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INNOVATING WITH DOMINANT SUPPLIERS: LESSONS FROM THE RACE FOR LASER LIGHT

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Traditionally, manufacturers could usually choose from several suppliers who would be more than willing to engage in innovation processes with them. However, more often the situation arises that a supplier has a dominant position because of a clear leadership or even exclusivity in a certain technology. How should the buying companies handle such situations when a supplier can choose the customer to collaborate with, rather than cueing in front of the customer's door? This paper focuses on how a buying company may best handle this situation of innovating with dominant suppliers. The methodology used is a case study that compares, from an original equipment manufacturer's perspective, two implemented supplier innovations with different expirations — a success case and a failure.

Findings lead to three main propositions: First, firms may benefit from carefully analysing and designing the buyer–supplier constellation in innovation processes and not only the quality of the innovation. Drawing back on attractiveness theory grounded in social exchange theory may provide clues on how to do so. Second, in case of a dominant supplier situation, traditional innovation management processes may fail and need to be amended by a dedicated innovation process with a different order of steps. In the case of supplier dominance, it is essential to first analyse the supplier constellation, and then make the decision for the innovation path to follow — and not the other way around. Third, in the fight for getting access to a supplier's innovation, a speed-up process with the buying company may be a tool for outperforming other buyers competing for the same supplier.

Keywords: Supplier innovation; innovation process optimisation; innovation project success factors; purchasing; supply management.

Introduction: Increasing Managerial Challenge Through Supplier Dominance in Innovation

Various empirical studies show the positive impact of external knowledge on the innovation performance of the sourcing firm (Ahuja and Katila, 2001; Laursen and Salter, 2006, 2014). Even stronger, in many industries, the majority of new patents are already registered by suppliers (Schiele *et al.*, 2012). It has been argued that sourcing innovations from suppliers may be a substitute for own R&D activities (Pihlajamaa *et al.*, 2017). However, supplier innovation often implies a high level of dependence of a buying company on its innovative supplier. The worst-case scenario for a buying company would be to depend on the innovation resource of a supplier for its own innovation capacity and a denial of access to these resources (Schiele and Vos, 2015). Anyhow, if the supplier has superior or even exclusive access to an innovation or radically new technology, the buying companies may have to compete for the supplier's prime attention. Social exchange theory exactly describes this situation: it posits that actors first evaluate the attractiveness of a potential partner, if possible, compare expectations with outcomes of the relationship and — importantly — then compare one partner with potential alternative partners (Lambe *et al.*, 2001). This is exactly the situation of a "dominant" supplier with a valuable innovation or a high potential for innovating, as this firm may be able to select its customer with whom to collaborate.

Previous research provides various insights about the classical innovation success factors (buying company related factors (Ensminger and Surry, 2008; Kotter, 1996; Lambooij and Koster, 2016), external, market related factors (Ensminger and Surry, 2008) and innovation-type-related factors (Ely, 1990, 1999; Ensminger and Surry, 2008) (Fig. 1)), which describe the conditions and behaviours that influence on whether an innovation project is successful or not. Previous research provides also many insights about the impact and necessity of Early Supplier Integration (ESI) in New Product Development (NPD) (Dekkers *et al.*, 2013). In parallel, the dependence of buying companies on suppliers and the importance on becoming a preferred customer has been found to grow (Ellis *et al.*, 2012; Morgan and Daniels, 2001; Schiele, 2012). Interestingly, however, previous research does not provide comprehensive explanations on how firms should manage the work in the novel situation of facing such dominant suppliers, which may or which may not at all be interested in working with a certain buying company.

Therefore, this paper focuses on providing guidelines on how to handle the innovation management process for dominant supplier's innovations, and hence on closing the research gap left open by the question: *How a buying company may*

best handle the situation of innovating with dominant suppliers so as to ensure gaining access to the supplier's exclusive innovation?

This paper contributes to innovation and supply management literature by introducing a new phenomenon largely neglected in innovation research, the case of manufacturers not having the privilege to choose among many competing suppliers, but, the other way round, innovative suppliers being able to choose their customer to offer the innovation. We take the perspective of the customer and analyse how the customer can best manage this increasingly common situation. This paper further contributes by showing that what used to be seen as one phenomenon — new product development with early supplier integration — in fact needs to be perceived as two issues; the case of buyer dominance and the case of supplier dominance. Trying to handle the two with the same tools is risky and can lead to failure, such as shown in our contrasting case study.

This paper is organised as follows: the theory chapter first presents insights from a detailed literature review and explains the classical innovation project success factors (including buying company related factors, market constellation and innovation type related factors). Secondly, it describes the "new", supplier related factors together with the importance of preferred customer status. The theory chapter is followed by the method and case section. To analyse the supplier-related factors in detail, a case study shows differences between two supplier innovation projects at an automotive Original Equipment Manufacturer (OEM). Both examples are headlamp innovations, each developed and supplied in different supplier constellations with respect to the automotive. In one case the OEM was successful and first on the market, while in the second case another OEM managed to get better access to the innovation provided by a dominant supplier.

Analysing these cases of dominant suppliers, this papers conclusions can be summarised in three main propositions:

(1) With supplier innovations, the buying firm needs to consider the supplier constellation and its own attractiveness for the dominant supplier. In case of limited preference of the supplier towards a buyer, the latter may need to avoid this innovation.
(2) Firms benefit from adapting their innovation management process, by relocating the process step "supplier selection" to an early stage than usual, anteceding the decision for the innovation path to follow.
(3) In order to handle the two types of supplier-based innovation — the dominant supplier and the non-dominant supplier case — firms benefit from defining a fast track innovation process to handle the situation of supplier dominance.

The paper ends with further considerations and complementary thoughts in a discussion and conclusion section.

Theory and Literature Review: Innovation Success Factors and Preferred Customer Theory

Classical innovation project success factors: Factors related to the buying company, market constellation and the nature of the innovation itself

Following Tushman and O'Reilly, innovation implies "new solutions" in products, technology, processes, and marketing and is one way through which organisations and nations gain competitive advantage (O'Reilly and Tushman, 1997). To create and handle the different kinds of innovations within a company, several new product development (NPD) processes and innovation management approaches are known. For instance, Lynn *et al.* describe a conventional NPD process as occurring through idea generation, idea screening, innovation development, testing, and new product launch (Lynn *et al.*, 1996; Williams and McGuire, 2010). This paragraph discusses previous research on classical success and blockade factors for innovation project realisation as well as innovation implementation. The identified factors are collected and thematically clustered in three categories (Yoo *et al.*, 2015): buying company related factors (1) and external, market related factors (2), to which innovation-related factors (3) have to be added:

(1) *Buying company related factors*:

Management involvement and especially *management commitment* is a main success factor of innovation projects (Ensminger and Surry, 2008; Kotter, 1996; Lambooij and Koster, 2016). The enthusiasm of leaders directly affects the motivation of the users of the innovation (Ensminger and Surry, 2008).
The second internal factor is the *escalation prevention potential*, which is the capability of an organisation to stop or steer implementation processes that do not meet their expectations. It may prevents an organisation from losing time and money on unsuccessful projects (Lambooij and Koster, 2016).
The third important buying company related factor is the *organisational culture*. Specifically, the openness of the organisation towards new ideas and the acceptance of the associated risks are to be seen as significant, particularly when the change is not triggered by external factors or an obvious and urgent organisational need (Barnett *et al.*, 2011; Yu *et al.*, 2013). Also the extent to which members of the organisation can influence decisions within the organisation as well as the organisational capability to promote the innovation,

which facilitates the diffusion, depends on the organisational culture (Barnett *et al.*, 2011; Lambooij and Koster, 2016).

The fourth relevant factor is *resources*. Resources, which includes the existing infrastructure as well as an organisation's finances, hardware, software, materials, personnel, and support structures, are needed to implement the innovation (Ely, 1990, 1999; Ensminger and Surry, 2008).

(2) *External, market-related factors*:

The first market-related factor is the *consumer's commitment to a brand* name or to a certain company. This is very important, because in uncertain environments, the acceptance of innovative products is related to trust between consumers and innovators. Therefore, a trusted brand name may more easily introduce innovations that will be accepted more easily by consumers (Eng and Quaia, 2009; Iliopoulos *et al.*, 2012).

The second external factor is *participation of external stakeholders*, which refers to the involvement of stakeholders in the decision-making process to adopt and implement an innovation (Ensminger and Surry, 2008).

Another external factor is the *economic climate and political situation*. The economic climate is often cited as inhibiting initiatives that were expensive and did not save costs directly (Barnett *et al.*, 2011). Politics was constructed both as positive and as negative forces in diffusion efforts (Barnett *et al.*, 2011). The basic and most important part of regulations is reflected in the set of laws, judicial and administrative acts (Plotnikova *et al.*, 2015). The fit of the innovation with the broader ideological context, both within and outside the specific business sector. If an innovation viewed as reflecting dominant ideological beliefs and being consistent with the "spirit of the times", initiatives are more likely to become established (Barnett *et al.*, 2011).

(3) *Innovation type-related factors*:

The first innovation type related factor is the *added value of the innovation as perceived by the users* (Lambooij and Koster, 2016). This added value can also be seen as either intrinsic or extrinsic rewards. These rewards can vary significantly from user to user. Additionally, the innovation itself may be distinguished as a reward (Ely, 1990, 1999; Ensminger and Surry, 2008).

The second relevant factor are the *needed knowledge and skills*, which are conditions that are needed *to use the innovation* and that also reflect the users' feelings of self-efficacy about using the innovation (Ely, 1990, 1999). The complexity of the innovation itself will also affect implementation, e.g., it will often require more training or skill development on the part of the users (Rogers, 1995, 2003).

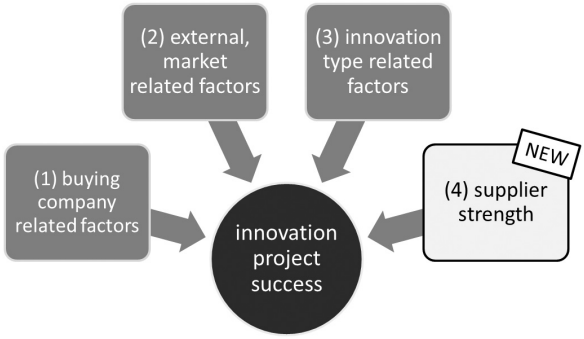

Fig. 1. Classical innovation project success factors (1)–(3) and the new challenge — supplier factors, especially supplier strength (4).

The classical innovation success factors (1)–(3) describe which conditions and behaviours can influence on whether an innovation project is successful or not. To take care of these factors, may have been enough at a time of closed innovation when most ideas originated in the firm's own research and development laboratories. However, in times of open innovation and joined innovation, in which supplier involvement in NPD is closely tied to NPD project performance (Dekkers *et al.*, 2013), firms benefit from taking a close look to the supplier-related factor (4) (Fig. 1).

Importance of preferred customer status for external knowledge sourcing

The above-mentioned innovation and NPD approaches and success factors focus on the initial company and refer mainly to internally generated innovations and internal company processes. The positive impact of external knowledge sourcing has been demonstrated by numerous empirical studies (e.g., Chen *et al.*, 2016; Leiponen and Helfat, 2010; Monteiro *et al.*, 2017). Indeed, nowadays the success of a firm increasingly depends on the resources of its suppliers and therewith the inclusion of external knowledge (Dyer and Hatch, 2006; Hult *et al.*, 2007; Hunt and Davis, 2012; Monteiro *et al.*, 2017). This has to do with the demand for ever shorter time to market and the massive technological knowledge that is needed to develop new products force them to rely increasingly on supplier cooperation during NPD (Azadegan, 2011; Hong *et al.*, 2011; Koufteros *et al.*, 2010; Thomas *et al.*, 2011; Wagner, 2012; Wagner *et al.*, 2010). ESI increases buying company innovation and innovation project success (Koufteros *et al.*, 2007; Un *et al.*, 2010), through improving the product development performance of firms in terms of productivity, quality, lead time reduction and cost reduction (Clark, 1989; Clark and Fujimoto, 1991; Echtelt *et al.*, 2008; Gupta and Souder, 1998; Petroni and

Panciroli, 2002; Primo and Amundson, 2002; Ragatz *et al.*, 2002). For example, Edward Roberts' panel study from 2001 shows that in the early 1990s, only 22% of the surveyed top R&D-intensive firms relied heavily on external partners for innovation, but he shows also that this share had grown to 85% by the end of that decade (Roberts, 2001).

However, ESI in NPD implies also a high level of dependence on the supplier and a higher complexity within the supply chain (Wynstra *et al.*, 2001), which may increase risks for the buying company. Indeed, some suppliers do not always collaborate in the manner expected. Buying companies are then disappointed by what some authors call supplier obstructionism (Flynn *et al.*, 2000; Hartley *et al.*, 1997; Hibbard *et al.*, 2001; Petroni and Panciroli, 2002; Primo and Amundson, 2002; Zsidisin and Smith, 2005). In addition an increasing number of firms seek external collaboration and similar resources in the same supply base, which leads to a growing competition for capable suppliers (Dyer and Hatch, 2006; Pulles *et al.*, 2016; Takeishi, 2001, 2002). Simultaneously empirical research shows that suppliers differentiate among customer relationships and treat selected customers as preferred customers depending on their level of attractiveness for the supplier (Ellis *et al.*, 2012; Rogers, 2009). Preferred customer status is defined as follows: influencing the supplier's behavioural intentions to the extent that the supplier awards selected customers with more favourable treatment and with preferential resource allocation than others (Hüttinger *et al.*, 2012; Pulles *et al.*, 2016; Schiele *et al.*, 2012; Steinle and Schiele, 2008). The supplier might, for example, put his best employees at the preferred customer's disposal, adapt his capacity to his partner's wishes and give priority to his most attractive buyer when offering up their expert knowledge and promising and innovative ideas (Schiele *et al.*, 2011). Additionally, preferred customer status and preferred access to suppliers' innovations allows buying companies to preempt competitors that share the same supplier, resulting in substantive competitive advantages on the market (Ellis *et al.*, 2012; Morgan and Daniels, 2001; Schiele, 2012). Therefore, becoming a preferred customer of important suppliers is essential, to obtain access these most promising ideas and innovations, that might not be achieved otherwise (Koufteros *et al.*, 2012; Schiele, 2012).

As visualised in Fig. 2, we have two possible scenarios: the "classical" one, where suppliers compete for a project with a dominant buying company, and the "new" one, where buying companies compete for a dominant supplier. This research work focuses on the second one, and the question is: What is the right behaviour if there is a supplier in a dominant or even monopoly position — how can buying companies convince the supplier to choose them? In particular, a supplier with an exclusive technology can choose the customer to which he offers the technology first. From an OEM's perspective, the question is how to become

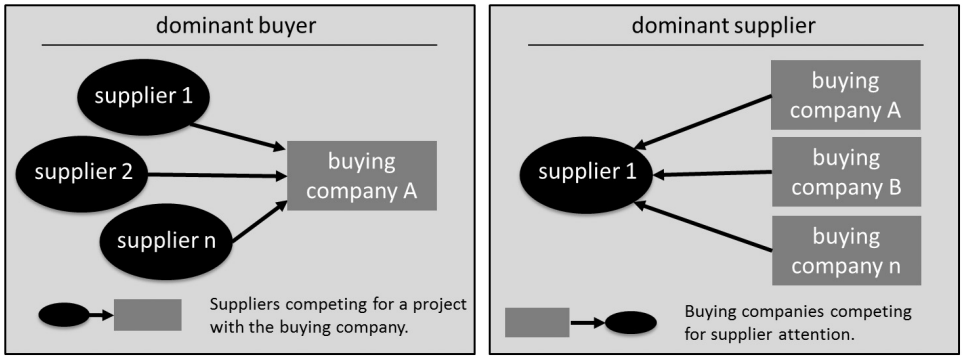

Fig. 2. Dominant buyer vs. dominant supplier scenario.

this preferred customer. To identify such monopoly constellations and to address them competitively, it may be necessary to innovate the innovation process.

Method and Case Selection: Analysing Two Contrasting Cases in the Automotive Industry

In this paper, a case study is applied because it is a useful tool to receive empirically valid insights in the early stages of theory building (Eisenhardt and Graebner, 2007). Thus, the goal is to achieve a good understanding about what the critical success factors are in the relationship between buying company and supplier if the buying company wants to implement a supplier's innovation ahead of their competition and if this supplier is in a dominant position. In this study, a "two-case" multiple case study approach (Yin, 2014) is employed to show two different types of external supplier innovation projects and to evaluate success and failure factors. The two-case approach is used because, on the one hand, it is possible to receive a direct replication of some factors or criteria. On the other hand, the project setup contrasts in some aspects, and in this way, it will be possible to achieve more detailed insights and results (Yin, 2014).

In order to explore the phenomenon of supplier dominance in innovation, it would be good choosing an industry where supplier innovations play a prominent role. Rese *et al.* (2015) provide some evidence in the automotive sector and show that automotive manufacturers rated the number of innovative ideas from their suppliers significantly highest in comparison to other sources. Hence, the here chosen automotive industry may be a good setting for studying supplier innovation. The considered company ("Auto A") is a European premium car manufacturer for which brand image first-to-market technology innovations are crucial. One of the key innovation fields of "Auto A" is lighting technology. Currently,

86% of the interviewees think that "Auto A" is still leading in the automotive lighting area. However, 62% believe that its standing has changed. According to this majority, the main reason for the change is not a failing of "Auto A" but the increasing speed of competitors (which now, too, seem to see lighting technologies as a key innovation field). That is the reason why two implemented innovation projects from the car lighting sector, with different expirations and dimensions, were chosen. Case one, hereafter "LED", describes the market introduction of a full-LED matrix beam headlamp, and case two, hereafter "Laser", describes the market launch of the laser headlamp.

The case study is based on qualitative empirical data gathered through interviews in different units and levels of the corporation and with the supplier. In total, 29 managers and employees from the different project-related business commodities (e.g., R&D and purchasing) of "Auto A" took part in the interviews. Additionally, two persons from sub-supplier "Z" were interviewed to obtain deeper insight, and particularly from the supplier side. Sub-supplier "Z" was chosen because "Z" is the inventor of the laser module. Thus, "Z" was the more important supplier in the laser case. Moreover, "Z" was also involved in the "LED" case, also as Tier 2. The supplier constellations of both cases are shown in Fig. 3.

Twenty interviews were conducted with persons related to the "LED" project, 17 interviews were held with persons related to "Laser" project, and 9 persons answered for both cases. Sixteen interviewees belong to the purchasing department, 8 work in the area of technical development, and 5 are from other departments (e.g., financial controlling). Personal interviews were held with a duration of one to two hours, and they were transcribed along a detailed questionnaire.

The questionnaire was divided into two sections. Section 1 included general open questions about the competitive situation in the automotive lighting business. Since Sec. 2 is case-related and contains open questions about the project setup

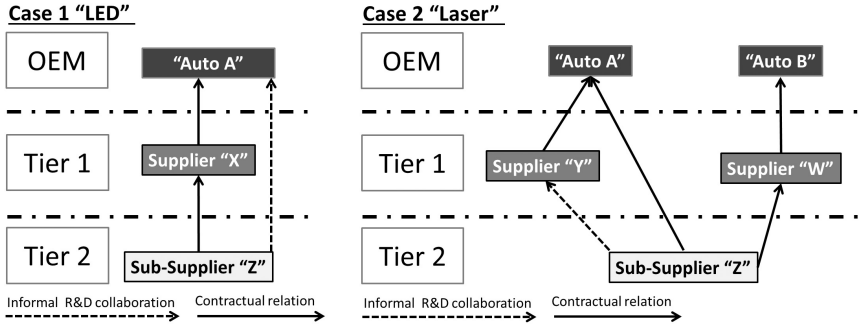

Fig. 3. Supplier constellations in the "LED" case and the "Laser" case.

and the framework and specific questions about the success and blockade factors, these factors were derived from the literature findings (see Figs. 1 and 2: buying company-related factors (1), external, market-related factors (2), innovation-related factors (3) and supplier factors, especially supplier strength (4)). The interviewees were asked to answer two different ratings per factor and question within a five-point Likert scale (from the extreme "always/very positive" through "sometimes/neutral" to "never/very negative").

Case Description: First to the Market vs. Loosing the Race

Case 1: LED matrix beam headlamp ("LED"): First to the market

The car manufacturer "Auto A" introduced the LED matrix beam headlamp 2013 within the new model of their flagship high-class vehicle. The matrix beam headlamp is based on a technology that divides the LED main beam into numerous small, single diodes. Managed by a powerful control unit, they are individually switched on and off or dimmed depending on the situation. The main function is the fade-out of oncoming traffic. The system works so precisely that incoming and outgoing vehicles are dimmed (and not dazzled) and all other areas in between are still given high-precision illumination by the main beam.

The interviewees note that, from the process perspective, "Auto A" set up the "LED" project as a standard project. "Standard" means that sales and marketing, financial controlling, research and development (R&D) and purchasing prepare a business case evaluation by calculating potential efforts with expected pricing and volumes. After the confirmation of the project within a specific board and top management committee, the purchasing department searches for and contracts the supplier. After the most competitive offer is chosen, the project development starts. Normally, the supplier is nominated two to three years before the planned start of production (SOP) of the car. In this phase, the quality department also joins the process. The process is accompanied with their validation and releases. Shortly before SOP, marketing becomes relevant again in promoting the new functionality within the new car.

However, due to the complexity and the degree of innovation as well as the high internal and external coordination and reconciliation effort, the project did not fit in this standard procedure. The R&D department previously initiated detailed pre-development studies with both first tier supplier "X" and second tier supplier "Z", which were unique in the "LED" project (supplier constellations are shown in Fig. 3). Very soon in the concept phase, the decision was made to conduct the basis development with supplier "X" and use the specific subcomponent of supplier "Z". Exclusivity coincidentally arose. Supplier "X" and, only implicitly,

supplier "Z" only offered the product and worked with "Auto A" (probably because other OEMs were not interested). Further, the R&D department pushed the idea forward through all processes and committees and supported it with the highest management attention, until the official board decision was made, to realise the "LED" project.

Case 2: Laser headlamp (Laser): Loosing the race

The Laser headlamp was supposed to be the next great lighting innovation after launching the matrix beam innovation. "Auto A" launched the Laser headlamp in June 2014 within a special sports car and, several weeks later, in the limited edition model of their corresponding series sports car. After a close "fight" about who would be first to market, "Auto B" launched the laser headlamp one week earlier than "Auto A" by handing over the first laser-equipped series cars to those new owners — framed within a large marketing event. Thus, the target to be first to market was not achieved (supplier constellations are shown in Fig. 3). Within the headlamp, the high-beam laser module uses four high-performance laser diodes, which produce a blue laser beam that is converted via a phosphorus converter into "road-traffic-friendly" white light. In addition to the very high level of luminance, it creates ideal conditions for the human eye, which in turn means that the driver becomes tired less quickly. In this case, the project was not initiated through the R&D department but was initiated through competitive pressure. The "Auto B" released several communications at the IAA ("Internationale Automobil Ausstellung"/"international motor show") in September 2013, when they announced that they wanted to launch the laser headlamp first. Therefore, "Auto A" was challenged to defend their leading position in the automotive lighting business. Only after this advertised launch "Auto A" perceived the high marketing value of "laser light". One interviewee said, *of course, the topic 'laser' was also loosely discussed and treated at 'Auto A' for approximately one year, but the final decision to deeply dive into it and realize the project was only made after the announcement of the 'Auto B'* (Engineer 1). After the announcement of "Auto B", the R&D staff of "Auto A" tried to obtain an appointment as soon as possible with the board and top management to obtain (according to the regular process) the official project decision to start the project and to secure promoters on the highest management level to push for project progress. The entire project flow was, according to the interviewees, far from normal processes and, therefore, somehow unstructured. Because of the sudden competitive pressure from "Auto B", the project phase was extremely shortened, which increased the risk level and the costs.

A small inter-disciplinary team was created. In this situation, it was unique that most activities operated independently of the normal project organisation of

"Auto A" because sports cars are managed by a small, separate company within the organisation of "Auto A". In the end, "Auto A" could not defend its leading position because supplier "Z" had already started to work with competitor "Auto B" much earlier, effectively giving this project priority.

Analysis: Comparing the OEM's Approach to Two Innovations

Cross-case analysis

The cross-case analysis compares both cases and shows the differences between them. The comparison is sub-divided into the same four categories as the literature findings: The Classical innovation project success factors: factors related to the buying company (1), external, market-related factors (2), the nature of the innovation itself (3) and supplier factors (4). The comparison contains the evaluation of all the case-related factors mentioned. This includes the 25 specific, predefined questions (which where phrased on the basis of the factors from the literature review) and, additionally, the evaluations of the individual factors that, in the interviewees' subjective opinion, either facilitated or blocked the project progress or success of the "LED" or "Laser" case.

The evaluation of individual factors shows the first difference. In the "LED" case, 68 positive and 42 negative factors were freely stated by the 20 interviewees (62% more positive factors than negative ones). The factors were thematically clustered and condensed into 21 positive and 18 negative main factors. In the "Laser" case, 39 positive and 45 negative factors were stated freely by the 17 interviewees. The factors were thematically clustered and condensed into 16 positive and 25 negative main factors. Compared with the "LED" case, the overall attitude toward the project seems to be slightly more negative (13% more negative factors than positive ones). All of the explained main differences are summarised in the following paragraphs (1)–(4). The rating shows, on a five-point-scale, the positive, neutral or negative appearance of the respective factor in relation to either the "LED" or "Laser" case (++ = "always/very positive", + = "very often/positive", 0 = "sometimes/neutral", − = "rarely/negative", −− = "never/very negative"). Only the striking differences (opposite rating tendencies), as well as factors for which the interviewees said that they generally reported 5 = "very high influence" or 4 = "high influence" on the project progress and success of any innovation, are listed.

(1) *Buying company-related factors*:

Organisational Culture: While interviewees from both cases said that almost all of the relevant departments and persons were involved, the quality of internal collaboration is perceived differently. In terms of decision willingness

and complexity of the decision-making process, a variation between the two cases can be noticed. For "LED", the judgment was negative, and for "Laser", it was very positive (with the restriction that the initial decision to realise the "Laser" came late). According to the interviewees in the "Laser" case, it was extremely positive; decisions were made quickly, and the decision paths were short. Even the extremely compressed timeline and working in a "hectic mode" through competitive pressure were rated between 4.5 and 5 in the "Laser" case. In this case, the high willingness to take risks and the special team spirit (the absolute will to beat "Auto B" in being first to market) were also assessed as very strong facilitators (rating 4.5 of 5).

Resources: The main factor in this sector is the lack of specific innovation-related processes (evaluation and selection of incoming innovations, distinct purchasing process, specific targeting process, individual quality management process, etc.), which was rated very negative in both the "Laser" and "LED" cases (between 1 and 1.5 = very high blockade factor). The internal process and internal collaboration show considerable differences between the two cases despite some commonalities. In both cases, an interdisciplinary team at "Auto A" handled the projects.

(2) *External, market-related factors*:

No external, market-related factors are discovered within the result comparison, were significant differences between "LED" and "Laser" case were obvious. The supplier constellations and cooperation are analysed in the separate paragraph (4) supplier-related factors.

(3) *Innovation-related factors*:

An initial difference between "LED" and "Laser" is the type of innovation. While "LED" is a radical new technology, "Laser" is a more evolutionary innovation whose value is very strongly related to marketing possibilities and customer attention.

The interviewees estimated the innovation value of "LED" to be an average value of 4.55 of 5, while the estimated value for "Laser" is only 3.5. The largest detected innovation-related difference is the maturity level of the innovation. In the "LED" case, the innovation was in a proper pre-development stage, and in the "Laser" case, the innovation was in a very early stage with limited pre-development insights.

(4) *Supplier related factors*:

From perspective of "Auto A": According to the interviewees of "Auto A" the main distinction between both cases are the supplier constellation and supplier selection. In the "LED" case, the collaboration occurred mainly with tier 1

supplier "X" and only indirectly with sub-supplier "Z". The cooperation with supplier "X" is rated as neutral, and the cooperation between "Auto A" and indirectly with "Z" is rated as positive (an indirect relationship because there was no contract between "Auto A" and "Z"). Nevertheless, in this constellation and in the respective situation, the collaboration was described as very constructive and overall positive from the development perspective. Focusing on the purchasing side, both cases were somehow treated as standard. In the "Laser" case, the headlamp palette for the planned successor (remake) of "Auto A's" sports car was already sourced when the decision was made to equip the car additionally with the laser headlamp. Therefore, the already nominated headlamp supplier was "Y" (a competitor of "X"). Because of this existing contractual relationship, the determined supplier for the laser headlamp project was also "Y". Supplementary negotiations with sub-component supplier "Z" were begun, since "Z" was then the only supplier that had the know-how in automotive laser technology. Finally, the laser module was separately and directly nominated with supplier "Z", although this supplier was also supplying "Auto A's" competitor.

When "Auto A" started the "Laser" project, headlamp supplier "Y" had only a little knowledge about lasers, and thus, they mainly kept themselves out of the discussions. The fact that there was no detailed pre-development phase, which caused a large amount of problems, especially with quality issues, was rated very negative (between 1 and 1.5 = high blockade factor for the realisation of the "Laser" project). Moreover, sub-supplier "Z" had never before had a direct (contractual) relationship with an automotive OEM, so they were not used to the processes and demands of "Auto A" (e.g., the sophistication level of the official offer was unknown). According to the interviewees, this fact was a very crucial point because there were several complications in the triangular coordination and cooperation and in the risk and responsibility split, which was also critical because of the specific laser safety issues. The technology related cooperation between "Auto A's" development department and "Z" was productive, but the interviewees realised, on the one hand, the difficulties caused by the immaturity of the product and, on the other hand, the limitation of resources that arose from the fact, that sub-supplier "Z" was serving both "Auto A" and "Auto B". In total, regarding the collaboration between "Auto A" and sub-supplier "Z" three main differences in the behaviour and conditions, comparing "LED" and "Laser" case, can be detected: the available supplier resources, the overall project management performance and the cooperation and communication (from R&D, purchasing, quality, finance, sales and marketing side). While they were perceived positively in the case of "LED", they were only perceived neutral in the case of "Laser".

From perspective of sub-supplier "Z": In general, sub-supplier "Z" answered that they sequentially meet with interested OEMs to talk about innovation — but "Z" saw itself as not the main initiator of either the "LED" or "Laser" case. In the opinion of "Z", the clear project initiator of "LED" was the headlamp supplier (Tier 1) "X". In the "Laser" case, the situation, according to supplier "Z", was quite similar, with the only difference, that the main initiator was the "Auto B", not the first tier supplier. The "Auto B" also chose the laser module supplier "Z", arranged a project structure with first tier supplier "W", and then started the project. With regard to the triangular relationships ("Auto A" company with "Y" and "Z" and "Auto B" with "W" and "Z") and the two-party relationships ("Z"-"Y", "Z"-"W", "Z"-"Auto A", "Z"-"Auto B"), differences are obvious. In the perception of sub-supplier "Z", the overall performance of first tier supplier "Y" was negative, independent of considering either the direct or triangular relationship. On the opposite side, the performance of "W" in either the triangular or direct relationships was rated positive or even very positive. Comparing the two OEMs, in the laser case, in the eyes of sub-supplier "Z", the "Auto B" was assessed more positively than "Auto A". The Z-interviewees reported that the "Auto B" clearly assumed the driving role in the triangular constellation of their laser project, was totally committed to the project, and ensured constant project communication and interchange of information within the triangle as well as in the direct relationship. The interviewee from supplier "Z" clearly noted, *from the early beginning of the project, the 'Auto B' phrased the precise goal and wish to realize the laser headlamp. The 'Auto B' forced the project progress all the way and finally realized it with the support of the entire triangle team.*

Three main results: Customer attractiveness and innovation process changes to speed-up

In the interviewees' view, the three main success factors in implementing a supplier innovation are as follows:

(1) The importance of designing the supplier relationship reflecting the attractiveness or not of the buying company *vis-à-vis* the dominant supplier (to obtain exclusivity by achieving preferred customer status and to focus on the entire *n*-tier stakeholder constellation).
(2) The relocation of the process step "supplier selection" with in the NPD process — it has to be earlier in the process. First analyse the supplier constellation and then decide for the innovation path to follow, not the other way round as currently usual.

(3) The installation of a specific evaluation and selection process for incoming supplier innovation projects, which is essential to assess as quickly as possible the potential risks and the feasible market potential and to decide between standard and a fast track innovation process, the latter often being necessary to secure the innovation of the dominant supplier.

Discussion and Conclusion: Importance of Customer Attractiveness and Need for Process Re-Design

In this section, the key findings of this study are discussed, and the limitations are shown. Moreover, an outlook on the managerial and research implications as well as on further research is provided.

This study gives insights into two automotive cases of a large car manufacturer that has tried to be the first to market with the two supplier innovations. Both innovation projects were finally successfully launched in the market, but the implementation of the product launch distinguishes the two cases. With a large distance of at least two years, "Auto A" was the first to market with the "LED" headlamp. However, in the "Laser" case, "Auto A" lost the "competition race", and the "Auto B" launched first. The main question is which factors differentiate the two cases by blocking progress and success in the laser case. While "Auto A" may have been to some extend blinded by its success with the LED lamps, the results of the evaluation strongly indicate that in the "Laser" case can best be understood from the perspective of there being a dominant supplier situation (Fig. 2). In the case of supplier dominance, two (or more) buying companies compare against each other to receive the preferential treatment and the innovation of the dominant supplier, in our case "sub-supplier Z".

Three main factors seemed to negatively influence the project success from the perspective of "Auto A" and hence can use as lever to improve and better handle situations of supplier dominance. First, (1) the design of the supplier relations (selection, attraction, exclusivity and collaboration), second (2) the need to relocate the process step "supplier selection" — because it was too late in the NPD process and third (3) the missing holistic innovation process approach, which should be divided into the evaluation and selection process at the beginning and the operationalisation acceleration process within the project phase.

(1) *Designing supplier relationships in order to be attractive to suppliers*: The major difference between the two cases was the supplier constellation and the collaboration with involved suppliers. In the "LED" case, there was coincidental exclusivity between "Auto A" and supplier "X" and sub-supplier "Z".

Even if the coincidental exclusivity was not contract based, there was a noticeable commitment to this constellation and to the project. This aspect was missing with "Auto A" and its supply chain in the "Laser" case. Thus, the conclusion drawn is that exclusivity and mutual commitment can be important main factors. Through the evaluation of the "Laser" case (from "Auto A" side and with the additional insights from sub-supplier "Z"), it became clear that the supplier-OEM constellation was essential. This means not only that "Auto A" has to select a supplier carefully but also that "Auto A" has to attract suppliers. In a typical innovation case, there is (at least at the beginning) only one supplier that offers the new product, technology, service, etc. It is quite logical that the supplier prefers the buying company (in this case, one automotive OEM) that offers the best conditions — both monetary and immaterial such as growth potential and relational quality. In such situations, the supplier is clearly the driver and not the buying company. According to the interviewees, it is important to start a re-thinking process to remove hurdles and create incentives to attract innovative suppliers and become a preferred customer. The two concepts customer attractiveness (Aminoff and Tanskanen, 2013; Christiansen and Maltz, 2002; Ellegaard *et al.*, 2003; Hald *et al.*, 2009; Mortensen and Arlbjørn, 2012; Ramsay and Wagner, 2009; Tóth *et al.*, 2015) and supplier satisfaction (Essig and Amann, 2009; Ghijsen *et al.*, 2010; Nyaga *et al.*, 2010; Ramsay *et al.*, 2013) may offer clues on understanding and acting, if a buying company aims to become a preferred customer of a supplier (Hüttinger *et al.*, 2012; Pulles *et al.*, 2016; Schiele *et al.*, 2012a,b). Supplier satisfaction is the buyer's ability to meet or even to exceed the expectations of the supplier (Schiele *et al.*, 2012a; Vos *et al.*, 2016). This satisfaction is significantly affected through the quality of the relationship between the buying company und the supplier, and in turn has a direct link to the value creation (Forker and Stannack, 2000; Vos *et al.*, 2016). Christiansen and Maltz point out, that being an "interesting" or attractive customer to suppliers assures their attention and loyalty (Christiansen and Maltz, 2010; Vos *et al.*, 2016). Furthermore, the handling of triangular or *n*-tier relationships needs to be improved, and proper pre-development has to be conducted. Frequent joint (top) management meetings have been suggested by one interviewee from supplier "Z" as tool to handle *n*-tier cooperation.

(2) *Evaluation and selection process for supplier innovation*: One main missing aspect, which the interviewees mentioned, is that there was no structured innovation evaluation and selection process for "incoming" supplier innovation. Literature suggests decentralisation as a solution for supplier dominance (Li and Zhou, 2016), but is also largely silent on how to proceed otherwise and in particular not in a channel conflict situation, but in innovation. The

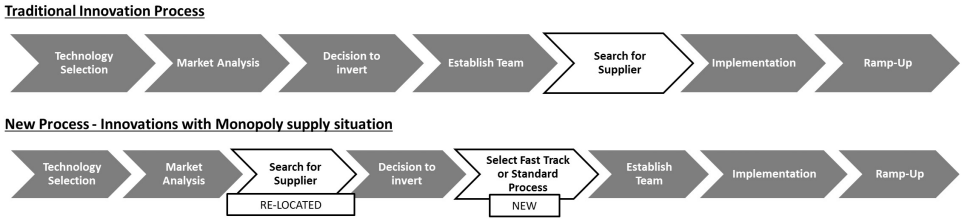

Fig. 4. New process draft "innovations with a dominant supplier situation".

interviewees claim that it is not practical to work with such an innovation topic or project within the standard innovation processes. Introducing a dedicated process for selecting and managing incoming supplier innovation would be important in order to create successful projects (Fig. 4). For instance, if an individual is thrilled about an innovation, making this particular actor the formal driver of the project. It is also important to include hard (e.g., monetary) and soft facts (e.g., positive impact on brand) in the evaluation. The step of supplier selection in such a dedicated process would be earlier than in the traditional process, because in the worst case the option of not to proceed with the innovation at hand due to supplier dominance might be possible.

(3) In the new innovation process, firms would further benefit from a *fast track acceleration process*. In their eyes, a holistic approach — adapted to the needs of an innovation — is needed. The decision-making process, the business case calculation, financial targeting and milestones, and timescale have to be more flexible and scaled and be adapted to the respective situation. Moreover, the role of purchasing is different in innovation projects and therefore has to be designed accordingly. In fact, generation of innovative ideas is generally gaining in importance as a task not only for R&D, but also for purchasing (Homfeldt *et al.*, 2017). Price negotiation along volume scales and competitive pressure is actually not possible. Therefore, the purchasing department should focus on other topics, such as joint cost calculation along the supplier's bill of material or the negotiation of exclusivity contracts.

According to the interviewees, being first to market with innovations is essential — especially within the core technology fields. Thus, the lack of a special innovation implementation process was mentioned. The standard process takes too long and does not fit the monopoly supply situation. Figure 4 shows the proposed new innovation process for dominant or even monopoly suppliers — it schedules two main changes: the early search and nomination of the supplier and the decision point between fast track and standard project management process.

The managerial implications: The results show that it is necessary to adapt the innovation process for situations of high supplier dominance and monopoly supply situations (Fig. 4). It may be self-defeating to try to handle situations of supplier dominance with a standard process designed to a different situation or — even worse, not recognising the special situation early enough. Taking supplier willingness to collaborate as guaranteed may be one of the reasons for so many new product development projects failing. Current literature is largely silent in providing any solutions for how to handle the situation of supplier dominance.

According to this research, three aspects are relevant to manage supplier dominance: (1) establishing preferred customer status; (2) define a dedicated process and relocate the supplier decision and nomination step more to the beginning within the innovation management process; (3) deciding between standard and accelerated, fast-track processes. The fast track decision process may be one instrument firms can use to outperform their slower competitors in the race for a supplier innovation.

As a preferred customer, in this context, the particular treatment would comprise, for example, an exclusivity agreement for the innovation project. Especially when the supplier is in a monopoly situation, it is important to focus much earlier on the search for a supplier and on the design of the buyer–supplier relationship. With regards to the managerial implications, it is important to establish at the beginning of the innovation process the preferred customer status check-up (Schiele, 2012). Only in the case in which it is a preferred customer, it can be asked if a particular speed is needed and, if so, apply a special accelerated process. In Fig. 4, the proposal for the process innovation is shown. Please note that this process is unlikely to be successfully applied in the situation of not being a preferred customer. In the absence of supplier benevolence, the risk would be too high for the OEM. In the short term this could mean, that an innovation project should not even be started because of the detrimental supplier constellation. As a long-term approach, it is crucial to establish preferred customer status with potentially innovative suppliers.

Research Implications: Innovation research may contribute by focusing more on the innovation processes — more specialisation is needed rather than "one process fits all". More attention to the buyer–supplier constellation is important, in addition to strategies for realising preferred customer status. There seems to be a fundamentally different situation, depending on which of the partners in the buyer–supplier relations has dominance. The case study contrasts an extreme situation with strong supplier dominance and a competition between the buyers. If there is low dominance or no monopoly situation, the standard process may be suitable.

First of all, the phenomenon of supplier dominance and its implications needs to be explored more in detail, as our exploratory research contributes by pointing to the problem of supplier dominance and exposing it as a special issue requiring dedicated attention. This study can only point out to the phenomenon and make some first suggestions on how to handle it, but this can only be seen as a first step in theory building and empirical verification.

Further research would benefit from systematically going through the entire cycle of academic research, which might advance science and avoid "fads" (Tidd and Bessant, 2018): (1) exposing the phenomenon, (2) understanding the problem, its impact and relevance, (3) trying to understand its mechanisms and antecedents, providing possible theoretical explanations, (4) empirically identifying antecedents to the phenomenon and (5) coming to an empirically tested model with increasingly high power of explanation, which can be used as a blueprint for successful managerial actions. Eventually, (6) contingencies factors may have to be studied, differentiating the application.

The present paper touches upon the first two phases, as it exposes the phenomenon of supplier dominance in innovation and reveals its potential impact with the case of the race for laser light, in which poor access to the dominant supplier lead to the manufacturer at hand being too late on the market. In the case of supplier dominance, our exploration of the phenomenon has shown that there are cases in which the traditional innovation process does not work properly and that a differentiation is needed, in particular, a better understanding on the situation of supplier dominance is needed. We propose some first suggestions on how firms might handle supplier dominant situations in innovation management. Further research may be helpful to fully explore the general relevance and scope of the phenomenon of supplier dominance in innovation processes. Research now may also benefit from fully understanding and explaining the phenomenon and its underlying mechanisms and antecedents, according to step 3. Would there be theories explain the supplier behaviour in cases of dominance? What are common characteristics of supplier action in such situations, such as resource allocation and contractual issues? How to stimulate supplier's innovation and its willingness to collaborate with a particular buyer (Makkonen *et al.*, 2018)? Constantly more complete models then would need to be tested on a large sample size.

Notwithstanding, there are also some limitations associated with this study. The case study was conducted in a large automotive OEM company, so the results are not automatically transferable to other company types, e.g., SMEs (small and medium-sized enterprises), first or second tier suppliers, or companies from other industries. Since all involved actors came from the same country, the results cannot be directly transferred to international cases, or those in other countries or

on other continents. Another limitation is the nature of innovation and the supply situation. The assessed innovations are both product innovations, so the results are not automatically transferable to other kinds of innovation, e.g., service innovations. In future research, other kinds of organisations (e.g., SMEs or non-profit organisations), companies from other countries and continents or other kinds of industries should be studied. In addition, other types of innovations can be assessed and evaluated. Moreover, it will be useful to apply other research techniques and employ, for example, a benchmark analysis to evaluate the best practices in innovation evaluation and innovation project selection or to execute a quantitative design, such as an empirical analysis, to explore which factors or innovation evaluation and selection criteria are the most common in the automotive supplier world. Future research could also develop deeper the connections to preferred customer theory, which was considered in this study.

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