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EXPLORING THE BUILDING BLOCKS OF EFFECTIVE CONSULTATIVE SELLING PROCESS

Bridging the gap between niche technologies and
potential customer applications

Master's Thesis
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ABSTRACT

Valtteri Hanhijoki: Exploring the building blocks of effective consultative selling process
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This study examines the complexities and solutions related to the sales of niche technologies, with a particular focus on thermal spray coatings. The sales of niche technologies often face challenges in the market due to their unfamiliarity, which leads to high perceived risks, as well as uncertainties regarding the value and applicability of the technology. These challenges are particularly significant in industries where new technology disrupts established solutions. Thus, this study addresses two key questions: (1) What are the prerequisites and building blocks for an effective sales approach of niche technology when the potential customer applications are unclear? and (2) How can the sales process of niche technology be structured to enable mutual value creation for both suppliers and customers?

The research adopted a qualitative approach, combining action research and case study methodologies. Primary data was collected through semi-structured thematic interviews, involving both suppliers and customers from various industries. This was complemented by secondary data, such as internal reports and prior interview notes from the researcher's employing company. A total of six interviews were conducted: three with suppliers using niche technologies (specifically thermal spray coatings and other novel surface treatment technologies), and three with customers purchasing products from these suppliers.

The results highlighted four key themes: nurturing supplier-customer relationships, demonstrating value, facilitating technology adoption, and co-creating value. Based on these themes, a comprehensive framework was developed to help technology providers overcome the barriers associated with selling niche technologies. The framework emphasizes the importance of building trust, fostering collaboration, and iteratively demonstrating both tangible and intangible benefits of the technology. Additionally, a seven-step sales process was constructed to support mutual value creation. This process can be utilized by sales managers to establish operational mechanisms and define performance indicators (KPIs) for their sales teams.

The findings of the study complement existing literature by providing concrete recommendations for companies utilizing niche technologies to advance their sales efforts. The results are particularly relevant for industries seeking to bridge the gap between niche-technologies and practical customer applications. To gain a broader understanding, further research could explore different customer groups and industries, as well as investigate how the type of niche technology influences the behaviour of these customer groups.

Keywords: consultative selling, modern selling, value-based selling, sales process, value co-creation, collaborative development, dyadic problem solving, niche technologies, thermal spray coating

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TIIVISTELMÄ

Valtteri Hanhijoki: Tehokkaan konsultatiivisen myyntiprosessin rakennuspalikoiden tarkastelu
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Tässä tutkimuksessa tarkastellaan niche-tekniologioiden, ja erityisesti termisten ruiskupinnotteiden myynnin monimutkaisuksia, ja ratkaisuja niiden myynnin edistämiseksi. Niche-tekniologioiden myynti kohtaa makkinoilla usein haasteita niiden tuntemattomuuden ja siitä syntyvien korkeaksi koettujen riskien vuoksi, sekä tekniologian arvoon ja sovellettavuuteen liittyvien epävarmuuksien vuoksi. Nämä haasteet ovat erityisen merkittäviä aloilla, joissa uusi tekniologia haastaa vakiintuneita tekniologioita. Tämä tutkimus käsittelee tähän liittyen kahta keskeistä kysymystä: (1) mitkä ovat niche-tekniologian tehokkaan myyntitavan edellytykset ja rakennuspalikat tilanteessa, jossa asiakkaiden mahdolliset käyttökohteet eivät ole selkeitä? ja (2), kuinka niche-tekniologian myyntiprosessi voidaan jäsentää niin, että se mahdollistaa molemminpuolisen arvonluonnin sekä toimittajille että asiakkaille?

Tutkimuksen lähestymistapa oli laadullinen, ja siinä hyödynnettiin toimintatutkimuksen ja taustatutkimuksen yhdistelmää. Ensisijainen aineisto kerättiin puolistrukturoitujen teemahaastatteluiden avulla, joissa haastateltiin sekä toimittajia, että asiakkaita eri toimialoilta. Tätä aineistoa täydennettiin sekundaarisilla lähteillä, kuten tutkijan työnantajayrityksen sisäisillä raporteilla ja aiemmilla haastattelumuistiinpanoilla. Haastatteluita suoritettiin yhteensä kuusi kappaletta: kolme haastattelua toimittajien kanssa, jotka käyttävät niche-tekniologioita (erityisesti termisiä ruiskupinnotteita, ja muita uudenlaisia pintakäsittelytekniologioita), ja kolme haastattelua asiakkaiden kanssa, jotka ostavat tuotteita näiltä toimittajilta.

Tulokset nostivat esiin neljä keskeistä teemaa: asiakas-toimittajasuhteiden kehittäminen, arvon osoittaminen, tekniologian käyttöönoton edistäminen ja arvon yhteisluominen. Näiden teemojen pohjalta kehitettiin kattava viitekehys, jonka tarkoitus on auttaa tekniologiatoimittajia ylittämään niche-tekniologioiden myyntiin liittyviä esteitä. Viitekehys korostaa luottamuksen rakentamisen, yhteistyön edistämisen ja tekniologian aineellisten ja aineettomien hyötyjen iteratiivisen osoittamisen merkitystä. Viitekehysten avulla rakennettiin myös seitsemästä vaiheesta koostuva myyntiprosessi, jonka tarkoitus on tukea molemminpuolista arvonluontia. Prosessia voivat hyödyntää myynnin johtajat esimerkiksi myyntitiimiensä toimintamekanismien ja suorituskykykymittarien (KPI) määrittämisessä.

Tutkimuksen tulokset täydentävät olemassa olevaa kirjallisuutta tarjoamalla konkreettisia suosituksia niche-tekniologioita käyttäville yrityksille niiden myynnin edistämiseksi. Tulokset ovat erityisen merkityksellisiä toimialoille, jotka pyrkivät kuromaan umpeen niche-tekniologioiden ja asiakkaiden käytännön sovellusten välistä kuilua. Laajemmän kokonaiskuvan saamiseksi tutkimusta olisi hyvä syventää vielä tarkemmin eri asiakasryhmiin ja toimialoihin, sekä tutkia mikä vaikutus niche-tekniologian tyypillä on näiden eri asiakasryhmien käyttäytymiseen.

Avainsanat: konsultatiivinen myynti, moderni myynti, arvopohjainen myynti, myyntiprosessi, arvon yhteisluonti, yhteinen kehittäminen, dyadinen ongelmanratkaisu, niche-tekniologiat, terminen ruiskupinnoitus

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PREFACE

I started working on my thesis while employed full-time as a Sales Manager at an SME in the industrial sector. The journey was long, and time was very limited while trying to do active sales work, work on side business, exercise and maintain other aspects of life while writing the thesis. Additionally, I still had to carry out mandatory military service, which got post-poned many times due to the above-mentioned time restrictions. Ultimately, at the middle of my thesis project, I decided to get the military service out of the table, and after that cut off everything else in order to focus on my work and thesis. At the start of my studies, I remember university professors recommending that no-one should start working full-time before the studies are finished, and here I am now, 7 years later, one example of those people that did not take this recommendation seriously. I can now only continue sharing this recommendation for younger generations to not jump to working life before the studies are done.

The topic and content of my thesis changed multiple times during the journey and ultimately evolved to focus on what I perceived at the time as the most pressing challenge in my sales work. Thus, the topic was not assigned by my employer, but rather by my own ambitions and thoughts regarding sales work. In my role, I frequently encountered situations where we sought to identify new applications for thermal spray coatings that were somewhat unfamiliar in the market, often with limited resources typical of an SME. Additionally, the potential applications for the technology were often in the most critical parts of the customer's processes, creating significant barriers that needed to be overcome. This experience motivated me to explore the sales process of niche technologies in greater detail, particularly in situations where customer applications were not yet fully understood.

I wish to thank everyone that had contributed to this thesis, especially my colleagues and customers, that I have had privilege to work with regarding this subject for many years. Also, big thanks belong to my thesis supervisors Leena Aarikka-Stenroos and Jouni Lyly-Yrjänäinen for their patience and guidance throughout the journey. Special thanks go to my partner, Lotta, who has helped me to push this thesis project further even in the most challenging and busy times in life.

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1. INTRODUCTION

1.1 Background of the study

Increasing the efficiency and reliability of industrial equipment and processes is common interest among process industry, OEMs, and their suppliers and service providers. This has caused new technologies and materials to arise to increase the reliability and service-life of the process components (Qin et al. 2020). Answering this call, thermal spraying has been one of the most rapidly growing technologies that has been used to either extend the longevity of components or to enhance their performance (Gildersleeve & Vaßen 2023; Joshi 2020). The versatility of thermal spray technology has led to it being adapted by many different industries, such as aerospace, automotive, steel and paper mill, mining, and energy generation applications (Gildersleeve & Vaßen 2023; Barshilia 2020; Joshi 2020; Tucker 2013 p. 7).

Given the success and advancements in the thermal spray technology, the pursuit for new potential applications is constantly ongoing. However, as a surface treatment technology, thermal spray is still quite niche outside of its core markets (Barshilia 2021; Viswanathan et al. 2021). According to Statista (2024), the market for industrial paints and coatings reached approximately 180 billion USD during 2023. From this, thermal spray coatings had market share of 10,5 billion USD with over 70 % coming from its core markets: aerospace, automotive and energy generation industries (Grand view research 2024).

Being such niche technology in other industries, introducing thermal spray coatings into new markets and applications contains several problems. On one hand, the technology might be unfamiliar to OEMs and end-users, and therefore, the value-potential is difficult to assess. This is the case especially with the newer thermal spray technologies, such as cold spray, but even the potential new industries that are aware of the technology and its benefits are hesitating to take the risk to move into it (Espallargas 2015; Vardelle et al. 2016). Introducing a new technology to these continuous processes, therefore, contains lots of uncertainty and, thus, one of the main challenges is to figure out how to overcome these uncertainties and make the value potential understandable to the users (Chaoji & Martinsuo 2022; Erwin 2014, pp. 5). On the other hand, to offer the most effective solution, the technology provider must possess a comprehensive understanding

of the potential customer's process characteristics. Many times, these industrial processes are very complex and contain multiple variables, which makes it difficult for the technology provider to understand the potential uses (Chaoji & Martinsuo 2022). Hence, establishing an environment for collaborative discussions with the potential end-users is a vital part when introducing such technology.

1.2 Research problem

Introduction of new technology is not straightforward and contains multiple variables, especially if the technology is relatively unknown and it disrupts the industry standard, as is the case with thermal spray coatings and other novel surface coating technologies. Disruptive technologies are problematic for established companies, since they are inclined to serve their existing customers with existing technologies, as the returns are better and the technologies are familiar (Utterback & Abernathy 1975). Primarily, companies' cost structures are designed to serve existing customers and their needs, while also aiming to maintain a good and stable level of profit and jobs. For this reason, disruptive technologies rarely attract established and stable companies. (Utterback & Abernathy 1975)

Good example of this kind of technological change is the replacement of widely used hard chromium coatings (Legg et al. 1996). Due to the exposure for carcinogenic hexavalent chromium during the process, and the process being environmentally harmful, the production process for hard chromium is getting more and more restricted year by year. However, thermal spray coatings being one of the potential alternatives for hard chromium coatings, also being superior in terms of quality, hard chrome still keeps the industry standard in many areas. As discussed by Legg et al. (1996), although being superior in quality, alternative coating methods might have higher costs, and they might require changes into the overall manufacturing process, part dimensions and materials. However, even by adopting these changes could produce environmentally friendlier and better performing products in the long run, companies still hesitate to take this step.

This kind of technological discontinuity challenges companies and existing technologies, ultimately leading to significant variance in products and processes (Anderson & Tushman 1990). Thus, companies must decide whether to engage in developing new technology or to try to protect their old technologies by further developing them to avoid being displaced by the new technology. The pace of adoption and acceptance of new technology in a social network is entirely determined by its characteristics (Rogers 2003). These characteristics include relative advantage, compatibility, complexity, trialability, and observability. Additionally, most people evaluate a new innovation and its benefits in their

minds based more on subjective experiences shared by their close circle than on information distributed by mass media or scientific research. For diffusion to be effective, the communication of the innovation must also be effective. However, the effectiveness is undermined by the fact that individuals' social networks and subjective experiences play such a significant role in diffusion that the heterogeneity of the societal system becomes a brake on it.

When the introduction of the new technology is driven by the technology provider (hereafter referred to as the "supplier"), there can be multiple barriers to overcome. Firstly, a lack of understanding from customers' processes and/or products makes it difficult to build a resonating approach which, furthermore, makes it more difficult to gain customer's interest (Anderson et al. 2006). Secondly, to be able to build this resonating approach, and to understand the potential uses, a solid base understanding should be built for both the supplier and the customer. As Paul Doyle (Strafford et al. 1995 pp. xvi) has put it, one of the most important elements of the business relationship between a surface engineer and a customer is the reciprocal exchange of expert-based knowledge. The importance of the expertise and knowledge of coating technologists in developing the thermal spray market is still well supported in today's literature (Dofrman et al. 2022; Espallargas 2015; Fauchais 2015; Vardelle et al. 2016). However, capturing this knowledge requires active participation and information sharing from both, the supplier and potential clients and, thus, might be time consuming. Thirdly, to decrease uncertainty of introducing a new technology, verification and validation of some degree should be conducted. By verification the parties are proven that the solution complies with the specifications, and by validation the parties are proven that the solution meets the customer requirements under the operational conditions (Perttula & Kukkomäki 2020). Depending on the application, this might require laboratory and field tests and, thus, require funding and possibly a pilot user.

As a whole, this might be overwhelming for the potential clients, and approaching this kind of problem setting is definitely not easy nor straightforward for the supplier. Having to squeeze sensitive information from the potential clients to find out the potential use cases, and at the same time, educate the potential clients of the technology, and all this without a clear vision of the value potential, is a difficult task. Thus, the main research question is...

RQ1: What are the building blocks and their prerequisites for an effective sales approach of a niche technology in the absence of clear understanding of potential customer applications?

Hypothesis is that an effective sales approach consists of different building blocks with certain prerequisites, and that their emphasis might vary depending on the nature and scope of the subject. Moreover, the approach and its contents should be perceived valuable for both parties and, thus, should be adjusted as per the subject at hand. However, it is not clear how to structure and operationalize these building blocks ensuring mutual value creation, considering the dynamic interplay between the supplier and potential clients. Therefore, this study seeks to answer...

RQ2: How should the sales process be structured to ensure mutual value creation for both the niche technology user and its customers?

To conclude, exploring the intricacies of introducing new technologies, RQ1 investigates the building blocks and prerequisites for an effective sales approach, addressing challenges arising from a lack of process understanding and the need for verification. Building upon this, RQ2 delves into the strategic organization of the sales process, aiming to unravel the dynamic interplay between suppliers and clients, and provide practical insights into optimizing sales approaches for mutual value creation.

1.3 Structure of the study

In the previous chapter, the research problem and research questions were introduced. In the upcoming chapters, the focus will be on addressing and providing answers to these questions. Chapter 2 begins with an exploration of the theoretical background, delving into the evolution of professional selling, types of selling, and the fundamental elements of value creation in customer-supplier relationships. Moreover, the concept of value co-creation is examined, highlighting its role in consultative selling, and laying the foundation for the subsequent chapters. Chapter 3 outlines the research methodology, detailing the research design, data collection methods, and analytical approaches employed in the study. Moving forward, Chapter 4 presents the empirical results, offering an overview and detailed insights into the sales approach, value elements, problem-solving processes, and communication strategies. Chapter 5 engages in a comprehensive discussion, addressing key findings, implications, and recommendations. Finally, Chapter 6 concludes the study, reflecting on the problem setting, outlining managerial implications, acknowledging limitations, and proposing avenues for future research. This structured approach ensures a systematic exploration of the multifaceted dimensions of effective sales processes for niche technologies.

2. THEORETICAL BACKGROUND

2.1 Evolution of professional selling

Buying decisions are mainly based on buyers' belief that their needs are understood by the sales representative (Crowley 1996). Furthermore, traditionally selling has been driven mainly by the sales representative, with the aim of overcoming customer objections and closing the sale (Dubinsky 1980). Traditional selling approach has consisted of seven steps: (1) prospecting, (2) pre-approach, (3) approach, (4) presentation, (5) handling objections, (6) close, and (7) follow-up, from which the sales representative was responsible mostly alone. This type of selling process is also referred as manipulative selling (DelVecchio et al. 2004) due to the fact that the intention is more on convincing the prospect to buy the product.

However, today's industrial buyers tend to lean more towards consultative service, where the sales representative works more as a problem solver and fact provider, rather than trying to convince the customer with manipulative techniques (DelVecchio et al. 2004). As stated by Viio & Grönroos (2014), this shift is resulting in change of focus from product-based selling and exchange to service and relationship. In other words, sales representatives should move away from "product dumping" towards more consultative approach, where the customer connects the dots (Bonney et al. 2022). To list a few factors, this transition in sales has been driven by new technologies, expanding strategic role of organizational selling and team selling, increased amount of information, and customer knowledge (Moncrief & Marshall 2005). Considering these transformative factors, Moncrief & Marshall (2005) has updated the traditional selling process to evolved selling process, consisting of seven steps: (1) customer retention and deletion, (2) database and knowledge management, (3) nurturing the relationship, (4) marketing the product, (5) problem solving, (6) adding value, and (7) customer relationship maintenance.

Firstly, customer retention and deletion has replaced prospecting in the sales process. This does not mean that there is no prospecting, but nowadays it is most of the time being conducted by other functions in the organisation, such as marketing. Instead, sales function uses time to retain and develop existing and high potential A-class customers, and harvest/outsource the C-class customers, with A customers generating 80 % of the revenue and C class customers below 10 % of the revenue (Evdokimova, 2021). Secondly, pre-approach is replaced by database and knowledge management. Today's organisations have vast amounts of easily accessible customer knowledge, and this step

is all about leveraging the knowledge to make selling more professional. This has also been discussed by Heikka (2020), emphasizing the importance of creating a fruitful relationship with the customer to get to know the customer's situation and needs, and from there constantly building customer knowledge. Thirdly, approach is replaced by nurturing the relationship. Rather than trying to figure out best possible approach to open a dialogue with the customer to close the next sale, this step is more about building an interpersonal foundation with the customer to solve a future problem. Fourthly, marketing the product has replaced presentation. Nowadays the presentations can be found from the company web site and advertisements, which is usually driven by the marketing function. However, salespersons are still making presentations, but they are not the main focus of the discussion with the customer. Instead, the main focus is on the fifth step, which is problem solving/consultative selling which replaces the step of overcoming objections. Instead of trying to find a way to overcome the objections, the goal is to identify and solve the customer's problems via mutual discussions. In consultative selling literature one of the main emphases is in mutual problem solving and exchange of information (Marcos Cuevas 2018; Smith & Lunsford, 2007; Hanan 1986; Moncrief & Marshall 2005). Sales people should work more as customer focused teachers educating the customers by exchanging information, giving recommendations, and providing future visions (Bonney et al. 2022). Following this, sixth step, or closing step, is replaced by adding value/satisfying needs. Instead of pursuing short-term closure, the goal is to develop mutually beneficial long-term relationship, from which closing a sale can be a part of, but the thinking should be more long-term. Finally, follow-up step is replaced by customer relationship maintenance. Traditional follow-up, such as asking if everything works fine with the product, has become more efficient with today's technology, such as e-mail. In fact, follow-up has shifted to being more of a business relationship building phase. (Moncrief & Marshall 2005)

To conclude, rather than being a task for the salesperson alone, evolved selling process is executed with the organisation as a whole. In fact, the salesperson is mostly associated with the steps 3, 4, 5 and 6, with the emphasis being on step 5, where the problem solving, and consultative selling happens. This is illustrated in Figure 1.

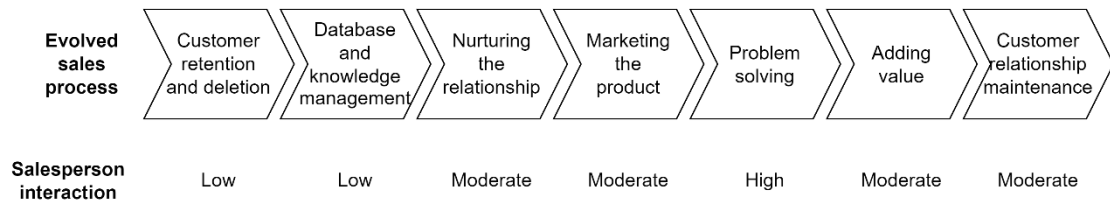


Figure 1. Process of evolved selling (adapted from Moncrief & Marshall 2005)

As the framework of Moncrief & Marshall (2005) presented in the figure above is mostly built around consultative selling approach, it is vital to understand that some researchers have pointed out the importance of applying other types of selling as well, depending on the nature of sales situation (Marcos Cuevas 2018; Geiger & Finch 2011; Dunn et al. 1981).

2.2 Types of selling

Marcos Cuevas (2018) has identified that companies' sales function should be ambidextrous, or as other writers call it, adaptive, including both consultative and transactional selling, depending on the sales situation and multiple other variables. Similar conclusions have been drawn by Geiger & Finch (2011) from mature industrial markets, arguing that salespeople need to be adaptive using mix of transactional and relational selling strategies, and that this mix depends on (1) the size and organizational structure of the customer, (2) boundaries of buyers' supply contracts, (3) nature and expectation of supplier innovation, and (4) expectations of supplier performance and value articulation.

On one hand, for new exploratory ways to create value, more sophisticated consultative approach works better (Marcos Cuevas 2018). This was also identified by Probert et al. (2013) when building a business case for new technology: the sales function needs to be more consultative and adaptive. Furthermore, the more solution based the product/service is, the more consultative and relational approach needs to be taken (Ferdinand et al. 2011). On the other hand, for more stable and established customers and products, more straight forward transactional sales approach can be more efficient (Marcos Cuevas 2018). Similar conclusions have been drawn early by Dunn et al. (1981), arguing that with transactional business and mature products consultative selling might actually be burdensome, and consequently take time away from acquiring new sales and finding new opportunities. Furthermore, for some customer groups, such as small businesses, consultative selling might even be a turn-off. This kind of setting is more centred around product presentations, objection handlings and different closing techniques (Kaski et al. 2018). However, as cited before, Geiger & Finch (2011) have emphasized

the importance of being adaptive by including relational selling to the mix, even in mature markets, where price and efficiency plays a big role.

Even though adaptive selling has been identified to produce great sales results, too high sales orientation might hamper the overall performance and customer trust (Paolo et al. 2016). Since trust has been identified to be one of the biggest factors affecting the supplier selection (Bunduchi 2012), it is important to understand what the suitable level of sales orientation in different contexts would be. As Paolo et al. (2016) have stated, salespersons should modify their level of sales orientation through the customer life cycle. Their findings have pointed out that at the earlier stages of customer life cycle, high sales orientation was interpreted as manipulative, and thus had negative effect on customer trust, whereas in the later stages, it did not have an effect on customer trust. This is supported by the findings of Kaski et al. (2018), stating that in new customer sales, salesperson's intent to push through the sale should be more responsive than initiative, meaning that salespersons should be genuinely interested in solving customer's problems, rather than fulfilling their own performance measures. Thus, when engaging new customers, the intent should be in relationship building with minimal sales orientation. In addition, lower sales orientation was perceived as more trustworthy for high-importance purchases, while higher sales orientation was seen as more trustworthy for low-importance purchases.

Adaptive selling literature mainly focuses on the sales approach; however, as stated above, sales orientation is another important factor that should be adapted by the salesperson depending on the sales situation. Thus, here the concept of adaptive selling is expanded to incorporate sales orientation, as illustrated in Figure 2.

Sales approach Consultative	New customers Novel products, complex products, critical products	Established customers Novel products, complex products
	Sales approach Transactional	No-go
	Sales orientation	Sales orientation
	Low	High

Figure 2. Sales orientation and approach in different situations

As illustrated in the figure above, for new customers sales orientation should be low. Here the intention should be in creating a foundation with the customer and nurturing the relationship, which, if reflected to the evolved sales process by Moncrief & Marshall (2005), happens even before marketing of the product. Furthermore, if the service and/or component is critical for the customer, lower sales orientation is also preferred. For established customers, higher sales orientation is preferred, since the customer relationship and trust are already built and, thus, the customer has a solid understanding of the supplier's offering. Therefore, the supplier can take more sales-oriented approach.

On the other hand, product complexity nor novelty are not variable factors for preferred sales orientation, but rather for sales approach. For more complex, customizable, and novel products and services (from customer's point of view), consultative sales approach should be taken. For standard and established products and services, transactional sales approach is preferred. However, it is important to be able to distinguish whether the product is standard or not from the customer's point of view. For example, for one customer the product might be standard, but for other customer it might be new and complex; thus, these two customers need different sales approach even though the product is the same. This emphasizes the importance of customer understanding, in other words, the supplier must understand the elements of value creation in different contexts to maximize the value for both parties.

2.3 Elements of value creation in customer-supplier relationship

Sales literature emphasizes the importance of understanding customer's needs when building value propositions (Anderson et al. 2006; Töytäri et al. 2011; Probert et al. 2013). Literature suggests that building of this understanding starts from first identifying the solution-problem combination. This means that the supplier should have a good understanding of the application areas and problems where the solution could bring benefits. Secondly, suitable customers should be identified, and understanding of customer needs should be built. Thirdly, based on the previous steps, value proposition should be built, preferably together with the customer. Anderson et al. (2006) have written about three different approaches when it comes to building a value proposition for potential customers: (1) listing all benefits, (2) listing favourable points of difference, and (3) resonating focus. Firstly, all benefits approach simply means listing all benefits that the customer would receive from the offering. However, this approach might be problematic due to the fact that not all listed benefits might actually be beneficial for the customer, thus, affecting the credibility of the offering. This approach is doable with minimal background work, but might not yield the best results. Better approach would be listing favourable points of difference, where the intention is to list the favourable points of difference relative to the second-best alternative. However, this already requires some level of customer understanding in order for the supplier to be able to find the differences that are considered the most valuable by the customer. Finally, resonating focus is considered to be the best approach when building a value proposition. As the name says, the intention is to find and clearly demonstrate only one or two points of difference that matters and resonates the most with the customer. However, this requires the most background work to build a solid understanding of the customer's process and preferences, and the advantages of other substitutive offerings.

However, in this process there might be certain decisive issues. What if the customer's processes and the actual advantages of the supplier's solutions are very unknown and difficult to measure? On one hand, if the supplier lacks a clear vision of where its solutions could provide the most benefit to the customer, the customer will likely need to provide information and assist the supplier in identifying the right applications. (Wouters et al. 2018). On the other hand, Töytäri et al. (2011) has suggested that the actual value assessment process should be carried out mutually with the customer to avoid biased value propositions and to reach the best outcome for both parties. This is supported by Probert et al. (2013), emphasizing the importance of jointly constructing the business case with the customer to eliminate any mismatch between the supplier solution and the

problem, and to ultimately meet the customer's needs. In fact, customer understanding should be built jointly with the customer already before starting to build the actual value proposition. For the customer willing to provide such assistance, the supplier needs to show and demonstrate that it is worthwhile for the customer to put resources and thinking to find these applications (Wouters et al. 2018). This is also called as providing leveraging assistance value proposition for the customer. According to Wouters et al (2018), leveraging assistance value proposition could consist of following elements: (1) providing extraordinary tailoring for the customer's target application, (2) providing some degree of exclusivity for the new technology, (3) boosting ROI by making the supplier more valuable, and (4) customer's reinforced positioning in new-technology ecosystem. Thus, traditional value proposition as its own might not be enough when approaching potential customers. This is illustrated in the figure below.

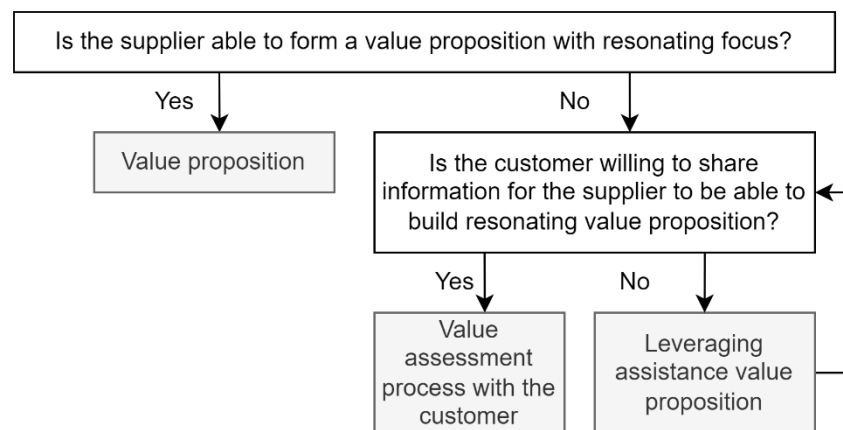


Figure 3. Value proposition and value assessment process

As illustrated in the figure above, the higher the uncertainty of the solution benefits is, whether it be due to lack of customer understanding or solution applicability, the more leveraging assistance value proposition should be emphasized. Moreover, Chicksand & Rehme (2018) has defined total value in business relationships as the sum of both customer and supplier value, consisting of tangible and intangible benefits and sacrifices. They also argue that failure of business relationship is often caused by failure to find a shared view of these benefits and sacrifices, as well as sharing them between the parties. Thus, for the business relationship to be beneficial for both parties, it should yield enough value for both, whether it be tangible, or intangible, or their combination.

The concept of value creation has been widely researched from multiple different viewpoints (Forbis & Mehta 1981; Walter et al. 2001; Smals & Smits 2012; Chicksand & Rehme 2018). Research has identified two main categories for value creation: direct and

indirect value. From these two, direct value is mostly associated with financial and monetary benefits, whether it be profits, positive cash flow, volume of sales, improved operational efficiency, or similar. In this literature review, different type of economic benefits are associated as direct value. On the other hand, in this literature review, indirect value is associated with non-measurable, intangible benefits, that are perceived as valuable for current and future business. Examples could be increased knowhow, reputation, and reduced supply/customer risk.

Early research, such as Forbis & Mehta (1981), has put emphasis more on the monetary and measurable customer-focused value-based strategies that strive from economic value to the customer (EVC). EVC takes into account the customer's life-cycle cost of the product and uses that as the basis for the supplier for pricing the product. That is to say, in order for the supplier solution to be interesting for the customer, it should have lower life-cycle cost than the previous solution. However, for the supplier to understand the life-cycle cost of the product, they must first understand the customer's operations. Furthermore, for the customer to understand the value of the supplier's solution, supplier has to build the value proposition based on the knowledge of the customer's life-cycle cost. The aim of this two-sided discussion is to create knowledge (indirect value) and provide maximum economic value (direct value) of the solution for both parties in the end, which is one way of value co-creation.

However, not all value creation is measurable monetarily nor directly. Walter et al. (2001) discusses about indirect value functions, such as gaining access to new markets and gaining critical information, which can be seen as another dimension creating value. For example, from the supplier point of view, customer relationships that yield low direct value, but high indirect value can be categorised as networking relationships, which can provide a great source of value for other relationships. Indirect value has been discussed also by Smals & Smits (2012) and Chicksand & Rehme (2018), and in their research suppliers seemed to appreciate indirect value as much or, in some cases, even more than direct value due to the multidimensionality of indirect value (with multidimensionality here meaning the extensive possibilities that indirect value can bring to the supplier, such as utilizing the gained knowledge, competencies, and reputation to grow other customers and access new markets, rather than only gaining financial benefits i.e., direct value from one particular customer). These identified direct and indirect value components from customer's and supplier's viewpoints are illustrated in Table 1.

Table 1. *Direct and indirect value components, supplier's and customer's view*

Direct value		Indirect value		Source
Customer	Supplier	Customer	Supplier	
	Positive cash flow Securing break-even volumes		Gained know-how and ideas Access to new markets Gained critical information Access to third parties Stability and control in sales	<i>Walter et al. 2001</i>
Tailored solutions Expansion of business	Financial compensation Volume of sales	Innovation Risk sharing	Gained knowledge Gained competencies Gained reputation	<i>Smals & Smits 2012</i>
Lower life-cycle cost Increased capacity Product flexibility Product functionality Product reliability	Gained profits	Psychological values (brand, prestige, etc.)	Gained know-how	<i>Forbis & Mehta 1981</i>
	Business growth Quality improvements	Know-how Safety Reliability Flexibility	References	<i>Makkonen et al. 2016</i>
Increased revenues Operational efficiency	Increased revenues Operational improvements	Reputation Social effects Environmental effects Reduced risk	Reputation Social effects Environmental effects Reduced risk	<i>Chicksand & Rehme 2018</i>

As illustrated in the table above, there are certain themes that recur between both the customer and supplier. Firstly, the most distinguishable direct value theme is related to financial benefits, whether it be increased revenue, business growth, gained profits, volume of sales, cash flow, or cost reductions. Secondly, depending on the customer supplier dyad, product and/or process improvement can be identified as the second direct value theme.

However, indirect value is more complex due to its multidimensionality and intangible nature. Nonetheless, some common themes can be distinguished from indirect value as well, the first being gained knowledge and know-how. Secondly, risk reduction, whether it be increased safety, reliability, flexibility, stability and control of sales, or risk sharing,

has been identified as one of the biggest indirect value drivers. Thirdly, psychological value, such as reputation, references, and social effects, has been identified as a driver for indirect value.

Interestingly, all of these value themes have been identified in the literature from both the customer's and the supplier's perspectives. This suggests that these themes are shared by both parties, though their relevance and emphasis may vary depending on the context, as noted by Chicksand and Rehme (2018). For example, the customer may prioritize themes such as financial benefits and risk reduction, while the supplier may place greater value on factors like gained knowledge and references (psychological benefits). In this way, value is co-created between the supplier and the customer. The direct and indirect value themes are illustrated in the table below.

Table 2. *Direct and indirect value themes*

Direct	Indirect
Product/process improvements	Acquired knowledge and know-how
Financial benefits	Reduced risk
	Psychological value

However, the challenge is to identify how the total value of the business exchange is built, and how to justify that it is satisfactory for both parties (Chicksand & Rehme 2018). This requires open discussion and building of understanding from the interests of both parties.

2.4 Dyadic problem solving in industrial setting: developing mutually beneficial solutions

Lots of research has been conducted about the importance and value of supplier integration at product/process development (Ragatz et al. 2002; Sjödin & Eriksson 2010; Rosell et al. 2014; Xiao et al. 2019; Johnsen 2009; Smals & Smits 2012). Collaborative development has been identified to have potential to reduce technology uncertainty, development times, costs, as well as increase quality output of the product/process. In collaborative development both, the customer and the supplier, share knowledge and utilize their competencies to solve a set of problems. However, not much emphasis has been put to the supplier firm's viewpoints and motivation for innovating and pushing the development. Naturally, for the supplier firm to be willing to put effort to these activities, there

must be some sort of perceived value that exceeds the put effort (Makkonen et al. 2016). Also, as discussed in section 2.3, value should be both sided. Thus, it is evident that in all collaborative development there is a set of prerequisites for the development efforts to be mutually beneficial and provide high enough perceived value for both parties.

2.4.1 Moderating factors affecting the motivation for dyadic solution development

As discussed earlier, it is evident that there should be a mutually shared vision on the value and benefits of the outcome, and that this value should outweigh the put resources and efforts for any collaboration to be interesting. These could be seen as prerequisites that needs to be fulfilled. Literature has identified multiple different prerequisites, which are listed in the table below.

Table 3. *Prerequisites for dyadic problem solving*

Prerequisite	Description	Source
Value potential	The value potential of the solution should be clear and interesting for both parties	Chicksand & Rehme 2018 Wouters et al. 2018
Shared vision	The process how the value would be reached should be clearly understood by both parties	Chicksand & Rehme 2018
Timing	Dyadic development should be appropriately timed to get the most out of it	Wlazlak et al. 2018 Kurpjuweit et al. 2018
Relationship quality	Parties should have certain level of shared trust	Kurpjuweit et al. 2018
Customer's absorptive capacity	Customer should have the capabilities and resources to assimilate and apply the solution	Wesley et al. 1990 Mohammad & Lakemond 2016 Kurpjuweit et al. 2018

As illustrated in the table above, the most important factors are (1) identified value potential and (2) shared vision. It is critical that the value potential is clearly communicated and understood by all parties, and that there is a clear vision on how to reach the desired outcome (Chicksand & Rehme 2018). Furthermore, the more unknown the technology and/or supplier is for the customer, the more important it is to communicate key points

of difference when reflected to the current solutions from other suppliers (Wouters et al. 2018). In other words, the advantages and financial value of the solution should be radically superior for the customer to be interested to go the extra mile with the new supplier.

Timing has also been identified to be one of the most important factors when initiating collaborative development (Wlazlak et al. 2018; Kurpjuweit et al. 2018). Regarding customer-driven development, the earlier the supplier can integrate into the development project, the more there is chance to affect to the final specifications (Wlazlak et al. 2018). However, the choice that which suppliers will be incorporated and at which stage, will ultimately be made by the customer. This highlights the importance of relationship nurturing and marketing (Moncrief & Marshall 2005), since this is the stage where the customer is made aware of the supplier's capabilities and offerings. Regarding supplier-driven development (supplier-push), supplier firms should incorporate buying firms into their product development before the product commercialization phase to be successful (Kurpjuweit et al. 2018). The motivation behind this timing strategy is to better identify and validate market needs, to get access to customer specifications and expertise, and to get access to testing opportunities. However, creating this kind of accessibility between the supplier firm and buying firm requires resources and trust, thus, well-established relationship is helpful. Thus, the next two factors are (1) timing, and (2) relationship quality.

The locus of initiative and customer's technical capability and knowledge plays a big role when starting a development project (Mohammad & Lakemond 2016). Wesley et al. (1990) talks about firm's absorptive capacity, which is the ability to recognize the value of new, external information, assimilate it and apply it. Different amounts of absorptive capacity is needed depending on the timing of the innovation, but it is never non-existent, since the buying company needs always to have the intention and capabilities to assimilate and apply the innovation (Kurpjuweit et al. 2018). Similar model has been presented by Tushman & Nadler (1977), discussing about the importance of matching the information processing capacity and information processing requirements. For example, if the information processing capacity is not sufficient to deal with the requirements, the decisions made might not be optimal. Thus, the final factor is customer's absorptive capacity.

However, even if these above mentioned prerequisites would be fulfilled, there might still be some degree of uncertainty that can affect the collaboration. Thus, how to overcome these uncertainties will be discussed next.

2.4.2 Handling of uncertainties and information gaps

In collaborative solution development, there is always certain amount of uncertainty, and risk of information gaps. Forbis & Mehta (1981) argue that customer resistance might arise due to (1) uncertainty about the solution benefits or payback period in comparison to the current solution, (2) inconvenience of changing suppliers, and (3) risk of being the first user. There are also uncertainties related to learning of the new technology and contracting issues, psychological lock-in to the supplier, and loss of power (Chicksand & Rehme 2018). Moreover, according to Salminen & Möller (2006), there can be significant amounts of technology and market uncertainty when marketing new and complex offerings. In more detail, technology uncertainty consist of the novelty of the technology, the level of investment, and the level of commitment required for adopting the new solution. In other words, the more novel the technology is, the more difficult it is to assess its real value before taking it into use (Sjödin, 2018). Moreover, the degree of customization needed for the technology to fit user requirements greatly increases the need for knowledge transfer, and, therefore, causes a risk for information gaps and uncertainties. Furthermore, market related uncertainty might arise due to a long distance between the buyer and supplier, and weak market position of the supplier (Salminen & Möller, 2006). According to Wlazlak et al. (2018), customer's operating procedures might also be a challenge. The lack of clear approach and structure on how the development project should be carried through, and the lack of collaborative discussions and knowledge transfer can greatly hamper the successful execution of the project. These uncertainties can be roughly categorised in three different groups: (1) supplier uncertainty, (2) technology uncertainty and (3) operating uncertainty, and they are listed in Table 4.

Table 4. *Possible subjects causing customer uncertainty*

Uncertainty	Source
Supplier uncertainty <ul style="list-style-type: none"> • Inconvenience of changing suppliers • Psychological lock-in and loss of power • Supplier distance and market position 	Forbis & Mehta (1981) Chicksand & Rehme 2018 Salminen & Möller (2006)
Technology uncertainty <ul style="list-style-type: none"> • First user risk • Actual solution benefits and payback period • Learning of the new technology • The degree of needed customization 	Forbis & Mehta (1981) Chicksand & Rehme 2018 Salminen & Möller (2006) Sjödin (2018)
Operating uncertainty <ul style="list-style-type: none"> Contracting issues Unfitting operating procedures 	Chicksand & Rehme 2018 Wlazlak et al. (2018)

As illustrated above, supplier uncertainty involves challenges like the inconvenience of switching suppliers, psychological lock-in due to established relationships, and concerns about the supplier's distance and market position. These factors can create a sense of dependency, reducing a company's negotiating power and making it difficult to adapt to market changes. On the other hand, technology uncertainty includes risks associated with being an early adopter, such as the uncertainty of realizing the expected benefits and determining the payback period. Additionally, the need for learning new technology and the extent of required customization can affect its successful implementation and integration into existing systems. Lastly, operating uncertainty arises from issues with contract terms and the potential misalignment of the supplier's operational procedures with the company's practices. These can lead to difficulties in managing the relationship and ensuring smooth, efficient operations.

Literature has identified many ways to reduce these uncertainties, and narrow down information gaps. Kurpjuweit et al. (2018) suggests that the suppliers that are pushing new innovations should (1) avoid purchasing departments and favour R&D departments, (2) build personal networks with the customer firms, and (3) work to get the customer firm more committed to the relationship and innovation. Purchasing departments should be avoided due to their focus being more or less on cost savings and in reduction of supplier

base, rather than focusing on innovation and development. Moreover, according to Salminen & Möller (2006), strong use of references is advisable for the solution supplier to reduce uncertainty. Additionally, Melander et al. (2014) suggests that in long-term relationships the customer's and supplier's technology roadmaps, trust, and goals should be aligned to ensure strategic and project level success. Sjödin et al. (2016) has also identified that involving the end-users already at the beginning of the project can vastly reduce uncertainty. Furthermore, forum for open communication throughout the project, and high level of trust are emphasized for reducing uncertainties and equivocality (Sjödin et al, 2016; Wlazlak et al., 2018).

However, according to Wlazlak et al. (2018), for the R&D department, the collaboration with suppliers was found to be time consuming, and this time would rather be spent to engineering work. R&D also tended to try and solve problems internally rather than collaboratively solving them with the suppliers. Thus, it is important to create an environment which facilitates the knowledge transfer between the customer, its R&D and suppliers. Moreover, it should also be noted that according to Kurpjuweit et al. (2018), incorporating buying firms too early in the supplier product development might cause a risk of losing intellectual property. To prevent the leak of intellectual property suppliers should choose partners they have long history and strong relationships with, and possibly try to safeguard the intellectual property with formal contracts. However, formal contracts itself might not be enough, since it can be difficult to set waterproof contract terms, because oftentimes the scope and nature of the development project changes as it progresses (Ali & Haapasalo, 2023).

As identified in the literature, there are many ways to look into uncertainties and information gaps, and how to overcome them. Figure 4 illustrates key actions that serve as a bridge over the uncertainty gap.

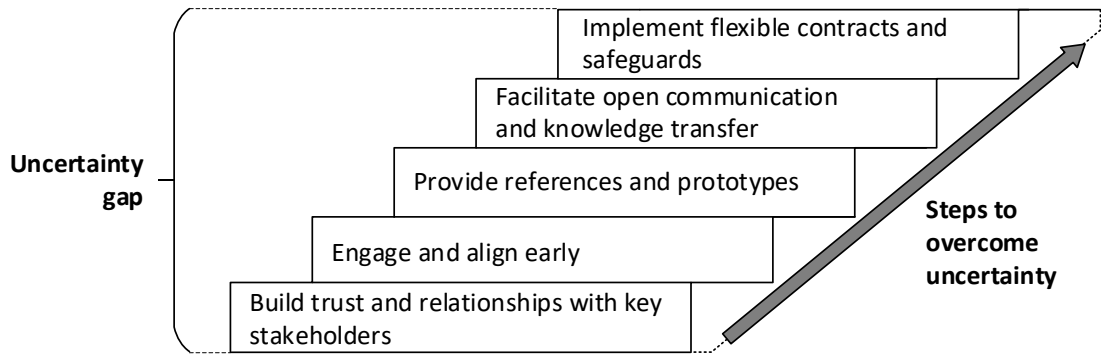


Figure 4. *Overcoming uncertainties in collaborative solution development*

As illustrated in the figure above, by building trust, engaging stakeholders early, providing evidence of value, facilitating open communication, and implementing flexible safeguards, firms can effectively reduce these uncertainties that might come across during the collaboration with the customer.

As reducing uncertainty is essential throughout the customer journey, so is facilitating problem solving and value co-creative environment, especially in situations where the technology is unfamiliar for the customer. This whole process is discussed in more detail at the next section, which combines all the forementioned topics into a cohesive framework that will be used further in this study.

2.5 Consultative sales process to facilitate problem solving and value co-creation

In absence of full customer understanding and customer specific industry references, finding new use cases and communicating the value of thermal spray coating technology is a difficult task. Building on previous sections, it is hypothesized that in this problem setting there are three main process phases, each having different goals, actions, and outcomes. This is illustrated in Figure 5.

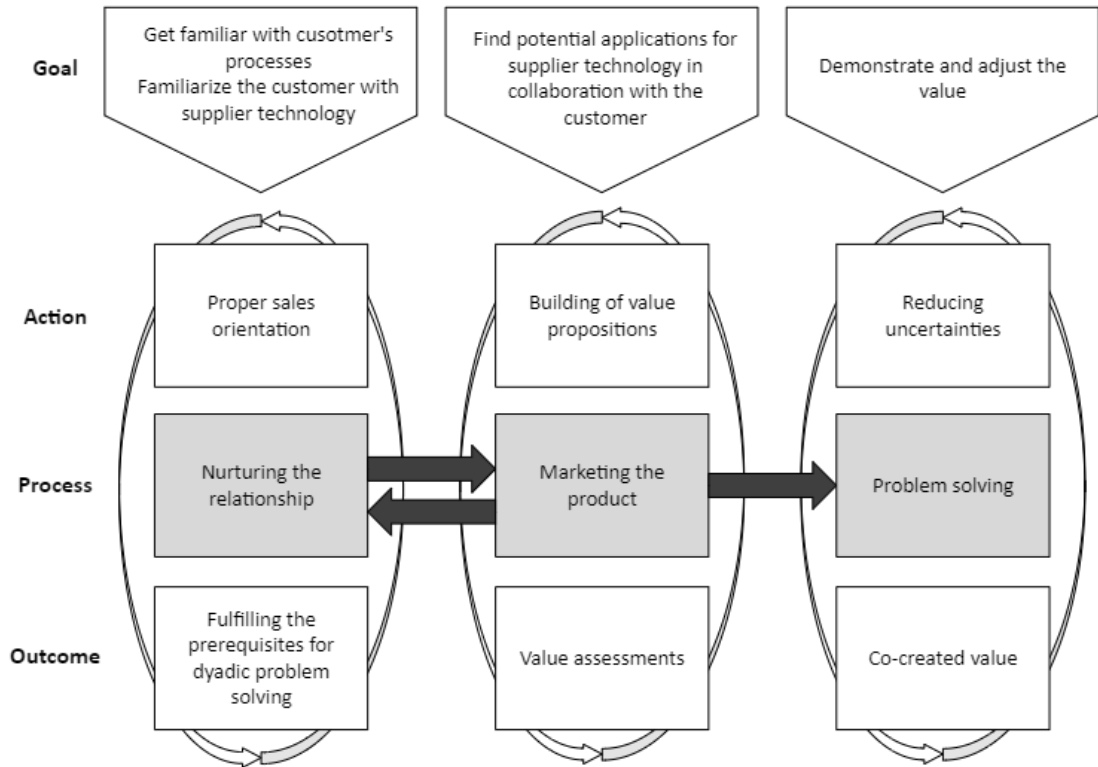


Figure 5. Building blocks for an effective sales process of a niche technology

In the first phase, as suggested by Moncrief & Marshall (2005), it is the utmost importance to build a trustful relationship with the customer, which is a challenge itself when there is no clear vision on how value could be generated. Automotive industry being one of the core markets for thermal spray coatings, Henriksson et al. (2021) has well identified some of the main challenges when introducing new materials to automotive industry. Firstly, as the customer expertise is mainly centered around the current solutions, it is hard to understand the possible effects when introducing new materials to the process. This generates knowledge gaps in vital areas and causes uncertainty. Secondly, in introducing new materials, network and infrastructure rigidities arise as the organization is optimized to build existing products with existing methods and technologies. Thirdly, it is hard to accurately identify the risks and costs of introducing new materials, since there is not a clear way in evaluating and testing new materials in contrast to the existing ones to provide water-proof test data. As suggested by Henriksson et al (2021), companies should establish a material strategy to constantly build knowledge on future plausible materials. This way the companies constantly have an up-to-date “idea bank” for future needs. Thus, for the technology supplier it is extremely important to get familiar with the customer’s processes and familiarize the customer with the supplier technology, to ensure its place in the “idea bank” when the need arises. This requires choosing a proper sales orientation depending on the customer type, relationship, and product type, and

regularly catching up to fill these prerequisites. The challenge still lies on how to approach these customers in absence of references and customer understanding.

The second phase works concurrently with the first phase. Here the goal is to find potential applications for the supplier technology by working collaboratively with the customer. This happens concurrently by marketing the supplier solutions while nurturing the relationship. In the process, value propositions are built, and when a potential application is identified, value assessments are done collaboratively with the customer. Here the challenge lies in value proposition process.

The third phase begins when the value assessments provide to be interesting enough. Here the goal is to demonstrate this assessed value by validating the solution, reducing uncertainties, and further adjusting it to reach the maximum co-created value.

3. RESEARCH METHODOLOGY

In this research a niche-kind of technology with high value-potential is being investigated, but which is unknown for most of the potential customers outside of the technology's core areas, such as aerospace, automotive, steel and paper mill, and energy generation applications (Tucker 2013 p. 7). Furthermore, most of the potential use cases for this technology are also unknown since it requires a solid understanding of the process environment and characteristics to be able to utilize this technology. This creates the supplier a two-sided problem. Firstly, there is the problem of not understanding the user's processes and technology, so it is not possible build a detailed value proposition without further discussions with the potential customer. Secondly, since the technology discussed is quite niche and unknown for most companies, it is difficult for the potential customer to assess its possible use applications.

From the designer point of view, there are seven main criteria to be considered when deciding whether or not coatings could bring value: component cost, design requirements, anticipated component life, repair cost, the geometry of the component, part size, and any environmental factors that could affect performance (Dorfman 2013 p. 245). Thus, evaluating whether the technology would bring value to the potential customer's operations requires resources and active participation from both parties, and finding the motivation for this kind of thorough investigation might be difficult, especially from the customer side, if there are not any immediate value generation in sight. Thus, the objective of this research is to better understand the process of value co-creation, how to set it up with new customers, and how to build it as a framework. In more detail the aim is to investigate what it requires to build an environment, where a new potential customer would be willing to use their resources to share information about their processes and technologies for a supplier to try and find solutions to improve these processes and technologies even further utilizing their own product/service kit, which in this case would be thermal spray coatings.

This research focuses on companies that own niche technology equipment and primarily operate as subcontractors and service providers for OEMs and the process industry. In the case of thermal spray coatings, these companies do not develop the technology themselves but instead acquire the necessary equipment and materials from the technology owners. By doing so, they enable the application of thermal spray coatings as part of their service offering, which often includes complementary processes like turning, milling, and grinding.

In the supply chain, the technology owner (e.g., equipment or material supplier) provides the tools and expertise, while these companies act as intermediaries, applying the technology to meet the needs of end customers. The figure below illustrates the key roles in this network: the technology owner, technology user, and other intermediaries, OEMs and the end customers.

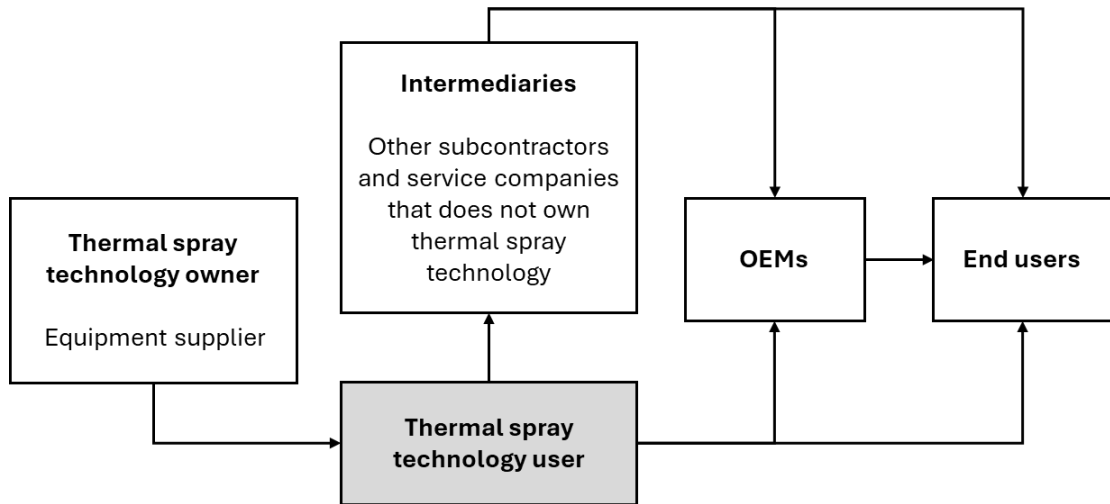


Figure 6. Supply chain network for the providing of thermal spray coatings

As illustrated in the figure above, the technology user interacts with all of the key roles in the network. In some cases, the technology user interacts with the end users already, but most of the time the interaction goes through other intermediaries or OEMs. This is because thermal spray coatings are usually used in specific mechanical components that belong into a bigger system, and these systems are typically supplied by OEMs and/or other intermediaries.

3.1 Research design

This study is qualitative in nature. Therefore, data is collected from non-numerical sources, such as in-depth interviews (Saunders, p. 151). This approach was chosen because the topic is largely exploratory and focuses on human experiences and behaviours. The main objective is to clarify and enhance the understanding of this topic by testing the framework presented in Chapter 2. Another influencing factor is the limited number of accessible companies that either have experience with coating technology or could be potential clients for this technology in the near future.

The research strategy combines action research and a case study approach for several reasons. Firstly, the researcher has been actively engaged in this field for the past three years, participating in the development and execution of customer accounts and sales models at one of the interviewed supplier companies (*later referred to as Delta*). This

prior experience has provided the researcher with a well-developed understanding of the topic, a refined starting point for the study, and the ability to navigate the nuances of the field. This foundation contributes to the overall quality and depth of the research, which might have been more limited without this prior knowledge and experience. Additionally, the researcher conducted a market study in July 2021, the findings of which are utilized in later chapters. Secondly, the researcher's employer has a proven track record of successfully initiating and completing sales journeys for this niche technology with both new and existing customers. These experiences are leveraged in the study by incorporating relevant customer companies as part of the research.

Most of the primary data was collected within a condensed timeframe, which gives the study a cross-sectional time horizon (Saunders, p. 155). However, the study also includes some longitudinal elements, as certain data, such as customer interviews, internal reports, and other secondary sources, have been gathered over the past three years.

3.2 Data collection

Data for this research was collected mainly via semi-structured interviews, and from secondary data, such as internal reports and past interview notes. Semi-structured interviews are used when the number of potential interviewees is limited and if the data tends to be complex and subjective (Flick 2014 pp. 249-266). Moreover, due to the subjectivity and complexity of the data, interviews are structured thematically, which is very typical for semi-structured interviews.

In order to get relevant empirical data from the interviews, theoretical and abstract ideas need to be translated into more tangible indicators and variables, allowing the researcher to observe and analyse the empirical world (Neuman 2014, pp. 207). This process is also called operationalization. In this paper the operationalization was carried out by translating the theoretical concepts and the framework presented in chapter 2 into thematically structured questions. These themes were derived from the different parts presented in framework in Chapter 2. This ensures that all of the main points will be considered and answered. These main themes are the following:

1. Customer-supplier relationship nurturing
2. Value co-creation
3. Prerequisites for dyadic problem solving

Firstly, the theme of customer-supplier relationship nurturing is to find out how the business relationship would be the most fruitful to upkeep and grow at the point where no

specific business transaction is in sight yet. The idea is also to validate whether the customer's viewpoints and supplier's viewpoints match together.

Secondly, by exploring the theme of value co-creation the aim is to delve into the mechanisms and stages of co-creation, identifying critical actions that ensure both suppliers and customers gain value from their interactions. Here the key questions are based on what makes a supplier or customer appealing, what direct and indirect benefits do both parties seek, and how can value be better demonstrated and assessed.

Finally, the third theme investigates the stages from initial engagement with a supplier's offerings to implementation, and similarly, from understanding the customer's operations to adopting solutions. Key questions address the necessary conditions for each stage, handling unfamiliar products or clients, associated uncertainties, and strategies to mitigate these uncertainties. The focus is on identifying the critical prerequisites that facilitate seamless progression and effective problem-solving in dyadic relationships. The interview guide can be found from Appendix A.

For data sampling Robinsons (2013) sampling approach for qualitative interview-based studies was utilized, which consists of four main points:

1. Define a sample universe
2. Decide on a sample size
3. Devise a sample strategy
4. Source the sample.

Firstly, since this study explores a framework for the sales of niche technologies, it is logical that the sample universe comprises companies using these technologies (suppliers), as well as intermediaries, OEMs, and end-users who source products from these suppliers (customers). This exclusion criteria alone puts limits to the industry and technology, geography, technology users, sample size and customer segments, making the sample universe quite homogenous. For the research to be valid and reliable, the homogeneity of the sample universe is considered when devising a sample strategy.

Secondly, as mentioned previously, the sample universe alone puts a limit to sample size. Additionally, due to the restricted amount of resources and time, the sample size cannot be too high for it to not to harm the data analysis. Thus, the quality of interviews will be emphasized in this paper over quantity.

Thirdly, the sampling strategy should consider the forementioned restrictions of sample universe and size and be suitable for the purpose of the research. One of these strategies is purposive sampling strategy. Robinson (2013) defines this as a strategy in which the researcher assumes, based on their theoretical understanding, that certain cases and individuals may have a unique, different and/or important perspective on the topic to be studied and, thus, their presence in research should be ensured. Since the motivation for the topics studied in this research has mainly come from the researcher's experiences from the field, it is likely that the sample chosen by the researcher is representative enough to provide valid and reliable data.

Finally, sourcing a sample simply means the phase where the researcher collects the data and/or contacts the potential interviewees and arranges a time for the interview with them. According to Flick (2004, pp. 167-168), there are two ways for sampling. The first way is to decide on the sample before the start of the investigation. In this case, the sample is set up based on set criteria. The second way is to extend the sample and supplement it on the basis of acquired knowledge during the investigation. However, this is mostly used in situations where the ideas about the case are still quite vague at the beginning of the study, and only crystallizes along when executing the investigation.

In this study the investigated phenomenon is relatively clear, and the data sources are limited. Thus, here the sampling and its criteria is set beforehand. The sample consist of a group of customer interviews (i.e. customers that are sourcing thermal spray coated components) and supplier interviews (i.e. suppliers that provide coating service and coated components), and other background data sources such as previous interviews conducted by the researcher. The interviewed customers and suppliers are listed in Tables 5 and 6.

Table 5. *Interviewed customers*

Company code	Company size (2023)	Customer type
Alpha	300 - 400 mEUR/a >500 employees	Process industry customer, base metal producer
Bravo	25 - 30 mEUR/a >100 employees	OEM, hydraulic equipment
Charlie	5 - 10 mrd/a >17 000 employees	OEM, mining and refining equipment

Table 6. *Interviewed suppliers*

Company code	Company size (2023)	Supplier type
Delta	10 - 15 mEUR >100 employees	Provider of thermal spray coating services and wear parts to process industry and OEMs
Echo	5 - 10 mEUR <100 employees	Provider of surface technologies, such as thin-film coatings

The researcher is working at supplier company Delta, and all of the suppliers has been chosen by the researcher with the criteria being:

1. The customer has to be an active customer of company Delta.
2. There should be an environment of collaborative development with the customer and company Delta.
3. Customers should represent different industries, volumes and sizes.
4. There should not be more than three years from the latest development project between the customer and supplier company Delta.

The first customer, Alpha, is an international base metal producer, with several production plants in Finland. One of the most recent coating development work has been done with this customer, and coating technology is still fairly new for the customer. Still being quite new to the coating technology, insights from this customer would be valuable for this work.

The second customer, Bravo, is Finnish OEM that offers hydraulic equipment to multiple different industries. Company Delta has had multiple coating development projects with this customer, and since this customer is striving to offer standardised products with high volume, it is interesting company to include in this study.

The third customer, Charlie, is a large OEM offering mining and refining equipment and services. Company Delta has had multiple development projects with this customer as well, but here the customer is offering more tailored than standardised solutions. Coating has also had a big impact on some of the customer's product lines, so it is interesting for the study to include this kind of customer as well.

The customer interviewees were chosen on the basis of who have acted as the primary counterpart in the most recent development projects, and who most likely would be the contact persons when initiating new development projects.

From the supplier interviewees two were chosen from company Delta, in which also the researcher is working, and one interviewee from company Echo, which is also providing coating services. Two interviewees were chosen from company Delta, because the company has had a very long history with expanding the use of thermal spray coatings throughout Finnish industries, and therefore contribute to the study very well. The two interviewees are both product managers responsible of different industries, and therefore do not overlap with each other. The third interviewee from company Echo was chosen because they also provide coating services for similar use cases as company Delta but is not competing with Delta in any way. Thus, including a company like Echo in this study reduces the risk of getting biased results, and increases the reliability and validity of the findings. The interviewees, their titles, and interview dates and types are listed in the table below.

Table 7. *Interviewees and their titles*

Company code	Interviewee title	Interviewing date and type
Alpha	Maintenance engineer	14.5.2024, remote interview
Bravo	R&D director	17.4.2024, live interview
Charlie	Product manager	18.4.2024, remote interview
Delta	Product manager 1	9.4.2024, remote interview
Delta	Product manager 2	8.4.2024, live interview
Echo	Sales & market development manager	14.4.2024, remote interview

As listed in the table above, when interviewing process industry customers, the counterparts are mainly maintenance management personnel. On the other hand, when interviewing OEMs, the counterparts are most likely product management & R&D personnel.

3.3 Data analysis

The collected data consisted of six semi-structured interviews and secondary data from organisational sources, including internal reports and past interview notes. The semi-structured interviews were thematically analysed to identify key patterns and insights, which were backed up with secondary data to contextualise findings with the researcher's organisation's established practices. This is illustrated in Figure 7.

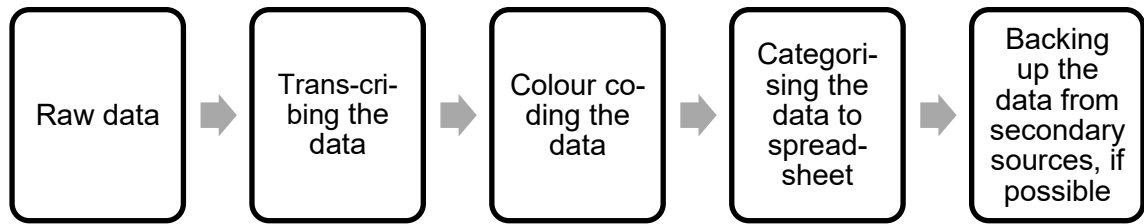


Figure 7. *The process of data analysis*

Data coding was carried out manually, and it involved categorising transcribed interviews into recurring patterns and themes, allowing for an organised identification of the critical elements within the consultative selling process.

The categorisation was carried out by first colour coding the transcribed data, where different colours represented different themes and elements that recurred between the interviewees. Four primary themes emerged from the data analysis, them being relationship nurturing, value demonstration, technology adoption, and value co-creation. After that, the colour coded data was transferred to a spreadsheet, where the data was categorised by themes and interviewees. Here the data was further compressed to highlight the key patterns and insights between the participants. The data that was left out was used in conjunction with the secondary data to enrich the relevant insights that were found from the compressed data set. By utilising these data sets, a multi-phase process between the familiarisation and adoption of niche technology was built, with each phase including prerequisite and uncertainty inputs to be fulfilled before proceeding in the process. This is illustrated in the figure below.

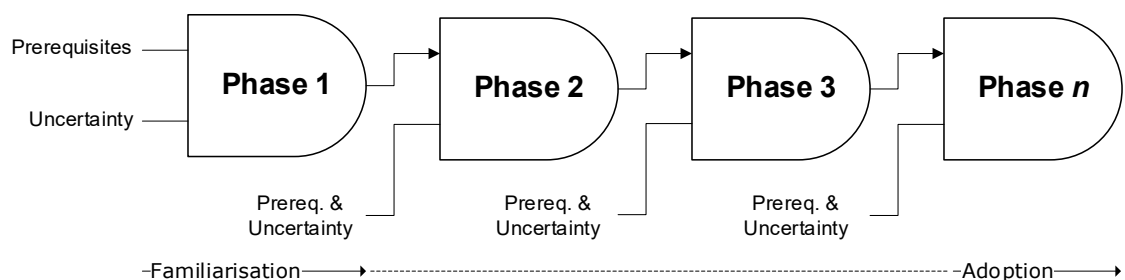


Figure 8. *The process between familiarisation and adoption of niche technology*

The data clearly revealed that for both the customer and the supplier, there is a process between the familiarisation and adoption of technology with multiple inputs and parameters. For the supplier participants, the process was much more recognisable and one of the participants even had a full sales process built around this function. For the customers, even if there was a recognisable process, it was not as clear and it differed quite a lot between the participants. For OEM's, the process tended to be more established and

refined, and for process industry, it tended to be more dependent on the magnitude of the technology adoption and value potential. At minimum, there were 4 recognised process phases, and, at maximum, there were 8 phases. Due to the variability in the process phases, the familiarisation-adoption process was first sketched out for all the participants. After that, the different processes were put next to each other to visualize their similarities and differences, to ultimately form one coherent process, which is discussed in more detail in next chapters.

To ensure validity, reliability, and accuracy, in interpretation of the collected data, the interview structure was cross verified internally at company Delta, and feedback from the interview was asked after every interview to further improve its structure along the process. Moreover, some degree of triangulation was included by utilising secondary data from organisational sources to back up the findings, and to reduce potential bias that the researcher might pose to the findings. Moreover, the interviewee participants were chosen from both sides, suppliers and customers, and customers were chosen from different industries and end user categories. This ensures that the sample includes a heterogenic view from both sides to find out what could be generalised and what are unique to the different groups. However, due to the sample size being small, this of course poses risks to the reliability of the findings. Lack of data for specific themes and process phases poses a risk on the alignment of the perspectives across different interviewees, thus affecting the reliability of the generalisation of the findings. Thus, with this sample size the findings will be analysed very critically, and cannot be generalised too widely, especially if certain themes and/or elements only consist of data that was brought up by less than 2 participants.

4. RESULTS

In this chapter, the findings from six semi-structured interviews are presented. Three of the interviews were conducted with niche technology users (suppliers), and three interviews were conducted with customers who source products from these suppliers, one of which was a process industry company, and the other two were OEMs. The purpose of these interviews was to explore the dynamics and building blocks of effective consultative selling and value co-creation for niche technology. The interviews lasted roughly 60 – 90 minutes each. All interviews were recorded, and the records were then littered to form a text document consisting of all interviews. This text document was then structured and coded, and the codes were then collated into potential themes, which were reviewed, defined, and named. Each theme is summarized in the next section and will be discussed in detail in the subsequent sections, supported by direct quotations from the interviews to illustrate the findings.

4.1 Overview to results

The analysis revealed four main themes:

1. Nurturing the relationship
2. Value drivers and value demonstration
3. Technology adoption process
4. Value co-creation.

First, nurturing the relationship addresses the importance of creating a trustful connection with the customer's key people, highlighting the activity of the supplier. From the suppliers' side, participants frequently mentioned that building trust and learning about the customer are the main points. From the customers' perspective, the activity of the supplier in educating and sharing the benefits of their technology was seen as the main point.

Second, value demonstration relates to the need of demonstrating the potential of supplier solution. In one way or another, all of the participants brought up the need of providing some sort of estimation on the potential value of the supplier solution.

Third, dyadic problem solving covers the phase where the supplier and customer are cooperatively exploring how to find the best fit for the solution. Here the participants highlighted the importance of testing as well as sharing of development resources and information.

Fourth, value co-creation encompasses the collaborative value development work that is carried through throughout the relationship. Tweaking the end-product and finding ways to utilize the technology even better and in more applications, were frequently brought up from the participants.

These themes collectively address the research questions posed at the beginning of this paper. The themes of nurturing the relationship and value demonstration provide insights into RQ1, while the themes of dyadic problem solving, and value co-creation provide insights into RQ2. In the following sub-chapters, each of these themes are explored and analysed in greater detail. This analysis provides a more comprehensive understanding of the participants' perspectives and the implications of these findings for this research.

4.2 Nurturing the relationship

Creating a trustful and knowledge-based relationship between the supplier and the customer emerged as a central theme in the interviews. In the interviews, there seemed to be a pattern in building the relationship, consisting of (1) background work, (2) creating connection and educating the customer, and (3) follow-up.

4.2.1 Background work

From supplier point of view, before taking contact to a potential customer, doing some degree of background work is essential. For example, product manager from company Alpha noted:

“We must have a view, that the customer can use our services somewhere. The more you know, the better you can approach and discuss about the customer’s thing.” (Delta, Product manager 2, 8.4.2024)

As sources for background work participants mentioned social media, personal network, trade fairs, references from company database, and relevant literature. This is supported by all interviewed customers:

“The most important thing is that the supplier is professional and approaches with their own thoughts and understands the customer’s challenges. There should also be courage to bring up own uncertainty, so that we could evaluate the feasibility

(of the supplier technology) to the use-application already at the early phases.” (Bravo, R&D director, 17.4.2024)

“You have the key role to recognize that a new opportunity is emerging in the market, so you can bring it to the attention of your customers. In other words, consider where this could be applicable, think about the customers, and then approach them with this new opportunity.” (Alpha, Maintenance engineer, 14.5.2024)

“The supplier should have sufficient references, or some illustrative documentation about the benefits and drawbacks.” (Charlie, Product manager, 18.4.2024)

However, in absence of relevant background information, participants noted that being honest and open about it to the potential customer is important. In these cases it is important to emphasize the willingness of educating the customer about the supplier’s solutions, rather than taking sales oriented approach. This aligns well with Paolo et al (2016), who suggested that at the early stages of interaction the sales orientation should be low. Thus, after background work, it is essential to create a trustful foundation with the customer, and to educate them about the solution and its benefits.

4.2.2 Creating connection and educating the customer

When starting a new relationship with a potential customer, all supplier participants emphasized that creating environment of trust is the main goal to be achieved. Over time the relationship evolves to more open and detailed discussions about the customer’s needs and how the supplier could fulfil those needs. However, in case of thermal spray coatings and other novel surface technologies, many times these needs are hard to identify, and it requires active education of the customer throughout the relationship. For example, sales and market development manager from Echo and product manager from Delta commented:

“First, we try to spark interest in our technology. We introduce ourselves, showing that there are other solutions beyond what they currently have. With our technology they get an additional tool in their toolbox for challenging situations. The need might not be recognized at this point either; instead, we give them options for future uses.” (Echo, Sales and market development manager, 14.4.2024)

“Bringing up our expertise and the positive benefits of our products. The customer can then figure out the rest.” (Delta, Product manager 1, 9.4.2024)

This approach aligns well especially with the OEM customer participants. Both OEMs mentioned that the need for developing a product begins from an identified problem at

the field of their customers. If there's no problem or pressure from the competition, normally there's no need to develop that particular product further. However, when the problem is identified, investigation starts, and this is the point where the supplier's technology should already be educated for and known by the OEMs.

In fact, even after implementing the supplier technology to some of the customers' applications, the education for the uses of the technology should not stop. Similar outcomes were found in an interview study held in July 2021, about the usability and understanding of thermal spray coating technology. This study was conducted by the same researcher as in this paper, and it included 6 OEM participants that were using thermal spray coatings in their products. Two of these participants had used thermal spray coating technology widely in their products for over 30 years, but for the rest the technology was either totally new and non-used or used only in a handful of components. Of these participants, four out of six had a feeling that they do not understand the full potential and application areas for thermal spray coatings. Furthermore, all participants emphasized that they would be eager to be educated more about this technology to increase their understanding about its use areas.

4.2.3 Follow-up

The follow-up part is tightly connected to the previous step but was emphasized so much that it has to be discussed separately. Follow-up in this context means regular communication and systematic education of the customer throughout the relationship. This was highlighted by all of the interviewed customers:

"Regular communication; we don't need to call every day, but we've been steadily keeping in touch. Often there's such a commotion with things going on in every direction, and you might not necessarily remember to share information. That's why it is important." (Charlie, Product manager, 18.4.2024)

"When thinking about the overall process and its development, your role is the most significant. It is your job to bring forth your opportunities and try to gain an understanding of what the customer's problems and needs are. Through this understanding, you can find the channel to implement and test your solutions." (Alpha, Maintenance engineer, 14.5.2024)

"If a supplier wants to be involved, contact is needed regarding certain matters. It doesn't have to be a significant contact, an email or some other message is sufficient for things to move forward, as matters easily get buried if they are not brought

up. For example, a new supplier should be proactive in maintaining communication." (Bravo, R&D director, 17.4.2024)

Thus, the supplier should be at the drivers seat, especially at the start of the journey, to keep the topic fresh and the customer interested. Additionally, this regular communication is the only way to get information about the customers' specific needs and problems, which ultimately helps in the next process phases. This whole process is illustrated in the figure below.

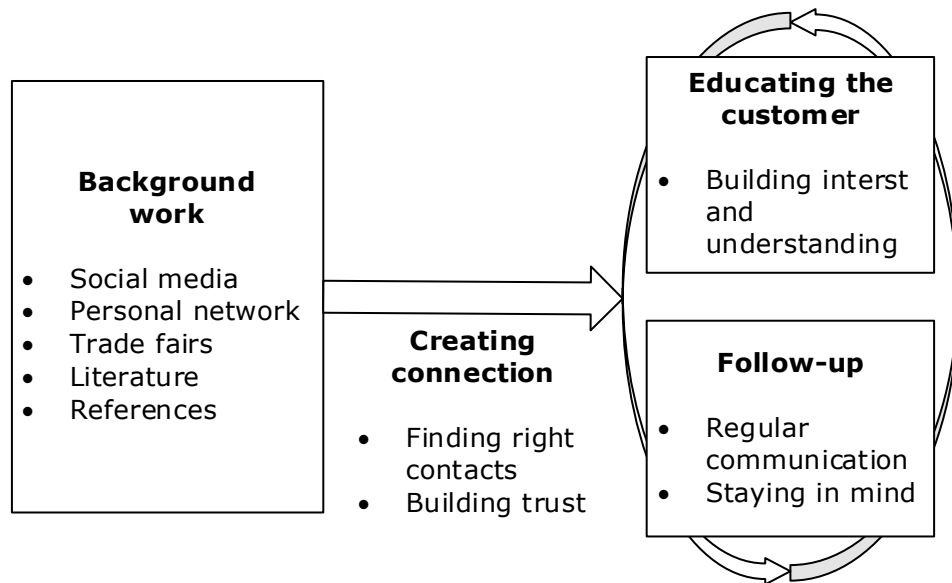


Figure 9. *The process of contacting and nurturing the relationship of new customer*

As illustrated in the figure above, the process of building a trustful and knowledge-based relationship between suppliers and customers involves three key steps: background work, creating connection and educating the customer, and follow-up. Initially, suppliers conduct background research to understand customer needs and establish credibility. Next, they focus on building trust and educating customers about the potential uses and benefits of their technology. Finally, maintaining regular communication and ongoing education ensures the relationship continues to develop, helping customers fully understand and utilize the supplier's solutions. However, in order to fully understand the value of the supplier's solutions, it is important to understand the value drivers and prerequisites for building a business relationship with new customers, which will be discussed next.

4.3 Value drivers

The interview responses revealed a clear pattern regarding the phases of value demonstration when developing the business relationship, them being: (1) prerequisites for collaboration, (2) initial value drivers, and (3) value demonstration. Firstly, the prerequisites for collaboration are abstract and subjective themes which give the parties an idea whether the relationship is worthwhile to develop further or not. This is closely linked to initial value drivers, which are the drivers that the potential client cares the most about and needs to be addressed already at the start of the relationship. When developing the relationship further, and when potential application areas for the supplier technology are found, value drivers turn into more concrete and objective drivers, including more measurable and monetary value propositions. These process phases are discussed in more detail below.

4.3.1 Prerequisites for collaboration and initial value drivers

At the very start, in order to build a foundation for long lasting relationship, there are several prerequisites that needs to be fulfilled for the collaboration to be interesting for both, the technology supplier and the potential client. In other words, both parties need to see value and potential in working together. From the supplier point of view, for the customer to be interesting, it needs to have high enough business potential, or some other interesting aspect such as willingness to be a pilot customer. Gaining information from the customer application or process was seen interesting as well, if it could benefit other areas of the supplier business. Moreover, if collaboration enables the supplier to get into a bigger network with more business potential, that could be seen as a value driver for the supplier. Also, some subjective and personal motivation related value drivers were identified. From the customer's perspective the prerequisites to gain interest were more concrete and were related to the extent of the supplier's product/service portfolio, supplier history and references, technology applicability, demonstrated cost efficiency, and reliability and stability of the supplier. Initial value drivers, on the other hand, were related more on economic benefits, increase in application life time, networking and gaining experience and knowledge. These findings are listed in Table 8.

Table 8. *Value drivers affecting the interest in collaboration*

Participant	Identified value drivers
Delta Product manager 1 9.4.2024	Business potential, information from customer application / process, pilot customer, networking, brand and image, good feeling for solving challenges, education of own personnel and customer personnel
Delta Product manager 2 8.4.2024	Business potential, cross selling of other divisions products, gaining information, networking
Echo Sales and market development manager 14.4.2024	Business potential, networking, gaining information, good feeling of solving challenges
Charlie Product manager 18.4.2024	Application lifetime increase, references, tools for future development, increased knowhow
Bravo R&D director 17.4.2024	Economic benefits, finding solutions for problems, networking, gaining expertise and knowledge, career development
Alpha Maintenance engineer 14.5.2024	Economic benefits, application lifetime increase, EHS

To establish a successful long-term collaboration, both technology suppliers and potential clients must see mutual value. When the key value drivers are met for both, they are more likely to pursue a deeper partnership, leading to more detailed discussions and identification of potential use cases.

4.3.2 Value demonstration

Ultimately the relationship comes to a point where the potential value of the supplier technology must be demonstrated. At this point the demonstration does not need to be totally related to the customer's application, but it should be close enough for the customer to understand the potential that the technology has. This could be seen as a preface for the potential test and prototype phase. For example, the interviewed customers mentioned:

"It would be good to perform calculations or present the benefits from the customer's viewpoint. For example, 'The current situation is x, and by doing this, we achieve situation y, which brings benefit z.' This helps to increase the customer's willingness to invest. If it is an investment-level matter, financial metrics are needed to be met in order for it to be implemented. If the supplier can assist with such calculations, it is a positive thing." (Alpha, Maintenance engineer, 14.5.2024)

"Reference projects might be a good way to illustrate value. Like giving supportive expertise, although it's not possible to give a 100 % guarantee. However, I don't appreciate exaggeration; the truth must still be present." (Bravo, R&D director, 17.4.2024)

"A document illustrating the benefits and drawbacks. References, if available, are always good. Ideally, the references would be precise, but that's not realistic. Mainly the benefits, of course, highlighting what could be achieved with the technology." (Charlie, Product manager, 18.4.2024)

Reference projects as value demonstration tools were mentioned by all supplier participants as well, however, from the supplier's point of view this phase can still be problematic since the potential customer applications can be relatively unknown at this point; thus, it is difficult to assess value in the absence of such information. As both product managers from supplier company Delta noted:

"We should know the customer's process and what the customer values as well as possible. Two different customers may have the same monetary value, but one may value something more than the other, such as work safety. Most commonly, the situation is that the benefits cannot be accurately assessed. Of course, we can always make some guesses, but a precise estimate is really difficult to give. The best scenario is if we can discuss with the customer to extract the parameters needed to calculate the actual value. However, often it remains quite uncertain what the actual value for the customer will be." (Delta, Product manager 1, 9.4.2024)

"The customer must be made to want the product or service. It is essential to know what the customer will gain from the coating. Thus, if something is presented, it must be quite tailored. You cannot go to all customers with the same presentation. Then, there is uncertainty about being able to bring the right arguments into the presentation. Background work can reduce uncertainty, but it requires a lot of time. When it's a new topic you know nothing about, how do you present it? Preparing for a half-hour meeting can take several days in such circumstances. One aspect

is whether there is information available elsewhere that can be shared with the customer to gain insights. For instance, if customer X has achieved certain results, what could we accomplish with another customer? This involves seeking references.” (Delta, Product manager 2, 8.4.2024)

This phase of value demonstration was clearly the most ambiguous and troublesome for the supplier participants, and no clear solution was found for this in the interviews other than deepening the relationship. As product manager 1 from Delta noted:

“The uncertainty stems from if we don’t know the customer’s application or our own product. The challenges tend to culminate in these areas. To reduce this, we just need to deepen the collaboration one way or another.” (Delta, Product manager 1, 9.4.2024)

However, if the value demonstration phase is successful and both parties recognize the potential in adopting the supplier’s technology, the technology adoption process can begin, which will be talked about next.

4.4 Technology adoption process

All of the participants had more or less aligned view on the technology adoption process, with some differences in the emphasis of different phases. For example, OEMs tended to put more emphasis on the prototyping and technology verification phase, while the process industry participant emphasised field tests. This process is illustrated in the figure below.

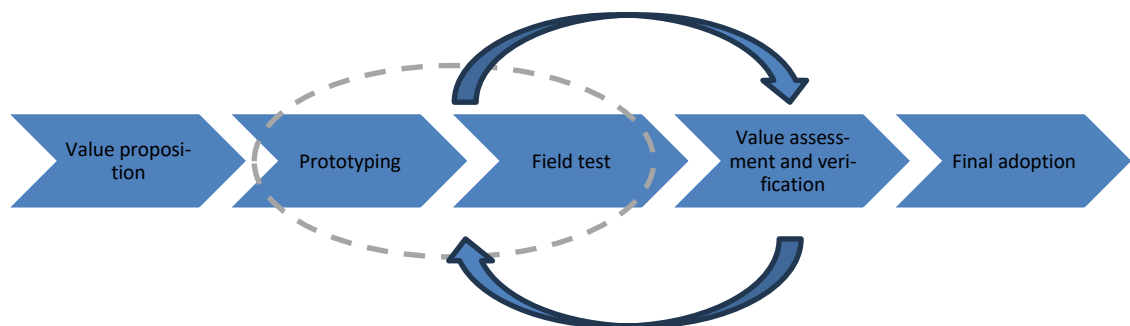


Figure 10. Technology adoption process

Firstly, the potential of the supplier technology needs to be verified for it to be adopted. At this point there is already an identified use case, for which the value proposition will be built upon. Secondly, there will be prototype and/or field test phase to demonstrate the technology performance in the actual environment. Many of the participants noted that this process can be iterative, since after the prototype phase new information will be

generated to further facilitate decision making for the final specification. Finally, there is final adoption phase, consisting of contract and price negotiations, production optimization and such. All of these phases will be discussed in more detail below.

4.4.1 Value proposition

This is the point where the first actual use case has been identified, and it is possible to create value propositions. Here the customer already has an idea of the potential benefits of the supplier technology, and the supplier believes that the technology can benefit the customer in one way or another. However, the actual value will still be unknown at this phase, the value proposition being quite abstract and open in nature. As product manager 2 from supplier company Delta noted:

“At this stage, we cannot know what benefits the customer will gain, so we can only assume that the lifespan could be X when it was Y before, for example. We need to get the customer to fully believe in the benefits of the product/service. The benefits must be demonstrated whether it’s lifespan or something else.” (Delta, Product manager 2, 8.4.2024)

Increase in component lifespan tended to be the main value element that was brought up from most of the participants, both suppliers and customers. This was not a surprise, since the technology at hand being thermal spray coatings, is quite often used to increase component lifetimes. For example, product manager from customer company Charlie noted:

“We need to find a solution that we believe will bring benefits. In this case, the benefit is that the lifespan of our product is extended.” (Charlie, Product manager, 18.4.2024)

However, customer Alpha also noted that there can be multiple other potential benefits that could help the customer, not only the increase in component lifespan. But it is up to the supplier to find and bring these up, as he mentioned:

“From your perspective, it’s worth highlighting these other benefits as well, beyond just extending the component’s lifespan. Consider the overall functionality of the process and maintenance needs. If the component detaches with less force, for example, the stress on the device and machine decreases, and energy consumption decreases. It improves the functionality of other equipment too.” (Alpha, Maintenance engineer, 14.5.2024)

Thus, for the supplier, understanding the bigger picture and the full value the customer could get, is important. This only comes through interaction with customers, and as the

knowledge increases, the more precise the value estimations are. This aligns well with the thinking of company Alpha, as they continued:

It is certainly difficult to measure the monetary value at this point, but some sort of forecast of the economic benefit would be needed. How well it meets expectations in the end? For that it would be appropriate to conduct a post-calculation or similar after the results.” (Alpha, Maintenance engineer, 14.5.2024)

With value comes the pricing. Even though the value setting can be vague and uncertain at this point, especially OEMs tended to emphasize the importance of pricing accuracy quite early, as company Bravo noted:

“As we envision what it could cost as a series-produced product, in the end it must fit within the product's price margin. The price should ideally remain about the same as it was during the specification phase. It's most unfortunate when development work is done, green light is given, and then the whole thing falls apart because the price jumps and no longer fits within our margin.” (Bravo, R&D director, 17.4.2024)

However, accurate pricing might be difficult in this phase, since the specification can still change. Moreover, if the product is new in one way or another, the prices are only estimates as long as the initial prototypes have been made. Thus, transparency here is the key, as supplier Echo noted:

“Throughout this process, maintaining discussion about pricing is important to ensure it doesn't get lost under the guise of 'research work.' The price is considered quite important already in the early phases, e.g., a test costing 100k and the final product price being 1 cent per piece. Both parties have the opportunity to influence the testing budget. It is important to ensure that the price is not a surprise to anyone. Then the fine-tuning begins as the volume starts to increase, leading to more in-depth discussions.” (Echo, Sales and market development manager, 14.4.2024)

Thus, it is important to upkeep the discussions about both, the perceived value of the technology and its pricing. This is illustrated in Figure 11.

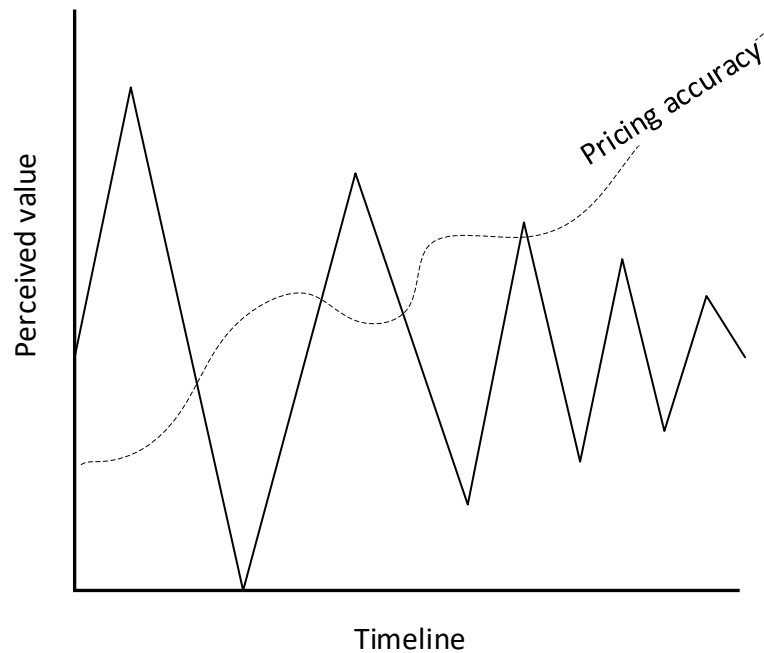


Figure 11. *Nature of value proposition and pricing accuracy at the start of technology adoption process*

As illustrated in the figure, the perceived value of the technology gets clearer the further the adoption process goes. Additionally, as the scope and solution gets clearer, the pricing accuracy also increases. Finally, if the pricing of the solution and perceived value meets with the supplier and potential client, the next phase is about testing the technology before its full adoption.

4.4.2 Prototyping and field testing

Before adopting the supplier technology, some degree of prototyping and /or field testing is required. This was brought up by all participants. Main reason is the fact that there is not yet a 100 % certainty that the solution will work as intended, and *proof-of-concept* needs to be conducted. Moreover, this has an important connection to value proposition process as well since, after this phase, the gained benefits will be more accurate. This was well concluded by Product Manager 1 from the supplier company Delta:

"If the supplier does not know the customer's process with sufficient accuracy, or their own product, it may become necessary to create a prototype or test series to achieve sufficient accuracy in benefit evaluation. Even if the supplier is completely certain that the solution will work, a prototype may need to be made for commercial reasons. But all in all, if we move to prototypes/test series, we are not entirely sure how well it will work." (Delta, Product manager 1, 9.4.2024)

There are also other important factors that play in this phase. One of the supplier participants highlighted the importance of making the first test delivery as accessible and easy for the customer as possible. Additionally, the swiftness with the delivery process was seen as an advantage, as Product Manager 2 from Delta mentioned:

“The price must be attractive for the test delivery. Testing the coating needs to be made easy. The threshold for trying should be very low. Test delivery with our own freight and even picking up the test piece. As easy as possible for the customer with a low threshold. Moreover, the test order needs to go through quickly, especially when dealing with a new customer and the matter is fresh in their mind, so that results can be obtained as quickly as possible to gain experience. The larger the company, the more important it is to make the prototype delivery to stay on schedule and ensure quality.” (Delta, Product manager 2, 8.4.2024)

This aligns well with the customer participants' answers, as this is a phase where the supplier's reliability and credibility is tested. This was well noted by the R&D director from company Bravo:

“The supplier's reliability is tested already during the prototype delivery – it is monitored closely in the initial phase. Working with a new supplier involves more observation.” (Bravo, R&D director, 17.4.2024)

However, this phase contains two potential risks. Firstly, many participants brought up the risks about potential misunderstandings and from drawing incorrect conclusions. As participants noted:

“Misunderstandings from either side are a risk. For example, the operating environment may not be as described or understood. Human errors. Material defects - what the customer says may not actually be accurate. For instance, stainless steel imported from China may be different from stainless steel produced elsewhere.” (Echo, Sales and market development manager, 14.4.2024)

“There is uncertainty because the use process and specific values can change, and they often do. The end-customer may start processing larger quantities, which immediately causes wear problems and other issues. Even the processed material composition can change from the initial discussions.” (Charlie, Product manager, 18.4.2024)

“There is a chance of failure here by drawing incorrect conclusions, or there may be factors at play that make it difficult to correctly interpret what the reference is and what it is being compared to. The test environment may also be different from

where the previous problem arose, so can we reliably replicate the test? It's unfortunate when a test is conducted and the results are lost or cannot be interpreted or recorded clearly enough. In the end, we should be able to justify the decision related to the next step, whether to move to production scale or abandon the solution.” (Alpha, Maintenance engineer, 14.5.2024)

“There can be uncertainty on the reliability of results. For example, if the customer has conducted the test themselves and we haven't been able to influence it. The customer may have tested the coating in a way that significantly distorts the results.” (Delta, Product manager 2, 8.4.2024)

Secondly, the small scale of the prototyping was brought up as a factor causing uncertainty. As some of the suppliers noted:

“Laboratory tests and the real world are always different worlds. This is a risk.” (Echo, Sales and market development manager, 14.4.2024)

“There's uncertainty when conducting a small-scale test, as we cannot be sure how it will work on a larger scale. We can simulate to some extent, but there is no simulator that takes all factors into account. Scalability is that we must consider. It's also a multi-phase problem.” (Charlie, Product manager, 18.4.2024)

Thus, addressing and bringing up uncertainties, knowledge gaps, and potential risks for misunderstandings, is essential to ensure the validity and reliability of the prototyping phase. Moreover, carrying out the initial tests in close collaboration with the customers can help to mitigate these risks and uncertainties. This was well aligned with the supplier company Delta and customer Alpha, as they mentioned:

“Getting involved in the customer's tests is important. Uncertainty may arise from whether there is enough information to make the right decisions. It requires cooperation with stakeholders on both our side and the customers' side to reduce uncertainty.” (Delta, Product manager 2, 8.4.2024)

“It would be good for you to be involved in the test arrangements and understand collaboratively how the test is intended to be conducted to avoid misunderstandings.” (Alpha, Maintenance engineer, 14.5.2024)

However, this still does not get rid of the scalability problem. Moreover, the prototyping phase gives the parties only the first impressions on the solution, and it is likely that after these impressions there is still a need for value verification before the final adoption, which will be discussed next.

4.4.3 Value verification and final adoption

After the solution and its benefits has been demonstrated in the prototyping phase, there can still be a long way for the final adoption. In fact, the need for iterative test cycles were brought up by multiple participants. For example, customer Alpha and supplier Delta commented:

“There should perhaps be an additional phase for conducting a larger scale test. Small-scale with low costs. If promising, then a larger test, where we also stop to consider whether the situation has changed from the small-scale test. We must constantly think about further development possibilities. If everything doesn’t go well, if there are challenges, can we improve and develop the solution even further by making additional changes?” (Alpha, Maintenance engineer, 14.5.2024)

“It may be necessary to conduct multiple tests to achieve desired outcome. Depending on the target, there could be several iteration rounds.” (Delta, Product manager 2, 8.4.2024)

Value verification, especially for OEMs, usually means testing and demonstrating the final specification in close to its real working conditions. Moreover, the results from these tests should be concise and clear, to justify full adoption. Additionally, the quality and reliability of the co-operation is assessed during this phase. For example, customers Charlie and Bravo mentioned:

“If we achieve good results during implementation, we must also be able to demonstrate those benefits on our side. Here, there should be a clear indication, preferably a single number that is easy to communicate forward. ‘With the existing solution, the number is this, and with this method, the number is that.’ Demonstrating the benefits concisely and clearly. Documenting is always highly valued. This is how we advance our game plan. We can demonstrate and prove these things to our customer. Moreover, we must feel that the cooperation is smooth and fruitful.” (Charlie, Product manager, 18.4.2024)

“We test a prototype series, based on which a statement is given on its suitability. The functionality is tested, and the quality is also assessed. After the test series, once approval is given, the procurement and production departments are authorized to use that technology/supplier. In other words, the supplier and the technology are approved. This includes evaluating the delivery times and generally assessing whether the co-operation has been smooth.” (Bravo, R&D director, 17.4.2024)

To conclude, the technology adoption process involves verifying the potential of supplier technology, starting with identifying a use case and building a value proposition. This is then followed by a prototyping and field-testing phase to demonstrate performance in the actual environment, with the emphasis on iterative testing to refine specifications and to verify the actual value. During the whole process, discussions about the price of the final solution in contrast to the testing phase is essential, while also addressing uncertainties. This helps both of the parties to understand the actual value of the solution at all times of the process, so that there would not be any surprises during the journey. This process is illustrated in the figure below.

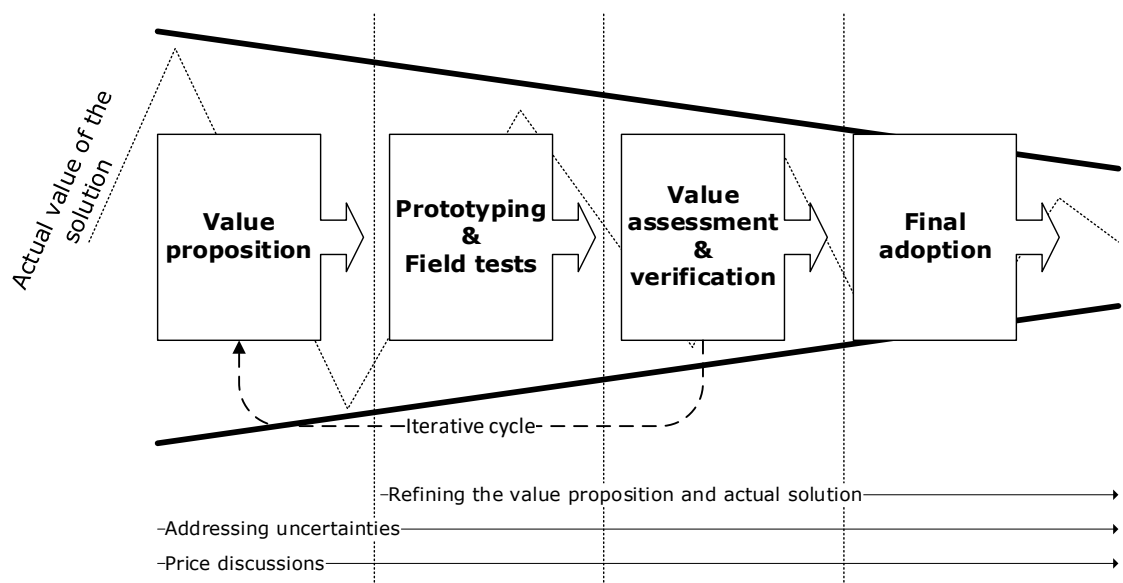


Figure 12. *The process from the initial value proposition to technology adoption*

After the solution has been validated and adopted, it transfers into a more traditional business exchange. Therefore, the negotiations typically centre around price, delivery terms, stock levels and so on. However, this phase is not part of this study, which is why it is not going to be discussed further. On the other hand, during the technology introduction process, and after the adoption, both the supplier and customer start to understand each other's businesses better, which ultimately reveals more possibilities for further cooperation. As this accumulated information and deepened relationship is valuable for both parties, this could be interpreted as co-created value, which will be discussed next.

4.5 Value co-creation

The concept of value co-creation was not familiar to any of the participants, but there were lots of similarities in the interview answers regarding this topic. Co-creative value

was seen more as a set of co-operative elements to be done to accelerate the sales of the customers' end products. The content of these elements differed quite a lot, however, and different people seemed to interpret value quite differently. For example, product manager 1 from supplier Delta mentioned:

“It means that the customer and the supplier together create greater value for the product than they would be able to calculate alone. The value creation that comes from working together.” (Delta, Product manager 1, 9.4.2024)

Here the intention is to add superior value to the end product by working together. Similar conclusions were drawn by the other product manager from company Delta, as he mentioned:

“Shared goals. In other words, how can we help the customer achieve their objectives? For example, collaborative coating development with the customer, with the goal of reducing the time spent on their post-processing.” (Delta, Product manager 2, 8.4.2024)

Here the ultimate goal was to reduce the customer's processing time, which in the end would reduce customers production costs and lead times. Product Manager 2 from Delta also mentioned that it is important to expand the collaboration to multiple stakeholders inside the customer's organisation to be able to create value collaboratively. Supplier Echo, on the other hand, emphasized regular communication as the driver for value co-creation:

“Every year, we sit down with the customers and discuss what has been done and how things have gone. The goal is to determine if there is anything we can improve or if everyone is satisfied. During these discussions, new development needs might emerge. It's an ongoing process.” (Echo, Sales and market development manager, 14.4.2024)

Thus, at the supplier side, value co-creation was interpreted as quite multifaceted process. From the customers' viewpoint, co-operative development and sharing of common goal was seen as the main drivers, as they mentioned:

I see value co-creation as the development of collaboration and partnership. But there's also the aspect that, for example, I personally enjoy social collaboration. Good social relationships create value in the work because it makes working more enjoyable. (Bravo, R&D director, 17.4.2024)

We should always aim for success. Every time we succeed, it benefits both of us. When there are issues at the end users process, it presents an opportunity to

solve and improve something. Perhaps that's the biggest opportunity. New processes are always emerging, so if we can develop good solutions in advance, that also adds value. Active exchange of information. (Charlie, Product manager, 18.4.2024)

First of all, value must be added. It is also important to accept that the customer must bring value to the supplier as well. It doesn't help if the supplier makes a significant effort, for example, to conduct a test that negatively impacts the supplier's operations. The cooperation must be sustainable and interesting, ensuring the lifecycle for both the customer and the supplier. (Alpha, Maintenance engineer, 14.5.2024)

Moreover, interviewee from the company Alpha highlighted environmental issues and their consideration in the value chain. How does coating affect the further processing of the component in scrap handling, and what are the emissions of a coated component compared to an uncoated one? Thus, the value co-creation can extend into further process phases as well, which might not straight affect the business of the customer nor the supplier but might still be important areas to develop and take into account.

To conclude, co-creative value was generally seen as a collaborative effort between suppliers and customers to enhance product value. Interviewees highlighted goals like reducing production time and costs through joint development, regular communication, and expanding cooperation across stakeholders. Social collaboration and environmental considerations were also recognized as important, with an emphasis on creating mutual, sustainable benefits. Ultimately, value co-creation was viewed as a multifaceted process driven by shared goals and continuous improvement.

5. SYNTHESIZING RESULTS AND DISCUSSION

In this chapter, the results from the semi-structured interviews, which were analysed thematically, will be discussed and compared with the theory and framework established in chapter 2. Additionally, the findings will be examined in relation to the research questions formulated at the start of this study. This section will provide an in-depth analysis of whether the results offer meaningful insights into the research questions and assess the validity, reliability, and credibility of the findings.

5.1 Building blocks for effective sales process of niche technology

The introduction of niche technologies, such as thermal spray coatings, into new markets presents unique challenges and opportunities. This section delves into the essential building blocks that constitute an effective sales process for such technologies, drawing on the findings from the empirical research and theoretical insights. The essential building blocks can be roughly divided into six different blocks:

1. Relationship building
2. Value proposition and demonstration
3. Proof-of-concept
4. Adoption

Firstly, establishing a trustful relationship with potential customers is essential. Before approaching potential customers, conducting thorough background research is crucial. This includes understanding the customer's industry, challenges, and potential applications for the technology. Background work helps in tailoring the sales approach and making informed discussions. The aim is to create transparent communication, understanding customer needs, and demonstrating a genuine interest in solving their problems. Trust is built over time through these consistent and honest interactions, and it is the hard prerequisite for the relationship to advance further.

Secondly, after the foundation for trustful relationship has been built, parties can start to find ways on how to provide value to each other. This is a building block of value proposition and demonstration, where the value proposition should be customizable to resonate with the customer's specific needs and priorities. Through interactions and commu-

nication with the customer, a deep understanding of the customer's processes and challenges should be built over time. This understanding enables the customization of value propositions that resonate with the customer, and it is a prerequisite for the relationship to evolve further. Value propositions should be clearly articulated, highlighting the unique benefits of the technology. This may include both tangible benefits, such as cost savings and performance improvements, and intangible benefits, such as networking and reduced risk.

Thirdly, implementing pilot projects or prototypes is essential to demonstrate the practical benefits of the technology. These projects serve as proof-of-concept, reducing customer uncertainty and providing tangible evidence of the technology's value. However, to advance to this phase, mutual perceived value should override the efforts and resources needed for this concepting. Thus, perceived value is the prerequisite for this phase. Moreover, this phase can often be iterative, allowing for adjustments based on feedback and performance evaluations. This iterative approach helps in refining the technology to better meet customer needs.

Finally, the adoption of the technology happens after the value of the solution has been verified at the proof-of-concept stage, with the result being valuable for both parties. Thus, verified value is the prerequisite for the adoption to take place. The objective of final adoption is to ensure the successful integration of the technology into the customer's processes. This can be done by finalizing contract negotiations and by optimizing production processes. Providing robust support during the implementation phase and addressing any issues promptly are essential. Moreover, establishing mechanisms for ongoing collaboration and continuous improvement are important. These building blocks with their prerequisites are illustrated in Figure 13 and summarized in Table 9.

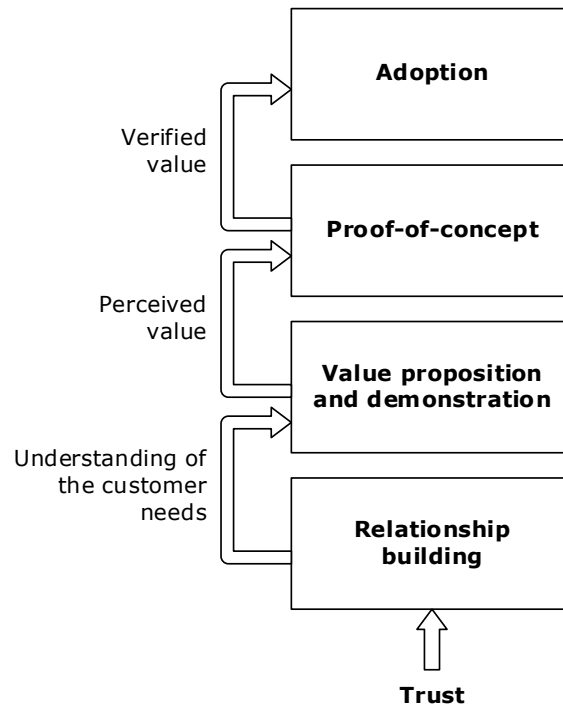


Figure 13. Building blocks of an effective sales process of a niche technology and their prerequisites

Table 9. Summary of the building blocks

<p>Relationship building</p> <p>Prerequisite:</p> <p>Creating an environment of trust</p> <p><i>“At first, gaining the trust of the customer is definitely the most important factor” (Delta, Product manager 2, 8.4.2024)</i></p>	<p>Goal: establishing a trustful, knowledge-based relationship with the customer.</p> <p><i>“...we don't need to call every day, but we've been steadily keeping in touch... (Charlie, Product manager, 18.4.2024)</i></p> <p><i>“The most important thing is that the supplier is professional and approaches with their own thoughts and understands the customer's challenges...” (Bravo, R&D director, 17.4.2024)</i></p> <p><i>“...we try to spark interest in our technology... The need might not be recognized at this point either; instead, we give them options for future uses...” (Echo, Sales and market development manager, 14.4.2024)</i></p>
<p>Value proposition and demonstration</p> <p>Prerequisite:</p> <p>Understanding of the customer's needs</p>	<p>Goal: building of value propositions that will resonate with the customer's needs and priorities.</p> <p><i>“We need to find a solution that we believe will bring benefits...” (Charlie, Product manager, 18.4.2024)</i></p>

<p><i>"We should know the customer's process and what the customer values as well as possible. Two different customers may have the same monetary value, but one may value something more than the other." (Delta, Product manager 1, 9.4.2024)</i></p>	<p><i>"It is certainly difficult to measure the monetary value at this point, but some sort of forecast of the economic benefit would be needed." (Alpha, Maintenance engineer, 14.5.2024)</i></p> <p><i>"At this stage, we cannot know what benefits the customer will gain, so we can only assume that the lifespan could be X when it was Y before, for example. The benefits must be demonstrated whether it's lifespan or something else." (Delta, Product manager 2, 8.4.2024)</i></p>
<p>Proof-of-concept</p> <p>Prerequisite:</p> <p>High enough perceived value</p> <p><i>"The customer must be made to want the product or service. It is essential to know what the customer will gain from the coating." (Delta, Product manager 2, 8.4.2024)</i></p>	<p>Goal: demonstrating the practical benefits of the solution.</p> <p><i>"...it may become necessary to create a prototype or test series to achieve sufficient accuracy in benefit evaluation. Even if the supplier is completely certain that the solution will work, a prototype may need to be made for commercial reasons..." (Delta, Product manager 1, 9.4.2024)</i></p> <p><i>"...In the end, we should be able to justify the decision related to the next step, whether to move to production scale or abandon the solution." (Alpha, Maintenance engineer, 14.5.2024)</i></p> <p><i>"It may be necessary to conduct multiple tests to achieve desired outcome. Depending on the target, there could be several iteration rounds." (Delta, Product manager 2, 8.4.2024)</i></p> <p><i>"...there should be a clear indication, preferably a single number that is easy to communicate forward. 'With the existing solution, the number is this, and with this method, the number is that.'" (Charlie, Product manager, 18.4.2024)</i></p>
<p>Adoption</p> <p>Prerequisite:</p> <p>High enough verified value</p> <p><i>"We want to have reliable technology in our final product, and we are willing to pay a certain amount for it." (Bravo, R&D director, 17.4.2024)</i></p>	<p>Goal: ensuring a successful integration of the solution into customer's process.</p> <p><i>"...After the test series, once approval is given, the procurement and production departments are authorized to use that technology/supplier..." (Bravo, R&D director, 17.4.2024)</i></p> <p><i>"This includes evaluating the delivery times and generally assessing whether the co-operation has been smooth." (Bravo, R&D director, 17.4.2024)</i></p> <p><i>"...we must feel that the cooperation is smooth and fruitful." (Charlie, Product manager, 18.4.2024)</i></p>

These building blocks highlight the interconnected nature of the sales of niche technology, with the prerequisites working as the connectors, emphasizing the iterative and collaborative aspects of the sales process. Each block represents a critical component that contributes to the overall effectiveness of introducing niche technologies into new markets. If reflected to the research questions that were set at the beginning of this study, these findings answer to RQ1 quite effectively, which was...

RQ1: What are the building blocks and their prerequisites for an effective sales approach of a niche technology in the absence of clear understanding of potential customer applications?

However, regarding the section of "...in absence of clear understanding of potential customer applications", there were not any special findings. The discussions with the participants regarding this topic pretty much provided the same results, that the only way to proceed in this kind of situation is by being honest and open, doing more background work, and just deepening the relationship with the customer in one way or another. This framework will be further refined in the section 5.2, where the interactions and communication are included.

5.2 Process elements of effective interaction and communication in consultative selling of niche technology

Building on the identified building blocks described in Section 5.1, this section expands the framework into process elements of consultative selling by including interactive phases into these building blocks. There are four interaction process phases, which are:

1. Initial engagement and background work
2. Information exchange and education
3. Collaborative problem-solving
4. Addressing uncertainties.

The refined framework diagram illustrating the integration of interaction phases into the building blocks is illustrated in Figure14, which each will be discussed separately:

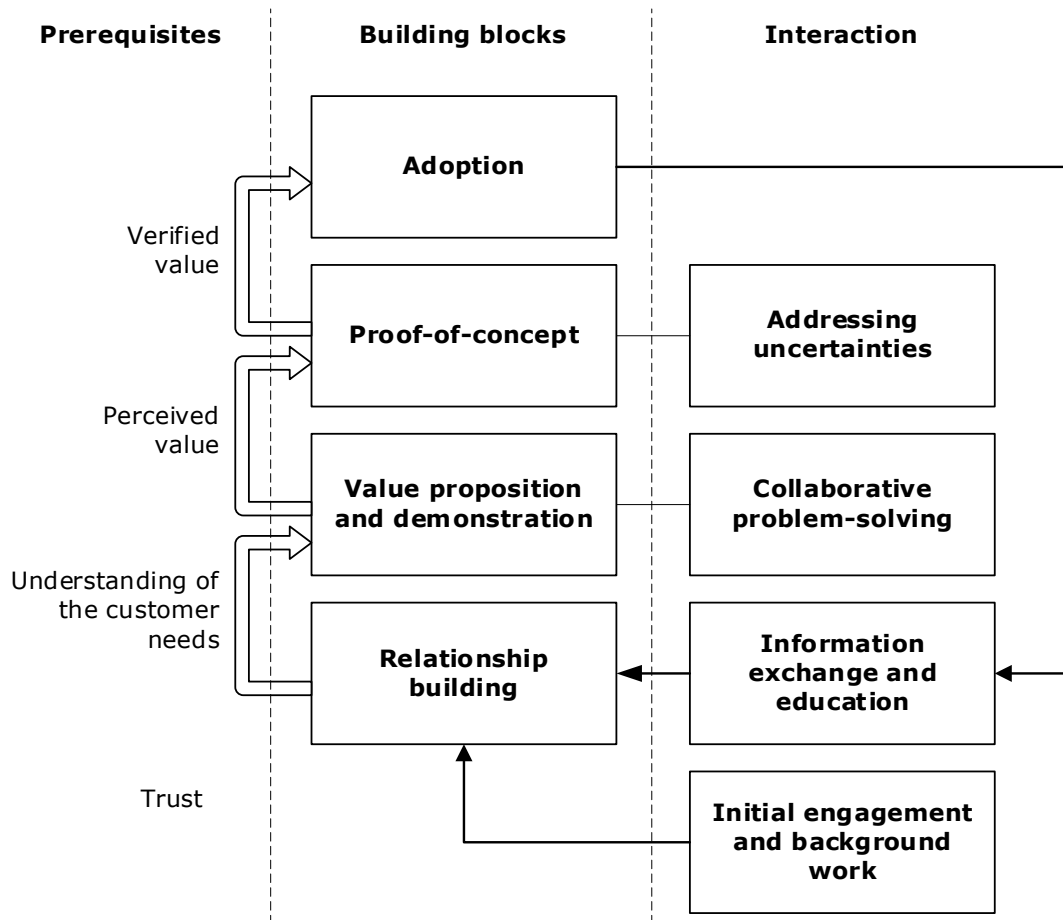


Figure 14. *The process elements of consultative selling for niche technology*

Firstly, objective of initial engagement and background work is to establish a foundation of trust and gather essential information about the customer's needs and context. This is done by conducting thorough background research on the customer's industry, challenges, and potential applications for the technology. Sources such as social media, personal network, trade fairs, industry literature & references can be utilized here. Thereafter creating a contact to the customer, focusing on building a relationship through transparent and regular communication. It is essential to understand the customer's specific needs and priorities to tailor the subsequent sales approach. This can be done by regular meetings and discussions to understand the customer's pain points and expectations while sharing preliminary insights and potential benefits of the technology to spark customer's interest.

Secondly, continuous information exchange and education of the customer about the technology and its possibilities are essential. This includes regular updates on new developments, potential applications, and success stories. Educating the customer helps in growing and maintaining their interest and trust in the technology. Concurrently, the

supplier should aim for learning more about the customer's process and challenges to be able to provide even more relevant and valuable insights that could interest the customer.

Thirdly, as the objective of value proposition and demonstration is to tailor it to the customer's specific needs and to demonstrate the unique benefits of the technology, encouraging collaborative problem-solving between the supplier and the customer leads to more resonating and innovative solutions. This involves joint development efforts, where both parties actively participate in finding the best fit for the technology. Effective collaboration requires open knowledge sharing. Both parties should be willing to share information and expertise to co-create value. This collaborative approach allows for a deeper understanding and better alignment of the technology with customer needs.

Finally, as the objective of proof-of-concept is to provide tangible evidence of the technology's value through real-world applications, addressing uncertainties and risks associated with adopting new technology is crucial. This includes providing detailed information on the benefits and potential drawbacks already at the very beginning of the customer relationship, ensuring that any potential issues are addressed and known by both parties right at the start. Moreover, transparent communication about the uncertainties and how they will be managed helps in building customer confidence. This involves discussing potential risks openly and providing strategies to mitigate them.

After the adoption, regular follow-up meetings to monitor the technology's performance and to gather feedback takes place. Concurrently, information exchange and education continue, and the sales cycle starts over, with the emphasis on updates on new developments and potential applications. Additionally, after the adoption, both parties start to accumulate understanding from each other's processes, which reduces the time spent at the first phases of the sales process.

5.3 Sales process for mutual value creation in consultative sales of niche technology

By further developing the framework presented at Sections 5.1 and 5.2, a seven-step sales process for mutual value creation can be built. These findings together are to provide answers to RQ2, which was...

RQ2: How should the sales process be structured to ensure mutual value creation for both the niche technology user and its customers?

This sales process is illustrated in Figure 15.

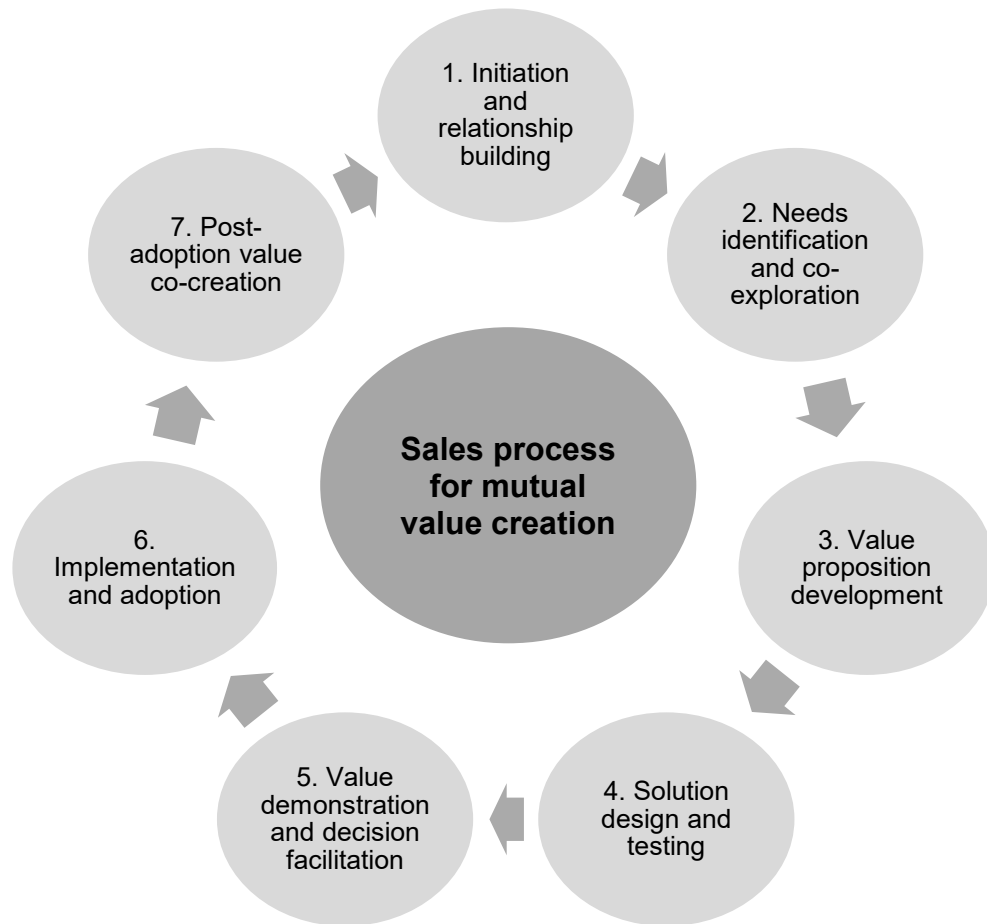


Figure 15. Sales process for mutual value creation

The figure above emphasizes the cyclical and iterative nature of the sales process, with each process phase having their own progression and interconnection. First, trust and mutual understanding needs to be built. This is done by conducting in-depth customer research, and by focusing on educating the customer about the potential use cases of the technology. Thus, the objective is to create customer engagement and readiness to explore the technology further. Moreover, it is important to avoid overt sales orientation to focus on creating a shared vision for collaboration. Second, understanding of customer-specific challenges and opportunities must be built co-operatively. This can be done by organising collaborative workshops and discussions, and by utilizing consultative approach to co-explore process challenges where the technology could create value. Ultimately, a list of potential application areas and shared goals can be built. Third, by developing specific use-case scenarios by comparing against alternative solutions with customer-aligned metrics such as lifecycle cost savings and performance improvements, clear and resonant value propositions can be crafted. Fourth, by prototyping and piloting, technical validity and financial benefits can be demonstrated to reduce uncertainties.

Fifth, by presenting data from prototyping and piloting phase, ROI and operational benefits can be addressed collaboratively with the customer to prove evidence for decision-making, and to solidify customer confidence. Sixth, for successful technology deployment, ensuring seamless integration into the customer's processes is important by monitoring performance and gathering feedback to adjust the solution, if necessary. Finally, after the adoption while the customer starts to get experience from the technology, regular follow-ups are important to assess the performance and satisfaction. This also helps to co-create new solutions or applications for expanded usage of the technology and to sustain mutual value and long-term collaboration, which ultimately starts the sales process again.

6. CONCLUSIONS

The growing interest in improving the efficiency and reliability of industrial equipment has led to the development of new technologies, including thermal spraying. This technology is widely used to extend the lifespan and enhance the performance of components across industries such as aerospace, automotive, steel, mining, and energy. Despite its success, thermal spraying remains niche outside its core markets. Introducing thermal spray coatings to new industries poses challenges, as the technology is often unfamiliar, and its value is difficult to assess. Overcoming these uncertainties requires clear communication of the benefits and a deep understanding of the complex processes of potential customers. Collaborative discussions with end-users are crucial to ensure successful adoption of the technology.

The primary research problem addressed in this study was the challenge of introducing a niche technology, specifically thermal spray coatings, into new markets and applications. This problem stems from the technology's relative unfamiliarity outside its core markets and the uncertainties and complexities involved in its adoption. The study aimed to identify the building blocks and prerequisites for an effective sales approach and to structure the sales process to ensure mutual value creation for both the niche technology users (suppliers) and their customers.

The research identified several key building blocks essential for an effective sales approach. These building blocks are relationship building, value proposition and demonstration, proof-of-concept, and adoption. Establishing trust through transparent communication and understanding customer needs is fundamental before engaging in the sales process. Conducting background research to understand the customer's industry and challenges enables tailored discussions. Once trust is built, the focus shifts to providing a value proposition that resonates with the customer's specific needs, both tangible and intangible. Pilot projects, or proof-of-concept, play a crucial role in demonstrating the technology's benefits, helping to reduce customer uncertainty before moving toward full adoption. Each step is iterative, involving ongoing collaboration and adjustments to meet customer expectations.

A comprehensive framework for effective interaction and communication during consultative selling was also developed, emphasizing the importance of ongoing engagement between suppliers and customers. This process includes four phases: initial engagement

and background work, information exchange and education, collaborative problem-solving, and addressing uncertainties. Continuous information exchange helps maintain customer interest, while collaboration allows both parties to tailor solutions to meet customer-specific needs. Addressing uncertainties early and transparently builds confidence, mitigating risks associated with adopting new technologies. Post-adoption, the relationship continues with regular follow-ups, education, and updates to ensure the technology's sustained success and integration into the customer's processes. This framework was further developed to form a 7-step sales process, emphasizing its cyclical and iterative nature.

Reflecting on the problem setting, the study's findings highlight the importance of a structured and collaborative approach to introducing niche technologies like thermal spray coatings into new markets. These insights provide a practical framework for overcoming the challenges associated with the adoption of niche technologies and ensuring their successful integration into new applications.

6.1 Theoretical contributions

In examining the consultative approach to selling niche technology, the study's findings reinforce Moncrief & Marshall's (2005) model of relationship-based selling, where educating the customer and fostering trust emerge as fundamental steps. Participants highlighted that engaging customers early and maintaining regular communication were essential, which aligns closely with consultative sales theory's emphasis on nurturing a knowledge-based relationship. Additionally, the findings extend Anderson et al. (2006) co-creation model, as customization and iterative testing processes proved crucial for aligning the technology to customer needs. Such insights reveal that in niche markets, consultative selling not only supports value creation but also builds the foundation for adaptive and responsive sales strategies (Cuevas, 2018), essential when addressing complex, novel technologies unfamiliar to the customer.

The findings also suggest that in niche technology sales, co-creation of value often requires additional investment in customer education and support beyond standard relationship building. Unlike more traditional contexts where both parties already understand their mutual benefits, niche technologies often demand a "leveraging assistance" phase, where the supplier invests time and resources in showing customers how the new technology can be valuable. This proactive, educative approach to value co-creation deepens Chicksand & Rehme's (2018) model by suggesting that suppliers sometimes need to contribute upfront to co-create perceived value for customers. This finding implies that,

in cases involving niche products, the supplier's role includes educative value, positioning the supplier as both an innovator and a knowledge provider. This role actively shifts power dynamics, potentially giving suppliers greater influence and positioning as essential knowledge holders in the relationship. Moreover, Kurpjuweit et al. (2018) emphasize that suppliers should be cautious about timing when pushing innovations to avoid overwhelming customers. However, this study's findings indicate that, with niche technologies, early and frequent customer engagement appears essential—not only to build trust, but also to customize solutions iteratively based on customer feedback. This iterative engagement seems necessary to overcome the steep learning curve associated with complex technologies. Thus, these findings suggest that, contrary to a cautious push, niche suppliers may benefit from a sustained approach to knowledge sharing, gradually familiarizing the customer with new concepts, potentially offering a new approach to timing in contexts with complex technology.

Both Chicksand & Rehme (2018) and Kurpjuweit et al. (2018) emphasize trust as a critical factor in successful customer-supplier relationships. However, this study's findings suggest that, in niche markets, trust alone may be insufficient without tangible risk-sharing mechanisms, such as collaborative trials or prototyping. These mechanisms can lower customer concerns about performance and adoption risks, showing that niche technology markets might require higher levels of embedded support to secure customer buy-in. The results highlight the importance of demonstrable action alongside relational trust, indicating that trust may have a more transactional element in niche markets where customers seek assurances not only in verbal or contractual trust but in action-based guarantees. This may propose a shift from abstract trust toward practical trust-building measures, thus refining Chicksand & Rehme's (2018) focus on trust by incorporating action-based reassurance.

A notable insight from the findings is that, in niche technology contexts, a significant knowledge asymmetry often exists between the supplier and customer, which can impede the co-creation process. Traditional models assume that customers generally understand the broad benefits of an innovation. However, the results show that for specialized technologies, the supplier must actively work to bridge this knowledge gap by ensuring knowledge symmetry before true value co-creation can occur. This insight suggests an extension to value co-creation theory, where knowledge symmetry—the process of aligning the supplier's technical insights with the customer's operational understanding—might be a precursor to effective co-creation. This insight could help future

studies investigate the importance of closing knowledge gaps as a formal phase in innovation adoption, particularly in B2B settings with technical products.

6.2 Managerial implications

The findings of this research offer several important implications for managers involved in the selling of niche technologies, especially in the context of thermal spray coatings and similar novel surface technologies. These implications can guide decision-making and operational practices to enhance the effectiveness of sales processes and create stronger customer relationships.

Firstly, managers should prioritize building and nurturing long-term relationships with potential customers. This involves understanding customer needs, maintaining regular communication, and providing continuous education about the technology. Establishing trust and demonstrating commitment can significantly enhance customer receptiveness to new technologies. Moreover, in busy business life non-urgent matters might easily get forgotten, so it is the sales manager's responsibility to keep the new technologies in the customers' mind.

Secondly, given the diverse applications and benefits of thermal spray coatings, it is crucial for managers to tailor value propositions to the specific needs and contexts of each customer. This requires a deep understanding of the customer's processes and challenges, enabling the presentation of relevant and compelling value propositions that resonate with the customer's priorities. Managers should also consider implementing pilot projects to demonstrate the practical benefits of thermal spray coatings in real-world applications. These projects can serve as proof-of-concept, reducing customer uncertainty and providing tangible evidence of the technology's value. Successful pilot projects can also generate valuable references and case studies for future sales efforts.

Thirdly, encouraging collaborative problem-solving between the supplier and the customer is essential. Managers should facilitate environments where open communication and joint development efforts are prioritized. This collaborative approach can lead to more innovative solutions and a better alignment of the technology with customer needs. Additionally, managers need to proactively address the uncertainties and risks associated with adopting new technologies. This includes providing detailed information on the benefits and potential drawbacks, offering robust support during the implementation phase, and ensuring that any issues are promptly addressed. Clear and transparent communication can help mitigate concerns and build customer confidence.

Finally, managers should establish mechanisms for monitoring the performance of the sales process presented at Figure 15 and gathering feedback from customers. This feedback can provide critical insights into areas for improvement and help refine sales strategies. Regularly reviewing and adapting the sales approach based on customer feedback ensures that the sales process remains dynamic and responsive to changing customer needs.

By implementing these managerial practices, companies can enhance their consultative selling approach, improve customer satisfaction, and ultimately drive the successful adoption of thermal spray coatings in new markets.

6.3 Limitations

The empiric data for this research was quite limited in number due to time constraints and available good quality interviewees. Moreover, OEM's and process industry customers tended to look things from a different perspective, as it was thought at the start already, and due to this, it was difficult to make rigid conclusions. Additionally, on one hand, the studied topic turned out to be quite complex, and, on the other hand, the dynamics between the suppliers and customers in these interactions tended to be quite unique. Thus, the sample size should've been preferably much higher to reduce dispersion.

Thirdly, the research relied heavily on qualitative data obtained through semi-structured interviews. While this approach provided in-depth insights, it also introduced subjectivity and potential biases from both the interviewees and the researcher. The interpretation of the data could be influenced by personal experiences and perspectives, which might affect the objectivity of the conclusions drawn.

Lastly, the study's dependence on self-reported data from participants could introduce inaccuracies or overstatements, as respondents might have provided socially desirable answers, or may not have fully given away all relevant information. This limitation emphasizes the possible need for triangulation with other data sources, such as quantitative metrics or longitudinal studies, to further validate the findings.

6.4 Future research

This research laid a good base for further research on interaction and building blocks of effective consultative selling of niche products and services. However, how different cus-

tomer groups act, and how the type of niche technology and/or service affects the behavior of these customer groups, would be beneficial to research more to get a better picture on the process.

Firstly, expanding the sample size and diversity of participants would enhance the generalizability of the results. Including a broader range of industries and geographic regions could provide a more comprehensive understanding of the challenges and opportunities associated with the adoption of thermal spray coatings into new markets.

Moreover, a mixed-methods approach that combines qualitative and quantitative data could provide a more robust analysis of the factors influencing the adoption and success of thermal spray coatings. Quantitative metrics, such as cost-benefit analyses or performance evaluations, could complement the qualitative insights obtained from interviews, offering a more holistic view of the technology's impact.

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APPENDIX A: INTERVIEW GUIDE

Customer interview questions	Supplier interview questions	Mihin kysymys liittyy?
<i>Theme: Customer-supplier relationship nurturing (15 min)</i>		
Mistä yhteistyösuhteen elinkaari toimittajan kanssa mielestäsi koostuu?	Mistä yhteistyösuhteen elinkaari asiakkaan kanssa mielestäsi koostuu?	Sales process
Mitkä asiat sinusta ideaalitulanteessa korostuvat yhteistyösuhteen luomisen eri vaiheissa?	Mitkä asiat sinusta ideaalitulanteessa korostuvat yhteistyösuhteen luomisen eri vaiheissa?	Sales orientation in different phases of the sales process
Jos toimittajan tuote/palvelu ei ole teille ennestään kovin tuttu, eikä toimittajalla ole suoria referenssejä alaltasi, miten suhdetta olisi paras lähteä rakentamaan?	Jos asiakas ei ole teille ennestään kovin tuttu, eikä teillä ole suoria referenssejä asiakkaan alalta, miten suhdetta olisi paras lähteä rakentamaan?	Sales orientation
Minkälainen myyntikäytös toimii teille mielestäsi parhaiten? Onko myytävän tuotteen/palvelun tyyppillä/kriittisyydellä vaikutusta tähän?	Minkälainen myyntikäytös toimii mielestäsi parhaiten? Onko myytävän tuotteen/palvelun tyyppillä/kriittisyydellä vaikutusta tähän?	Sales orientation
<i>Theme: Value co-creation (20 min)</i>		
Mikä tekee toimittajasta kiinnostavan?	Mikä tekee asiakkaasta kiinnostavan?	VP process
Riippuen mitä haastateltava vastaa yllä olevaan, tarkenna: Mitä suoria hyötyjä toimittajan pitää pystyä osoittamaan ollakseen kiinnostava? Entä mitä epäsuoria hyötyjä voit kuvitella saavasi toimiessasi toimittajien kanssa?	Riippuen mitä haastateltava vastaa yllä olevaan, tarkenna: Mitä suoria hyötyjä asiakkaan pitää pystyä osoittamaan ollakseen kiinnostava? Entä mitä epäsuoria hyötyjä voit kuvitella saavasi toimiessasi asiakkaan kanssa?	Indirect and direct value themes
Jos sinun on vaikea arvioida toimittajan ratkaisun tuoma arvo, millä keinoin toimittaja voisi tätä arvoa havainnollistaa paremmin?	Miten lähestyt tilannetta, jossa sinun on vaikea arvioida ratkaisusi tuoma arvo asiakkaalle? Mikä voisi helpottaa tuodun arvon arviointia? Miten asiakas voisi auttaa tässä?	Co-created value
Mitä yhteinen arvonluonti mielestäsi tarkoittaa?	Mitä yhteinen arvonluonti mielestäsi tarkoittaa?	Co-created value
Miten ja missä vaiheissa yhteinen arvonluonti toimittajan kanssa mielestäsi muodostuu?	Miten ja missä vaiheissa yhteinen arvonluonti asiakkaan kanssa mielestäsi muodostuu?	Process of value co-creation
Mitkä ovat sinulle tärkeimpiä toimenpiteitä, joilla varmistetaan, että sekä teknologiatoimittaja että sinä hyödytte yhteistyöstä?	Mitkä ovat sinulle tärkeimpiä toimenpiteitä, joilla varmistetaan, että sekä asiakas että sinä hyödytte yhteistyöstä?	Process of value co-creation
<i>Theme: Prerequisites for dyadic problem solving (25 min)</i>		

Mitä eri vaiheita toimittajan tarjoamaan tutustumisen ja käyttöönoton välille kuuluu?	Mitä eri vaiheita asiakkaan toimitaan tutustumisen ja ratkaisusi käyttöönoton välille kuuluu?	Dyadic problem solving process
Riippuen mitä haastateltava vastaa yllä olevaan kysymykseen, kysytään niihin liittyen: Mitkä edellytykset tulee täytyä missäkin vaiheessa, jotta prosessi etenee? (Entä jos toimittajan tuote/palvelu ei ole teille ennestään kovin tuttu?)	Mitkä edellytykset tulee täytyä missäkin vaiheessa, jotta prosessi etenee? (Entä jos asiakas ei ole teille ennestään kovin tuttu?)	Dyadic problem solving prerequisites
Mitä epävarmuuksia liittyy kuhunkin vaiheeseen?	Mitä epävarmuuksia liittyy kuhunkin vaiheeseen?	Dyadic problem solving uncertainties
Miten näitä epävarmuuksia voisi vähentää?	Miten näitä epävarmuuksia voisi vähentää?	Overcoming uncertainties