optimization phase, AOS360 will continue to play a pivotal role in the integration of predictive maintenance systems. By predicting wear and tear and providing timely notifications, Rejlers aims to prevent operational downtimes, further enhancing efficiency and reducing costs for our customers.

8.1.4 Enhanced Capabilities Through Collaboration

The collaboration with Potential Partner 1 extends our capabilities into areas such as wastewater management, presenting mutually beneficial opportunities for innovation and value creation. This strategic partnership reinforces Rejlers's commitment to staying at the forefront of technological advancements in collaboration with industry experts.

8.1.5 Contributing to Sustainable Growth

The Digital Consultancy Department aligns with Rejlers's broader goals of innovation and sustainable growth. By embracing digital transformation, we not only meet the immediate needs of our customers but also contribute to the long-term resilience and competitiveness of Rejlers in a rapidly evolving business landscape.

In essence, the proposed department serves as the vanguard of Rejlers's digital journey, built on collaboration, innovation, and a commitment to delivering exceptional value to our customers. Through a carefully orchestrated series of steps, we aim to not only meet but exceed the expectations of our customers while setting new benchmarks in the realm of digital consultancy.

8.2 Functions and services it will provide.

The proposed Digital Consultancy Department at Rejlers embodies a customer-centric philosophy, engaging in collaborative partnerships to steer organizations through the digital transformation journey. The department's primary functions revolve around understanding and addressing customer needs. This begins with in-depth assessments, ensuring a nuanced understanding of specific challenges, operational intricacies, and growth objectives. Through co-creation workshops, the department actively involves customers in the design process, fostering a sense of ownership and tailoring digital solutions to their unique requirements.

A cornerstone of the department's services lies in leveraging AI and AOS360 for process optimization. The integration of Rejlers' proprietary product, AOS360, is strategically positioned to enhance operational efficiency and deliver real-time insights within the chemical industry. This includes implementing AI algorithms to analyse data patterns, identify inefficiencies, and provide actionable insights, empowering customers with data-driven decision support. Additionally, through strategic partnerships, particularly with Potential Partner 1, the department aims to seamlessly integrate predictive maintenance solutions, ensuring operational reliability and timely interventions. The continuous exploration of emerging technologies and a commitment to educational outreach and training further solidify the department's role as an innovation hub.

In essence, the Digital Consultancy Department acts as a catalyst for digital innovation, not merely providing solutions but actively partnering with clients in their transformative journey. Through a structured approach, it ensures the alignment of digital initiatives with overarching business goals, fostering sustainable growth. The services offered extend beyond immediate needs, contributing to the long-term resilience and futureproofing of operations in the ever-evolving digital landscape.

8.3 Alignment with Rejlers's Goals

The establishment of the Digital Consultancy Department is intricately woven into Rejlers's overarching goals, positioning the company at the forefront of digital innovation and client-centric solutions. At its core, the department aligns seamlessly with Rejlers's commitment to delivering exceptional value to its diverse clientele and staying at the cutting edge of technological advancements.

One of Rejlers's fundamental goals is to provide solutions that resonate with customer needs and expectations. The Digital Consultancy Department, rooted in a customer-centric approach, aims to collaboratively navigate clients through the complexities of digital transformation. By commencing with process optimization based on insights gained from AOS360 and expanding into predictive maintenance, the department ensures a tailored approach that directly addresses the pain points of Rejlers's customers.

Rejlers has a rich history of innovation, and the Digital Consultancy Department serves as the embodiment of this ethos. Through the infusion of AI, AOS360, and strategic collaborations like with Potential Partner 1, the department brings forth cutting-edge technologies. This alignment ensures that Rejlers not only stays abreast of technological trends but actively pioneers digital solutions in collaboration with industry experts.

Another key goal for Rejlers is to foster sustainable growth and resilience in a dynamic business landscape. The Digital Consultancy Department plays a pivotal role in achieving this by facilitating a phased, strategic approach. Starting with process optimization ensures a robust foundation before venturing into predictive maintenance and broader digital transformation initiatives, mitigating risks, and fostering sustained growth.

Rejlers emphasizes the importance of continuous learning and skill development. The Digital Consultancy Department aligns with this goal by not only staying updated on emerging technologies but also by engaging in educational outreach. The department acts as a knowledge hub, offering training and insights to both clients and internal teams, contributing to the overall skill enhancement within Rejlers.

9 Conclusion and answers to the research questions

The comprehensive exploration of Research Question 1 revealed a spectrum of benefits and potential risks associated with Rejlers' embracement of digital transformation services. The identified benefits include enhanced operational efficiency, improved customer experience, and the ability to stay competitive in a rapidly evolving market. However, potential risks such as the need for significant initial investment, challenges in adapting to new technologies, and the possibility of resistance from existing workflows were also brought to light. However, by considering the positive aspects and taking calculated risks, Rejlers can certainly achieve more favourable outcomes than unfavourable ones.

In addressing Research Question 2, strategic insights emerged on the most effective strategies for establishing the digital transformation sector within Rejlers. As per the interviews, surveys and my opinion states that starting with process optimization through AI and AOS360 can be a prudent initiation strategy. The future Digital Consultancy Department or services, designed with adaptability and customer-centricity, can be surfaced as a key element in the effective integration of digital services. This approach can lead us to leverage existing customer relationships for innovative solutions.

In conclusion, the Digital Consultancy Department isn't just a new venture; it's a manifestation of Rejlers's commitment to excellence, innovation, and enduring client satisfaction. By seamlessly aligning with Rejlers's goals, the department becomes an integral driver of the company's future success in the digital era.

After the initial conclusion, Rejlers can further solidify its future actions by implementing the following strategies:

- Investment in Training and Change Management:
  Address the potential risks identified by investing in comprehensive training programs for employees. This will facilitate a smooth transition to digital processes and mitigate resistance.
- Collaboration and Partnerships:
  Forge strategic collaborations with digital experts, possibly through partnerships with tech-savvy firms or academic institutions. This can bring in external knowledge and expertise.
- Continuous Learning and Adaptation:
  Establish a culture of continuous learning and adaptation within the organization. This involves staying abreast of the latest technological advancements and fostering a mindset of innovation.

- Iterative Implementation:
  Implement digital solutions iteratively, starting with process optimization and gradually expanding into more complex areas. This phased approach allows for learning from each stage and making improvements accordingly.
- Customer Feedback Mechanism:
  Develop a robust mechanism for collecting and incorporating customer feedback. This ensures that the digital solutions align closely with customer needs and expectations.
- Data Security and Privacy Assurance:
  Given the increasing emphasis on data security and privacy, Rejlers should prioritize robust measures to safeguard sensitive information. Compliance with relevant regulations is crucial.
- Monitoring and Evaluation:
  Regularly monitor and evaluate the performance of digital initiatives. This involves assessing their impact on operational efficiency, customer satisfaction, and overall business outcomes.
- Scaling Successful Initiatives:
  Identify successful pilot projects and scale them up across the organization. This scaling process should be accompanied by continuous improvement to optimize results.
- Market Research and Trend Analysis:
  Conduct ongoing market research and trend analysis to anticipate future developments in digital technologies. This foresight enables Rejlers to stay ahead of the curve and proactively respond to changing industry dynamics.
- Corporate Communication:
  Effectively communicate the digital transformation journey to both internal and external stakeholders. This transparency fosters trust and understanding, minimizing resistance, and maximizing support.

By integrating these strategies into their digital transformation roadmap, Rejlers can navigate the challenges and capitalize on the opportunities presented by the evolving digital landscape.

Lastly, I want to say, that after process optimization and predictive maintenance, Rejlers could consider expanding into the following areas within the industry:

- Advanced Analytics and Data-driven Decision-Making:
  Utilize data analytics to derive meaningful insights from the vast amount of data generated in industrial processes. This can involve predictive analytics, prescriptive analytics, and data-driven decision-making to optimize various aspects of operations.
- Energy Efficiency Solutions:

Develop solutions focused on enhancing energy efficiency within industrial processes. This could involve the integration of smart technologies to monitor and optimize energy consumption, reducing overall operational costs and environmental impact.

- IoT Integration for Real-time Monitoring:
  Extend the use of the Internet of Things (IoT) for real-time monitoring of equipment and processes. This includes deploying sensors and connected devices to gather data, enabling proactive maintenance and improving overall operational visibility.
- Supply Chain Optimization:
  Explore opportunities to optimize the supply chain by integrating digital technologies. This could include real-time tracking of inventory, demand forecasting, and streamlining logistics for improved efficiency.
- Quality Control and Assurance:
  Implement digital solutions for enhanced quality control and assurance throughout the production process. This may involve the use of AI-based systems to detect defects, ensure product consistency, and maintain high-quality standards.
- Remote Monitoring and Control:
  Develop solutions that enable remote monitoring and control of industrial processes. This can enhance operational flexibility, reduce downtime, and facilitate efficient management of dispersed facilities.
- Digital Twin Technology:
  Invest in digital twin technology to create virtual replicas of physical systems or processes. This can be valuable for simulation, testing, and optimizing processes before implementation, minimizing risks, and enhancing efficiency.
- Augmented Reality (AR) for Maintenance and Training:
  Explore the application of augmented reality for maintenance activities and employee training. AR can provide on-the-job guidance, visualize complex processes, and improve the effectiveness of training programs.
- Cybersecurity Solutions for Industrial Systems:
  With the increasing digitization of industrial processes, focus on developing robust cybersecurity solutions to protect critical infrastructure from cyber threats and ensure the integrity of data.
- Customized Digital Solutions for Clients:
  Tailor digital solutions to the specific needs of clients within the industry. This could involve offering consultancy services for digital transformation, understanding unique challenges, and providing bespoke solutions.

By diversifying into these areas, Rejlers can position itself as a comprehensive digital solutions provider, addressing a broader spectrum of challenges faced by its clients in the industrial sector.

10 Reflection

Embarking on this thesis journey has been an exhilarating and transformative experience. The realization of reaching conclusive findings was, at times, obscured by numerous hurdles that demanded resilience and perseverance.

The challenges encountered, such as navigating the intricacies of GDPR compliance, securing interviews with customers, conducting internal surveys, and orchestrating internal interviews, presented formidable obstacles. The persistence required, whether through repeated calls or emails to stakeholders, became a test of my determination.

The groundwork for this journey commenced a year ago, marked by an earnest quest to gather insights from engineers and higher management whenever opportunities arose, be it during internal functions, social gatherings, or coffee breaks. This initial phase was crucial in laying the foundation for what would unfold later.

The true essence of the work, however, unfolded when I sought internal approval and meticulously articulated the potential benefits of digital transformation consultancy. This involved a meticulous process of registering on Wihi, finding a supervisor, and commencing the thesis writing even before securing a supervisor—a testament to my proactive approach.

Undoubtedly, the journey was a blend of challenges and excitement. From navigating the maze of bureaucratic procedures to persuading stakeholders of the merits of the proposed consultancy, each step brought forth valuable lessons. The process not only enriched my understanding of digital transformation but also honed my skills in negotiation, persuasion, and resilience.

In retrospect, the challenges were not mere roadblocks but opportunities for growth and learning. The pursuit of interviews and approvals, the meticulous data gathering, and the formulation of a coherent narrative within the thesis were all integral components of a journey that, while challenging, has undoubtedly been instrumental in my personal and professional development.

Reflecting on the thesis journey, there are a few aspects that could have been enhanced:

- **Early Supervisor Engagement:** While the initial stages of the thesis involved proactive steps like writing before securing a supervisor, earlier engagement with a supervisor could have provided more structured guidance and potentially streamlined certain processes.
- **Stakeholder Communication:** Enhancing communication strategies, especially with stakeholders who were challenging to reach, might have expedited certain aspects of the data collection process. Clearer communication channels and perhaps more personalized approaches could have been explored.

- **Mitigating GDPR Challenges:** Given the challenges posed by GDPR, a more proactive approach to understanding and navigating these regulations could have been beneficial. Seeking advice from legal or compliance experts early on might have provided more clarity.
- **Structured Data Collection Plan:** While the hurdles in data collection were overcome, a more detailed and structured plan for data gathering could have streamlined the process further. This includes a detailed schedule for interviews, surveys, and other data collection methods.
- **Reflection during the Process:** Incorporating periodic reflections during the journey could have provided real-time insights into the challenges faced and adjustments needed. This could have allowed for more agile adjustments to the research strategy.
- **Leveraging Networking Opportunities:** The early groundwork of gathering insights during internal functions, parties, and coffee breaks was commendable. However, exploring additional networking opportunities, perhaps even beyond the immediate organizational context, could have provided more diverse perspectives.

These are only reflections with the benefit of hindsight, and each challenge faced during the thesis journey has contributed to valuable learning and growth. The journey, with its imperfections, has led to a comprehensive and insightful thesis.

As I conclude this thesis, I carry forward not only the knowledge acquired but also the resilience cultivated in the face of challenges. The journey, with its twists and turns, has shaped me into a more adept researcher and strategist, ready to confront the complexities of real-world problem-solving.

Last but not least,

A Heartfelt Thank You:

As I conclude this thesis, I want to express my sincere gratitude. Thank you to Rejlers for providing the platform and support for this research journey. The insights gained from your organization have been invaluable.

A special thanks to my supervisor, whose guidance and expertise shaped this thesis. Your insights were a compass, navigating me through the complexities of this research.

To all the employees who participated, your time and perspectives were crucial. Thank you for your contributions; they have enriched this study.

This has been an exciting and challenging journey, and I appreciate the support and encouragement from everyone involved.

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Appendices

Appendix 1. Survey text and questions sent to internal Rejlers.

Introduction and Questions sent within Rejlers.

Title: Ctrl+Alt+Innovate: Engineering a Digital Twist for Rejlers

Greetings!

I am Snehal Bopardikar, your friendly Business Unit Manager for the Control team stationed in the vibrant city of Vantaa, Finland. While juggling the exciting responsibilities of this role, I have embarked on a master's journey at Haaga-Helia University of Applied Sciences, specializing in Leading Business Transformation with a captivating focus on Digital Business Opportunities. It is quite an adventure, I must say!

Currently, I am deep into the realms of crafting my thesis, and guess what? It is all about Rejlers. Picture this: a quest to unravel the mysteries of the digital universe and uncover whether we should plunge headfirst into a new realm – one brimming with possibilities like Machine Learning models, Predictive analysis, the enchanting Internet of Things (IoT), the wizardry of Artificial Intelligence (AI), and the magical touch of Robotic Process Automation and many more. We are talking about carving our path in the grand competition that the world is currently engulfed in. Please note, that this thesis is about doing research and Rejlers has not planned to offer such services yet.

Now, here comes the fun part – I am on the lookout for some allies in this scholarly expedition. Yes, that is you! Your insights, your thoughts, your perspective – they are all like precious gems that will help me in my research. To make this happen, below is a questionnaire. It has a mix of intriguing multiple-choice questions and a few ponder-worthy subjective ones too.

So, if you are up for a dash of survey excitement, I am eagerly waiting for your nod. Your participation will be the guiding star on this thesis voyage, and together, we will unlock doors to new digital realms that could also redefine our landscape at Rejlers.

Here's to a future brimming with bytes of brilliance and digital wonders!

Cheers,

Snehal Bopardikar

1. How many years of experience do you have in the current industry?

2. Please indicate your position using terms such as management, middle management, senior expert, or junior expert.

3. How familiar are you with digital solutions or digital transformation services? Between 1 to 10, 1 being the lowest.

4. Which of the following digital consultation solutions do you find most beneficial for enhancing organizational competency within Rejlers in Finland, Abu Dhabi, Sweden, and Norway? Please prioritize them, with the top choice considered as the most favoured one.

1 Artificial Intelligence, Machine learning, Predictive/Prescriptive maintenance

2 Internet of Things (IoT) devices

3 Computer vision

4 Cloud-based collaboration tools

5 Process optimization using AI.

5. Or do you have something else in your mind, that I have not listed above?

6. What do you believe should be Rejlers's initial priority if it intends to pursue opportunities in the digital realm? Please prioritize them, with the top choice considered as the most favoured one.

Adequate budget allocation

Skilled workforce

Clear business objectives

Support from top management

7. If Rejlers pursues new digital services, then what should we focus on?

Buy or partner with a company with ready expertise.

Building competence from scratch means hiring people with the required skills in Rejlers.

8. Do you think Rejlers should go ahead and expand their expertise in digital business such as AI, Machine learning, IoT, Predictive analysis using AI, computer vision etc.?

Yes, definitely!

No

Should focus on current business.

9. If your answer to the previous question was No, then why not? It will help me to think better and in all directions.
If your answer were "Yes" or "Should focus on current business" I would appreciate your opinion or some comment for the future of Rejlers.

Appendix 2. Data from Survey

1. Level of familiarity with digitalization as per experience as per survey data

How many years of experience do you have in the current industry?	How familiar are you with digital solutions or digital transformation services? Between 1 to 10, 1 being the lowest.
6	7
13	6
12	6
13	6
13	2
6	6
1	1
15	5
9	7
6	2
15	8
16	5
10	6
35	7
2	6
4	6
1	2
29	3
40	3
25	8
32	4
2	3
35	3
16	6
17	2
40	3
5	7
20	3
10	2
5	3
18	5
0	1
24	10
1	5
16	5
31	8
30	5
25	8
6	4

2 Data as per the level of experience and a desire for a change in Rejlers

How familiar are you with digital solutions or digital transformation services? Between 1 to 10, 1 being the lowest.	Do you think Rejlers should go ahead and expand their expertise in digital business such as AI, Machine learning, IoT, Predictive analysis using AI, computer vision or different digital solutions?
7	Yes, definitely!
6	Yes, definitely!
6	Yes, definitely!
6	Yes, definitely!
2	Yes, definitely!
6	Yes, definitely!
1	Should focus on current business
5	Yes, definitely!
7	Yes, definitely!
2	Yes, definitely!
8	Yes, definitely!
5	Yes, definitely!
6	Yes, definitely!
7	Yes, definitely!
6	Yes, definitely!
6	Yes, definitely!
2	Yes, definitely!
3	Yes, definitely!
3	Should focus on current business
8	Should focus on current business
4	Yes, definitely!
3	Yes, definitely!
3	Yes, definitely!
6	Should focus on current business
2	Yes, definitely!
3	Should focus on current business
7	Yes, definitely!
3	Yes, definitely!
2	Yes, definitely!
3	Yes, definitely!
5	Yes, definitely!
1	Should focus on current business
10	Yes, definitely!
5	Should focus on current business
5	Yes, definitely!
8	Yes, definitely!
5	Yes, definitely!
8	Yes, definitely!
4	Yes, definitely!

2 Data as per position in Rejlers and familiarity with digital transformation

Please indicate your position using terms such as management, middle management, senior expert, or junior expert.	How familiar are you with digital solutions or digital transformation services? Between 1 to 10, 1 being the lowest.
Management	7
Senior Expert	6
Lead Engineer	6
Senior Expert	6
junior expert	2
Junior Expert	6
junior expert	1
Management	5
Mechanical engineer	7
Senior design engineer	2
senior expert	8
Senior Expert	5
Middle management	6
Middle management	7
junior expert	6
senior expert	6
junior expert	2
senior expert	3
senior expert	3
Senior expert	8
Senior or lead	4
junior expert	3
Senior expert	3
Management	6
Senior expert	2
Lead Consultant	3
Middle mgmt.	7
senior expert	3
Lead Engineer	2
Designer	3
Management	5
Design Engineer	1
Middle management	10
Senior Expert	5
management	5
Senior expert	8
junior expert	5
Management	8
Middle management	4

3 Responses and Positions at Rejlers

Position at Rejlers	If your answer to the previous question was No, then why not? It will help me to think better and in all directions. If your answer was "Yes" or "Should focus on current business" please response
Lead Engineer	Clear objectives & areas must be defined beforehand
Senior Expert	The current & upcoming projects which Rejlers undertake will need a great deal of Digital Enhancements. So better preparation would help Rejlers achieve their future objectives.
senior expert	Advantages and the disadvantages of AI/ML should be recognized and well-considered. Haste is not a good option here. But IoT and AI will be virtually everywhere in the future, and we should master these to be top-notch.
Middle management	I think it's mandatory to move a bit towards new fields and outwards from the focus area (however not too much / too soon). Then it would be best to purchase some company (=get the service up and running quickly) and start developing/implementing it best possible ways to our current functions.
Senior expert	In my opinion, in this world situation, the company must ensure that we keep our key customer relationships and develop our core competence.
Senior expert	I think we should learn about the possibilities, choose only the most relevant ones to develop, and stay updated about the rest. We should not spread our energy too much since each possibility may require significant investment to become useful for us and our customers. I have been in organizations taking too many half-ready new digital tools into use at the same time and exhausting the middle managers. If a system does not save time for the ones using it, it is not well implemented or managed. We should create criteria for evaluating new possibilities so that we can make good, educated choices on where to focus.
Senior expert	I have only minor knowledge of digital solutions. But in my previous workplace, we had co-operated with Oulu University about how to use "big data" and AI to operate a biorefinery. We did only "basic engineering" for that project. That project never started because everybody of our people understood too little about digital solutions like AI and we never got a clear picture of what advantages would be possible to reach. This happened about 6 years ago. Maybe now people in Rejlers and factories understand this kind of process optimization better and this can be a business possibility for Rejlers.
Lead Consultant	Business commercials are different from reality. The focus in leadership is "Profit must come in quarterly". That is why a ready-made skilled partner is the only possible solution.

Position at Rejlers	If your answer to the previous question was No, then why not? It will help me to think better and in all directions. If your answer was "Yes" or "Should focus on current business" please respond below
Lead Engineer	If Rejlers does not work with digital business solutions, Rejlers will be outdated and lose business opportunities.
Management	Resources are limited so we should focus on one or two topics, not all that was listed. One option would be to power up the AOS360 tool with AI. Our customer is a huge user of the tool in maintenance planning. In this area, there could be opportunities for AI.
Senior Expert	Focusing on current business must be a priority for now. However, acquiring a company with ready expertise I think would be an economical choice in the long run. After acquiring more insight into the realms of digital solutions, only then it would be wise to decide whether to venture into that corridor.
Management	We would need a digital strategy, like what is being built around sustainable development.
Middle management	Engineering has taken a major leap forward going from 2D to 3D, so maybe there could be the next big opportunity to move from 3D to something else. Maybe AI could be a catalyst in this transformation, so we should investigate it.