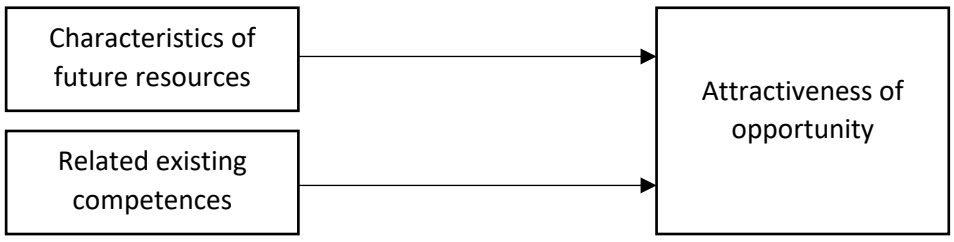
Research Vignette: How to evaluate business opportunities and what is the importance of the existing competences?

This research vignette has the intention to share interesting results in opportunity research. It is written by Wilco Mensink, master student in Business Administration, in collaboration with PD Dr. R. Harms and Dr. K. Zalewska-Kürek from the University of Twente. The research focuses on the evaluation of opportunities and the role of the existing competences of the firm.

Background and research questions

Due to rapidly changing market demands and emerging new technologies, managers of manufacturing firms must keep pace by responding quickly to business opportunities and therefore they develop new products, services or even business models. Such business opportunities can lead to value generation if the opportunity is identified, evaluated and exploited in the right way. But, what causes the manager to choose for a certain opportunity? To overcome this decision process, the assumption is made that the manager generally looks at two issues: (1) what are my existing competences and (2) what future resources are necessary to exploit the opportunity in an efficient way. The goal of this research is to empirically gain more insight into the relationship between new business opportunities and the match with an organization's existing resources. More specifically, it determines what resource-related characteristics of opportunities are important and determines their influence on the attractiveness of an opportunity in the manufacturing industry. To guide the research, the following research questions are prepared and can be answered after completing the research:

1. *What characteristics do play an important role when evaluating business opportunities from a resource-based perspective?*
2. *What is the importance of the relation between the characteristics of the opportunity and the existing competences of the firm in opportunity evaluation?*



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Investigation method
Firstly, the characteristics of the future resources were determined through literature research. After this, a questionnaire was developed by letting respondents rate the attractiveness of an opportunity based of 14 different scenario's. This method is also called the conjoint analysis. Through rank-ordered logistic regression in the statistical program STATA, the contributions of each characteristic in the opportunity attractiveness can be measured. For this research, 51 managers in the manufacturing industry with middle and upper class responsibilities filled out the questionnaire.

Findings
Results of this investigation show that the value of an opportunity is the biggest contributor in the attractiveness of the opportunity. Because of this, it seems that the manager focuses on the potential gains an opportunity can bring to the firm. After the value, respectively limits on competition, rarity and imitability followed in their contribution of opportunity attractiveness.

The relation of the existing competences was also measured. Outcomes of the analysis show that a high value leads to a high attractiveness, especially for firms with related existing competences. For these firms, it is relatively easy to exploit the opportunity and capture the value because they already possess the knowledge, skills and abilities to do so. However, if the opportunity is rare, or the firm is old, opportunities with a low relatedness are more attractive than opportunities with a high relatedness. Rare opportunities or a high firm age can be reasons for managers to go for opportunities that are beyond their competences.

This research was primarily written on the following works:

Haynie, J. M., Shepherd, D. A., & McMullen, J. S. (2009). An opportunity for me? the role of resources in opportunity evaluation decisions. *Journal of Management Studies*, *46*(3), 337–361. https://doi.org/10.1111/j.1467-6486.2009.00824.x

Urban, B. (2014). The Importance of Attributes in Entrepreneurial Opportunity Evaluations: An Emerging Market Study. *Managerial and Decision Economics*, *35*(8), 523–539. https://doi.org/10.1002/mde

Keywords: Opportunity evaluation; competences; resource-based view; conjoint analysis

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What opportunity to choose?

Manufacturing firms evaluating business opportunities that match their existing competences

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Management summary

This research emerges from a challenge of a Dutch manager within a manufacturing firm. While looking for related opportunities to increase market share or improve their performance, the reasoning behind choosing for one opportunity instead of the other, is missing. This opportunity evaluation issue is also getting more attention in the academic literature. Frameworks or models on how managers make decisions in opportunity evaluation are in minority. A reason for this is that most scholars devote their attention to the process before and after opportunity evaluation, to mention; opportunity recognition and respectively opportunity exploitation.

So, the main goal of this research is to find out how managers evaluate business opportunities and what is the role of their existing competences. The literature review shows that opportunities can entail future resources that are valuable, rare, inimitable and puts limits on competition. Therefore, these variables act as the independent variable where the opportunity attractiveness is the dependent variable.

Through a conjoint experiment, 51 managers evaluated a hypothetical opportunity based on 11 different scenarios. Each scenario had a different combination of the independent variables. Through rank-ordered logistic regression modeling, the contribution of the independent variables are measured. Also, the importance of the combination of variables became clear.

Results of this investigation show that the value of an opportunity is the biggest contributor in the attractiveness of the opportunity. Because of this, it seems that the manager focuses on the potential gains an opportunity can bring to the firm. After the value, respectively limits on competition, rarity and imitability followed in their contribution of opportunity attractiveness.

But how about the relation between the opportunity and the existing competences of the firm? Outcomes of the analysis show that a high value leads to a high attractiveness, especially for firms with related existing competences. For these firms, it is relatively easy to exploit the opportunity and capture the value because they already possess the knowledge, skills and abilities to do so. However, if the opportunity is rare, or the firm is old, opportunities with a low relatedness are more attractive than opportunities with a high relatedness. Rare opportunities or firm age can be reasons for managers to go for opportunities that are beyond their competences.

To conclude, managers should keep in mind the value, rarity and their firm age, when evaluating business opportunities. For opportunities that are unrelated to the existing competences, a higher rarity and firm age is favorable. With opportunities that do relate to the existing competences, the value of the opportunity is most important.

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Table of key definitions

Construct	*Definition*	*Author(s)*
Business Opportunity	"Business opportunities are situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their cost of production"	(Shane & Ventakaraman, 2000, p. 220)
Opportunity attractiveness	"The potential of the opportunity to generate competitive advantage and entrepreneurial returns to the firm"	(Haynie, Shepherd, & McMullen, 2009, p. 338)
Opportunity recognition	"Opportunity recognition can be defined as the cognitive process (or processes) through which individuals conclude that they have identified an opportunity. "..." Opportunity recognition is only the initial step in a continuing process, and is distinct both from de- tailed evaluation of the feasibility and potential economic value of identified opportunities and from active steps to develop them through new ventures."	(Baron, 2006, p. 107)
Opportunity evaluation	"Opportunity evaluation represents a first-person judgment where the knowledge, skills, competencies, and resources of the venture or individual affect the entrepreneurs' assessment of the attractiveness of that opportunity."	(Urban, 2014, p. 523)
Opportunity exploitation	"Opportunity exploitation is characterized by developing a product or service based on a perceived entrepreneurial opportunity, acquiring appropriate human resources, gathering financial resources, and setting up the organization."	(Kuckertz, Kollmann, Krell, & Stöckmann, 2017, p. 92)
Competences	"Competencies are defined as the skills, knowledge, abilities and other characteristics that someone needs to perform a job effectively"	(Draganidis & Mentzas, 2006, p. 53)
Manager	A person who has a say in the strategy of the manufacturing firm. Typical functions are: CEO, Vice Presidents, Business Development managers, Sales managers or equal.	(Hinsenveld, 2017)

1 Introduction

1.1 Origin of the research

This research stems from a question from a Dutch Vice President in the manufacturing industry. The firm designs, produces and assembles medium and high-pressure valves for the energy industry. They know that they are performing well with their current competences and resources like design engineering, technical knowledge, international sales power and 24/7 production. The firm also knows that the products are mostly sold to the power generation industry, more specific, the fossil-fired plants. This can be described as a sector with an unstable environment often due to environmental issues. With these observations in mind, the firm is orienting on exploring international opportunities for new business that matches their current competences. These activities should provide additional growth and subsequently please stake- and shareholders' demands. But before exploiting the opportunity, an assessment must be made on whether the opportunity matches the firm from a resource-base perspective.

1.2 Background

Due to rapidly changing market demands and emerging new technologies, managers of manufacturing firms must keep pace by responding quickly to business opportunities and therefore they develop new products, services or even business models (M. S. Wood & Williams, 2014). Such business opportunities can lead to value generation if the opportunity is identified, evaluated and exploited in the right way. For this reason, opportunities are seen as the key driver for entrepreneurial action (Gruber, Kim, & Brinckmann, 2015).

Also in the international entrepreneurship literature nowadays, business opportunities have become an essential part in the strategy development of medium to large manufacturing companies. Therefore, it is not surprising that more and more studies devote their attention to the process of developing opportunities (Gruber et al., 2015; Urban, 2014; M. S. Wood & Williams, 2014; Wood & Mckelvie, 2015). Here, two phases can be distinguished: opportunity recognition (discovery) and opportunity exploitation (Alvarez & Busenitz, 2001). Research shows that high alertness, systematic search, prior knowledge of the manager, network of the manager and the managers' environment are influencing the recognition of opportunities in a positive way (Baron, 2006). The opportunity exploitation is being researched in terms of the processes, entry modes and decision heuristics (Haynie et al., 2009).

Most researchers have devoted their attention to the opportunity evaluation of entrepreneurs, students and venture capitalists in the US (Wood & Mckelvie, 2015). Here, there are four major streams of literature focusing on mental models, integration, congruence and action to orientation (Wood & Mckelvie, 2015). Firstly, opportunity evaluation research on mental models deals with the cognitive images that decisionmakers have, when thinking about the consequences that the opportunity can bring (Ardichvili, Cardozo, & Ray, 2003). Secondly, the integration stream of research focuses on the integration of distinctive dispositions, knowledge and goals that influences human decision making. Also factors like emotions and cognition of the decisionmaker is included (Foo, 2011; Mathias & Williams, 2014). Thirdly, the congruence literature entails the degree of similarity between the cognition of the decisionmaker as opposed to the cognition of other stakeholders. It discusses the congruence between, for example, entrepreneurs and angel investors to get funding for exploiting an opportunity. Lastly, the action

orientation literature focuses on what will happen if an individual acts on an opportunity that is feasible and desirable (Haynie et al., 2009; Shane & Venkataraman, 2000).

As one can see, the literature on mental models, integration and congruence is generally included in the action orientation literature. In all streams the individual focuses on the consequences that an opportunity can have for the individual and the firm. What not has been considered is the relationship between the characteristics of the firm and the possibilities an opportunity can entail. Only one article compares the characteristics of an opportunity with the competences of the firm (Haynie et al., 2009).

But, why are the existing competences important when evaluating business opportunities? Competences are defined as "a combination of tacit and explicit knowledge, behavior and skills, that gives someone the potential for effectiveness in task performance." (Draganidis & Mentzas, 2006, p. 53). In opportunity exploitation, it is crucial to perform the tasks in an effective way. Reasons for this is that opportunities come with significant resource investments in an uncertain environment. By having the right competences, one is able to achieve this and therefore the risk is decreased.

To overcome the evaluation process of exploiting the recognized opportunities, the assumption is made that the manager generally looks at two issues: (1) what are my existing competences and (2) what future resources are necessary to exploit the opportunity in an efficient way. This way of looking at opportunities is also described as the Resource-based View (RBV) and used in several scholars for researching the decision-making processes (Alvarez & Busenitz, 2001; Conner, 1991; Haynie et al., 2009). The reason for choosing the RBV is that it enables us to focus on the resources that are needed to generate or sustain future profits, specifically the resources that are valuable, rare and not easy to imitate (Barney, 1991).

1.3 Goal & Research question

The goal of this study is to empirically gain more insight into the relationship between new business opportunities and the match with an organization's existing resources. More specifically, it determines what resource-related characteristics of opportunities are important and determines their influence on the attractiveness of an opportunity in the manufacturing industry. To guide the research, the following research questions are prepared and can be answered after completing the research:

3. *What characteristics do play an important role when evaluating business opportunities from a resource-based perspective?*
4. *What is the importance of the relation between the characteristics of the opportunity and the existing competences of the firm in opportunity evaluation?*

To start off with these elaborate questions, it is important to know what exactly is meant by 'business opportunities'. In this research, we consider opportunities as "those situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their cost of production" (Shane & Ventakaraman, 2000, p. 220). This definition is commonly accepted and widely used in other scholars to support their definitions of business opportunities (Åkerman, 2015; Haynie et al., 2009).

The context of this study is set by companies from the manufacturing industry. This means that each company designs, produces and sells real products. The reason for this is that this environment is characterized as turbulent. Hereby, it is important to respond quickly to changes, by making the right decisions in opportunity evaluation (Thomas, 2014). Furthermore, most opportunities in this sector come with significant amounts of resource endowments, for instance, the investment in technical equipment and the corresponding technical knowledge. Therefore, the assessment of the opportunity is a crucial step in the whole opportunity process (Gruber et al., 2015).

1.4 Theoretical relevance

Lately, there is an increase in research on the phase between recognition and exploitation, namely the evaluation of opportunities. A central question can be asked to illustrate the problem: Why does a manager decide to exploit opportunity A, but not opportunity B. The conceptual and empirical frameworks on the way how decisionmakers evaluate the attractiveness of a certain opportunity are in minority. Some researchers call this the 'black box' of opportunity decision-making, to emphasize that this process is still underexposed (Gruber et al., 2015; Priem & Butler, 2001).

This research is empirically investigating what resource-related attributes of opportunities are most important in the evaluation process of managers within manufacturing firms. This gives more insights in the cognition of the individual and what opportunity attributes are perceived as more attractive and hereby adding to the decision-making literature (Andersson & Evers, 2015). Therefore, this research is determining the specific characteristics of the opportunity and also the importance of each characteristic when making decisions on business opportunities.

Furthermore, this research also focuses on the relatedness of the existing competences to the opportunity attributes. Only one research has done that before, but here, the respondents were American entrepreneurs and the research was not focused on a specific industry (Haynie et al., 2009). Because the attributes are the same, we are able to compare the results and see if similarities exist. If there are differences, then probably the sampling frame causes this and further investigation is needed.

In the following sections an overview of the literature on business opportunities is given, together with the development of the hypotheses. Thereafter the methodology of this specific research is being discussed. Finally, the conclusion and discussion are treated with the limitations and recommendations for further research into this field.

2 Theory

This literature review is part of an empirical research and the goal is to create a literature overview of what is important in the international business opportunities topic. Here, the scope is set by the following questions: "*What do we know about international opportunity evaluation?*" and "*What do we know about the links between the competences of the firm and the opportunity evaluation?*". Ultimately, the result of the review is to generate several hypotheses that can be tested in a quantitative way.

A systematical literature review was conducted of English language, peer-reviewed journal papers (Wolfswinkel, Furtmueller, & Wilderom, 2013). These papers are known for their validated knowledge and impact in the academic research field (George, Parida, & Lahti, 2014). To find these articles, the database of SCOPUS was used. First, the relevant papers about opportunity recognition were identified, by searching with the key words: "opportunity recognition", "opportunity discovery" and "opportunity identification" in the subject area 'business'. To find more information about the competences and resources, key words like: "core competences", "organizational competences" and "resource-based view" were being used. Finally, information about the relation of the opportunity evaluation and competences was gathered by using the key words: "opportunity evaluation" AND competenc* OR capabilities, "opportunity evaluation" AND resourc* OR resource-based-view and "opportunity assessment" AND competenc* OR capabilities.

In total 93 articles were found as a result of searches in SCOPUS (see figure 1). In the next steps, the double articles were filtered out and the sample was refined based on the title and abstract. Hereafter, the article was read and filtered based on the text. New relevant articles were collected through forward and backward citing and these were assessed in a similar way. Ultimately the final sample of 42 eligible articles systematically leads to new knowledge about the subjects and this is further discussed below.

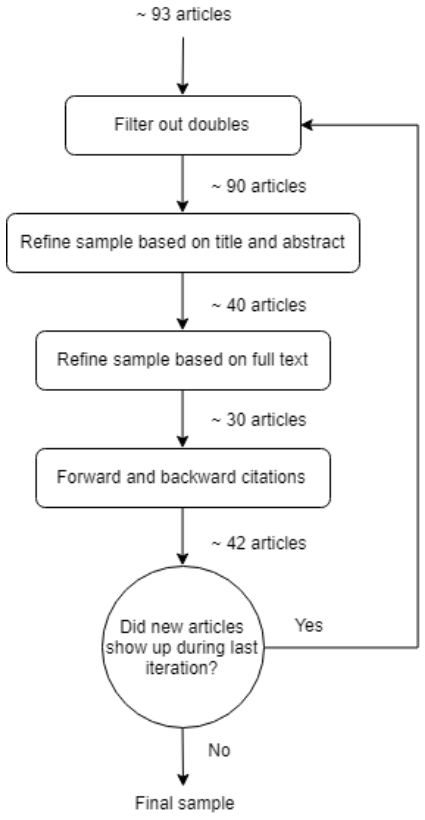

figure 1 Literature search process

2.1 Resource-base view

This research makes use of the resource-based perspective in unraveling the decision-making process of opportunity evaluation. The origin of the resource-based view was developed by Penrose (1959) by stating that the inimitable competences of a firm gives strategic advantage. In the mid 80's, Wernerfelt (1984) built further on this work by declaring that a firm's competitive advantage is a function of tangible and intangible resources, that are difficult or costly for other firms to acquire. A firm can sustain its competitive advantage by combining the resources that are valuable, rare, inimitable and not-substitutable (Barney, 1991).

The resource-based view contributes the literature, because this view explains the differences in profitability of firms, instead of looking only at the industry conditions (Peteraf, 1993). Especially in the 80's and 90's the research focused a lot on external factors like product-market combinations and the competitive environment of the firm, leaving the internal factors underexposed. Through this, the central

question why some firms are more successful than other firms, in the same market is crucial. The resource-based view takes this into account and enables others to asses an organization by looking at its competences, capabilities and other resources (Wernerfelt, 1984).

With the RBV, the 'organizing framework' is developed and acts as the base of many RBV studies. The reason for this is that the use of this view is has gained wide acceptance because of its applicability and recognizability. However, many scholars did build their work on secondary sources, which are derivates of the original seminal works of Wernerfelt (1984) and Barney (1991). Through this, the core definitions of value, rarity, inimitability dilute or get a different meaning. This research is using the core definitions of the RBV of Barney (1991), who made the 'organizing framework' which is the most detailed and formalized representation of the business-level resource-based perspective (Priem & Butler, 2001).

The resource-based view perspective shows similarities with the term 'competences'. Competences can be defined as "complex combinations of tangible and intangible assets, people, and processes that organizations use to transform inputs into outputs. Finely honed competences can be a source of competitive advantage" (Lichtenthaler, 2005, p. 698). Competences are the resources that can be leveraged to exploit certain opportunities and thereby gaining competitive advantage (Teece, Pisano, & Shuen, 1997; Wilcox King & Zeithaml, 2001). By combining these definitions, we use the following term for competences: "a combination of tacit and explicit knowledge, behaviour and skills, that gives someone the potential for effectiveness in task performance." (Draganidis & Mentzas, 2006, p. 53).

The terms 'competences' and 'capabilities' are often confused with each other both in academic and everyday discussions. The terms are used interchangeably and there is no consensus regarding the meaning of these terms. However, capabilities are more related to the ability to perform basic activities of a firm. By doing this better than the competitor, it could increase business performance (Collis, 1994). Nevertheless, this provides a limited view on the activities where a specific firm can utilize its specific knowledge and abilities that cannot be imitated (Danneels, 2002; Wilcox King & Zeithaml, 2001). Therefore, the more comprehensive term 'competences' is used in this research.

2.2 Business opportunities

Opportunities are "those situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their cost of production (Shane & Venkataraman, 2000, p. 220). Practical examples of such opportunities are "new venture creation, acquisitions, new product development and new business development" (Walsh & Linton, 2011, p. 199). In the literature there are two distinctive streams of opportunities to find. One can 'discover' an opportunity or one can 'create' an opportunity (Åkerman, 2015).

In creating an opportunity, an entrepreneur launches a very innovative product or service that completely disrupts the existing market. This process entails deep investments in time and money to have a significant impact on an existing market. This view is developed in the beginning of the 20th century by the Austrian economist Joseph Schumpeter and many of the scientific scholars build their work on this stream of thinking (Andersson & Evers, 2015).

By discovering an opportunity, a disequilibrium in a certain market is found and balanced. Other parties like competitors do not experience disadvantages, only the 'gap' between supply and demand is bridged. Through this, a firm is able to penetrate a market in a silent way. This theory is developed by the American economist Israel Kirzner in the beginning of the 70's (Eckhardt & Shane, 2003). Opportunity discovery can be an unplanned endeavor, whereas opportunity creation is a process that is intentional and carried out by following a certain strategy.

An opportunity on itself has a potential to generate value over time. But, before this is reality, entrepreneurial action is needed to form and transform the opportunity into new resources, goals or new relationships between resources and goals (Oyson & Whittaker, 2015). This can be captured in a process that consists roughly out of three phases: opportunity recognition, opportunity evaluation and opportunity exploitation (George, Parida, Lahti, & Wincent, 2014).

In the recognition phase, the opportunity is being found or built. In this phase, the influencing factors are: alertness of the manager (Andersson & Evers, 2015), conducting a systematic search (Kraus, Niemand, Angelsberger, Mas-tur, & Roig-tierno, 2017), prior knowledge of the manager (Lumpkin & Lichtenstein, 2005), the network of the manager (Chandra, 2017), cognition (Oyson & Whittaker, 2015) and environment (Maine, Soh, & Dos Santos, 2015). These factors are proven to have a significant impact on the recognition of new business opportunities.

In the second phase, the opportunity needs to be evaluated. Here, the assessment is made, whether the opportunity can deliver competitive advantage to the company in the future (Digan, Kerrick, Cumberland, & Garrett, 2017; Haynie et al., 2009). The decisionmaker makes an assessment if the opportunity is attractive to follow up. Points of attention in this phase are the company's knowledge, skills, abilities and resources (Danneels, 2002; Haynie et al., 2009; Lichtenthaler, 2005). If the opportunity is attractive to a firm, they can pursue with the exploitation of the opportunity. Crucial to this phase is that the right resources are being acquired in order to execute the opportunity in an efficient way (George et al., 2014).

2.3 Opportunity evaluation

Opportunity evaluation "represents a first-person judgment where the knowledge, skills, competencies, and resources of the venture or individual affect the entrepreneurs' assessment of the attractiveness of that opportunity." (Urban, 2014, p. 523). It is the key activity in deciding whether the opportunity can generate value in the future and thereby assessing its attractiveness. But what is exactly meant with opportunity attractiveness? In this research, we use the following definition: "that is, the potential of the opportunity to generate competitive advantage and entrepreneurial returns to the firm" (Haynie et al., 2009, p. 338). A high attractiveness of an opportunity can be stimuli for entrepreneurial action. This eventually leads to visible outcomes like selling new products or break into different markets. For this reason, the amount of research on opportunity evaluation is increasing, but still in minority. The literature shows three major causes for this.

Firstly, past research has focused more on other aspects of the opportunity process, namely opportunity recognition (Alvarez & Busenitz, 2001; Baron & Ensley, 2006; George, Parida, Lahti, et al., 2014) and opportunity exploitation (Kuckertz et al., 2017). However, there is a trend that more and more

scholars put their attention on the evaluation phase. The literature review of Wood & McKelvie (2015) shows that there is an increase in research on the opportunity evaluation of entrepreneurs, students and investors, thereby focusing on entrepreneurship. Research on the evaluation of business opportunities of managers within firms is missing.

Secondly, most of the articles base their research on the three processes described in Shane & Ventakaraman (2000), namely; opportunity recognition, evaluation and exploitation. Since these phases were not the main focus of their article, the concept of opportunity evaluation was underdefined. This is the cause that many articles built their work on opportunity evaluation which is not distinctive enough from recognition or exploitation (Wood & Mckelvie, 2015).

Lastly, due to the fuzzy concept of opportunity evaluation, the academic work on opportunity evaluation is mostly fragmented. Indicators for this show up when looking for academic papers. Most scholars use 'opportunity evaluation', but there are also articles using the concept 'opportunity assessment', 'opportunity judgement' and 'opportunity interpretation' (Walsh & Linton, 2011). Although the concepts differ, the conceptual reasoning behind it shows parallels. This permits us to use the conceptual and empirical results of these articles, but not before making a statement on what opportunity evaluation is.

To create a clear understanding of the construct: opportunity evaluation, the scientific articles are scanned for definitions and explanations. Some articles on opportunity evaluation did not give an explanation at all. Other articles relied on the interpretation and imagination of the reader by giving statements on the construct (Chandra, 2017). So, the articles who gave a clear definition were gathered and the definition is displayed in table 1.

table 1 Definitions of opportunity evaluation

Definition	*Author(s)*
"Because opportunities are multidimensional constructs, the evaluation of the potential value inherent in a business opportunity relies on subjective **judgments** regarding different characteristics of an identified opportunity."	(Gruber et al., 2015, pp. 206–207)
"Opportunity evaluation represents a first-person **judgment** where the knowledge, skills, competences, and resources of the venture or individual affect the entrepreneurs' assessment of the attractiveness of that opportunity."	(Urban, 2014, p. 523)
"Opportunity evaluation decision policies are constructed as future-oriented, cognitive representations of 'what will be' assuming one were to exploit the opportunity under evaluation. Put simply we suggest that opportunity evaluation is ultimately about envisioning the future – specifically the wealth generating resource combinations to be controlled by the entrepreneur post- exploitation."	(Haynie et al., 2009, p. 338)

"Opportunity evaluation is a conceptually distinct and interpretive endeavor whereby mindful individuals attend to exogenous decision criteria (e.g. technologies, resources, etc.) and apply knowledge to make **judgments** regarding the personal pursuit of opportunity"	(M. S. Wood & Williams, 2014, p. 574)
"Opportunity evaluation involves individuals' **judgments** and beliefs regarding the degree to which events, situations and circumstances construed as an entrepreneurial opportunity represent a personally desirable and feasible action path."	(Wood & Mckelvie, 2015, p. 256)

What becomes clear is that the evaluation process entails judgements on whether the opportunity is attractive to the one who is evaluating. It is also future-oriented because the judgement is about looking forward to what will happen when the opportunity is going to be exploited. This means that the opportunity decision process takes place in the mind of the manager, who judges the feasibility of exploiting the opportunity in a successful way. Furthermore, the scholars point out the importance of looking at the resources to exploit the opportunity. By doing so, it becomes clear that the fit between the resources of the firm and the opportunity characteristics is one important aspect in opportunity evaluation. Taking this all together, we can come up with a clear definition of 'opportunity evaluation':

A judgment of a manager on the attractiveness of an opportunity that is influenced by the existing competences and resources of the firm and the characteristics of the identified opportunity.

Since the opportunity evaluation concept is getting more attention, the influencing factors in this decision process have become an essential part of unraveling the decision-making process itself. After a systematic literature review on opportunity evaluation with the resource-based view, the four major influencing factors are brought to the surface. The literature shows that the evaluation phase can be influenced by the manager, regulations, the opportunity or the firm (see figure 2). Since this research is about the evaluation of opportunities that are related to the competences and resources of the firm, the scope is set to the opportunity-based and firm-based influencers.

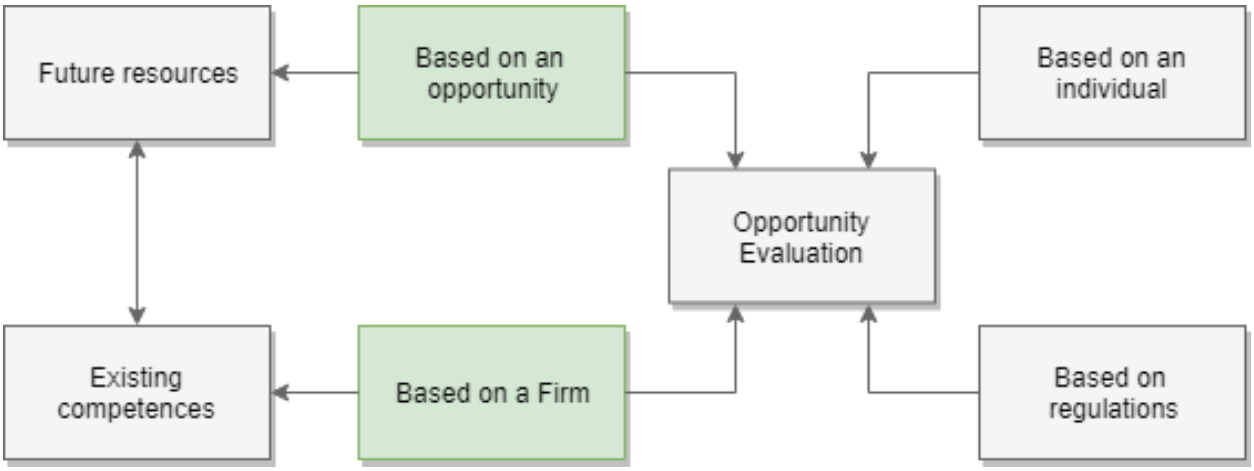

figure 2 Influencers of opportunity evaluation process

2.3.1 Opportunity based

The future resources are linked to the opportunity because opportunities often come with future competences and resource combinations. These can be used to generate and sustain entrepreneurial profits (Digan et al., 2017). However, this depends on value, rarity and imitability of the opportunity under evaluation (Barney, 1991; Conner, 1991; Wernerfelt, 1984). Therefore, we can assign these attributes as the characteristics of business opportunities (Haynie et al., 2009). Through this, there appears to be a match between the existing resources (that belong to the firm) and the future resources (that belong to the opportunity).

2.3.2 Firm based

Figure 2 shows that the opportunity and firm both have characteristics that are related to the resources or competences. The existing resources of the firm can be investigated by looking the firm's ability to generate and sustain future profits. This is consistent with the use of the term 'competences', that can be defined as "the skills, knowledge, abilities and other characteristics that someone needs to perform a job effectively" (Draganidis & Mentzas, 2006, p. 53). These competences are the resources that can be leveraged to exploit certain opportunities and thereby gaining competitive advantage (Teece et al., 1997; Wilcox King & Zeithaml, 2001).

When evaluating opportunities, managers are looking at the relation of the existing competences and the opportunity at hand. Here, opportunities can be related or unrelated to existing competences. This depends on the stage of the business cycle and the market growth perspective that comes along (Lichtenthaler, 2005). However, the authors base their conclusions on the input of several corporate companies and state that more research is needed over multiple companies.

2.3.3 Individual based

The evaluation of the opportunity is done by individuals and hereby the decision making process is influenced by multiple individual characteristics. Some scholars treat the cognitive aspects such as prior experience, knowledge, emotions whereas others include more external factors like the network of the individual. This field of research is already widely covered in the literature and therefore, this research is only including the variables age and knowledge as control variables. Another reason to leave the individual characteristics for what it is, is that this research focuses on the evaluation of managers within firms. Here, the personal characteristics have less impact than in, for example, startups.

2.3.4 Regulations based

The last influencer in opportunity evaluation are rules and regulations. This has been researched in terms of regulatory policies that can harm the autonomy that an entrepreneur has (M. Wood, Bylund, & Bradley, 2016). Here, one can think of regulations that prevent firms to undertake fraudulent action. But also rules for hiring and firing employees. This is mostly the case when individuals want to engage in the new venture creation process. This research however focuses only on the manufacturing branch and assumes that regulations for these companies are more or less the same. Therefore, this is not the main topic in this research.

Results of empirical research show that there is an interesting relationship between the opportunity attributes and the firm attributes. So, there is a link between the future resources and the existing competences of the firm (Barney, 1991; Wilcox King & Zeithaml, 2001). Scholars call this phenomenon: 'opportunity relatedness' (Haynie et al., 2009). Results of this study show that entrepreneurs are attracted to opportunities that are related to the existing human capital, if the value of the opportunity is high. Opportunities that are not related are more attractive if the opportunity is rare or puts limits on competition. However, these results were obtained from American entrepreneurs and not from managers within firms.

But what resource-related actors are contributing in the attractiveness of an opportunity? As already mentioned, future resources can be measured with the value, rarity, imitability and limits on competition criteria (Wernerfelt, 1984). These criteria provide a basis for competitive advantage and determines why some firms are performing better than other firms. Usually, these criteria are used to map the capabilities of the firm. But in this research, we use them as guideline to develop resource based theory in opportunity evaluation. The reason for this is that such criteria can be applied on all firms and every manager can have a different opinion about the importance of each single criteria when evaluating opportunities (Priem & Butler, 2001).

Looking at the existing competences of a firm, they can be described as "the skills, knowledge, abilities and other characteristics that someone needs to perform a job effectively" (Draganidis & Mentzas, 2006, p. 53). Other scholars mention that such competences are needed to quickly adapt to changing opportunities (Prahalad & Hamel, 1990). Therefore, they can also be seen as resources that provide competitive advantage. Investigating these relationships by combining the characteristics above, leads to the development of several hypotheses. These are discussed in the following paragraph.

2.4 Hypotheses development

For this research, a total of 10 hypotheses were developed to test the influence of the opportunity-specific characteristics on the attractiveness of an opportunity. In figure 3 the attributes in the opportunity evaluation are displayed and the number of the hypotheses are given.

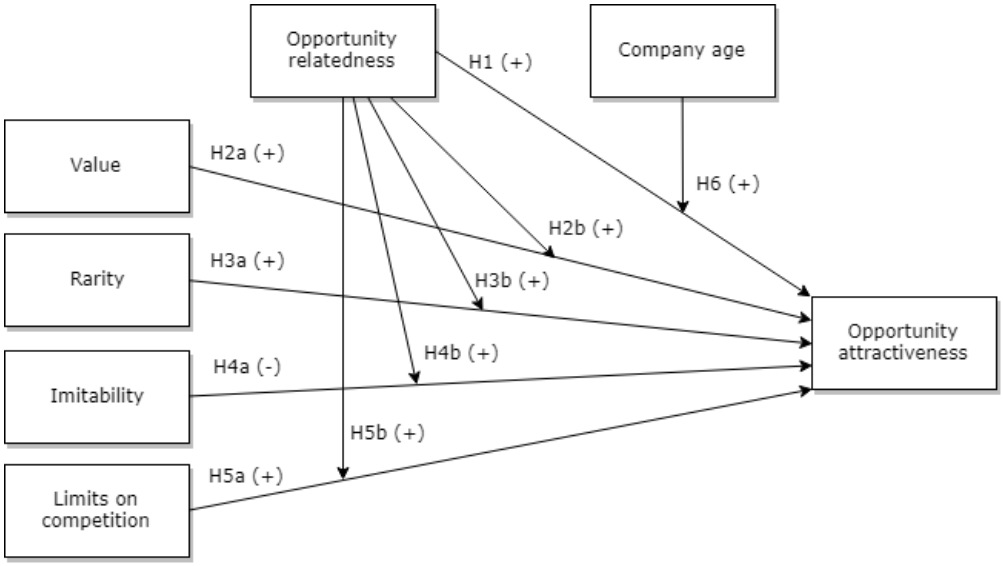

figure 3 Hypotheses of the research

To determine if an opportunity is attractive, managers look at the fit between the characteristics of the opportunity and the resources of the firm (Haynie et al., 2009). If an opportunity is related to the current knowledge, skills and abilities, it can be exploited in an efficient way. If we focus on human capital, productivity is increased when employees are performing tasks that are highly related to the tasks that fits directly to the human capital (Gibbons & Waldman, 2004). Therefore the manager will evaluate the opportunity as more attractive than opportunities who are not related to the existing competences (Walsh & Linton, 2011). This leads to the development of the first hypothesis:

> *Hypothesis 1: The more related the opportunity is to the existing competences, the more attractive the opportunity is.*

To further determine the attractiveness of an opportunity, the characteristics of the opportunity need to be addressed. Since we are looking through the resource-based lens, resource-related attributes that enhance the firm's performance are the best matching criteria to investigate (Priem & Butler, 2001). Previous research points out that only the resources with valuable, rare and inimitable attributes can generate economic profits (Markides & Williamson, 1996; Miller, 2004).

Value – The value of an opportunity can be explained by the increase in efficiency and effectiveness of existing products and processes by leveraging the resources that result from exploitation (Haynie et al., 2009). If the resources that result from exploitation of the opportunity are more valuable, the attractiveness of the opportunity is likely to be higher (M. S. Wood & Williams, 2014). The reason for this

is when the opportunity is exploited, the efficiency and effectiveness of the existing production process will be higher (Duliba, Kauffman, & Lucas, 2001). This ultimately leads to a better overall performance of the firm.

Furthermore, the opportunity can serve both the existing competences and increase the value of an opportunity by looking at the resources that are related to that opportunity (Walsh & Linton, 2011). Through this, the higher value leads to a higher attractiveness, especially for the resources that are related to the firm. Imagine a company that is producing truck tires. An opportunity for taking over a company that efficiently produces car tires comes across. By taking over the car tire company, they can extract technologies and knowledge that is used to produce car tires. They can use it in the production process of truck tires and through this, the production process of truck tires can be improved. With this example in mind, the following hypotheses can be made:

Hypothesis 2a: The higher the value of an opportunity, the higher the opportunity attractiveness.
Hypothesis 2b: The positive relationship between the opportunity value and opportunity attractiveness is greater when the relatedness of a certain opportunity is high than when it is low.

Rarity – The rarity of an opportunity is defined by the degree to what information about an opportunity is unavailable to others. The more rare an opportunity and the related resources are to a company, the more attractive the opportunity is to the firm (Priem & Butler, 2001). An example: if the competition does not possess specific information about a certain opportunity, it must spend time and other resources to obtain it. Probably, expansive research is necessary before exploiting the opportunity, especially in the manufacturing industry, where information is key to exploit opportunities in an efficient way.

If the opportunity is also related to the existing competences of the firm, a manager can take major advantage of the high rarity of an opportunity by being the first to exploit an opportunity (Lieberman & Montgomery, 1998). The competition first needs to develop their competences to apply the actions that comes with the technical information. Through this, the firm can start with an advantage and stay ahead of competition, by being the first to exploit rare opportunities. Therefore, the third hypotheses are designed as:

Hypothesis 3a: The higher the rarity of an opportunity, the higher the opportunity attractiveness.
Hypothesis 3b: The positive relationship between the opportunity rarity and opportunity attractiveness is greater when the relatedness of a certain opportunity is high than when it is low.

Imitability – The imitability of an opportunity can be characterized by the potential to what other companies can imitate the opportunity. It is also credible to believe that a company develops substitutes for that specific opportunity. In situations where this is not the case, the opportunity will be more attractive to a manager. This is in line with Henderson and Cockburn (1994), who state that certain competences can be a source of competitive advantage, if it is difficult or costly to imitate.

Furthermore, imitability is a cornerstone to the resource-based view (Wilcox King & Zeithaml, 2001). It ensures that the competences of the firm are protected, and this is mainly reached by causal ambiguity. Through this, competitors do not know what the relationship is between the resources and the competitive advantage (Barney, 1991; Wilcox King & Zeithaml, 2001). So, the competitors do not know

what combination of resources to imitate (Alvarez & Busenitz, 2001). Therefore, it is expected that higher imitability evokes lower opportunity attractiveness for firms with related competences than for firms with unrelated competences. The fourth hypotheses emerge:

> *Hypothesis 4a: The lower the imitability of an opportunity, the higher the opportunity attractiveness.*
> *Hypothesis 4b: The negative relationship between the opportunity imitability and opportunity attractiveness is greater when the relatedness of that opportunity is high than when it is low.*

Limits on competition – The limits on competition stands for the extent to which the opportunity, once exploited, provides a stable market position. When firms are disrupting the market through the exploitation of innovative opportunities, other firms can imitate the opportunity. Here, the advantage of the first innovative firm are dissipated and the market position becomes unstable. However, if the imitating firm does not know how to combine the imitated resources (causal ambiguity), the competitive advantage and the market position of the innovative firm remains intact (Alvarez & Busenitz, 2001).

Moreover, if the opportunity resources are related to the existing knowledge, skills and abilities, the manager will use the chance to make the most of the stable market position. This can be explained by looking at the entry barriers of a certain market. These barriers ensure that new entrants will not break into the market, leaving an opportunity for the manager to operate in the market without competitive rivalry for a limited moment of time. The opportunity is related to the resources of the manager, so this time can be used to put even more limits on competition, by building more barriers for others to enter the market (Haynie et al., 2009). This leads to the following hypotheses:

> *Hypothesis 5a: The higher the opportunity puts limits on competition, the higher the opportunity attractiveness.*
> *Hypothesis 5b: The positive relationship between the limits on competition and opportunity attractiveness is greater when the relatedness is high than when it is low.*

Firm age – As firms grow and markets mature over time, companies will rearrange their assets in order to perform their activities in an efficient way (Helfat & Eisenhardt, 2004). Ageing companies are also struggling to deliver the growth performance and therefore are looking for diversification opportunities (Lichtenthaler, 2005). However, companies that grow often develop products that are associated with their organizational, technical and market knowledge (Helfat & Eisenhardt, 2004). The reason for this is that such firms already have the routines to pursue such actions. If they want to diversify, firms must unlearn these routines, before new routines can be learnt. Unlearning these routines becomes more difficult when firms get older (Autio, Sapienza, & Almeida, 2000). In this context, it is credible to believe that, as a firm gets older, there is an increasing interest for opportunities that are strongly related to the existing competences of the firm. Therefore, the last hypothesis is designed:

> *Hypothesis 6: The positive relation between opportunity relatedness and opportunity attractiveness is more positive for older firms than for younger firms.*

3 Methodology

3.1 Research strategy

To examine the opportunity evaluation decisions, conjoint analysis is used. This method allows researchers to investigate decision making and how each respondent values single attributes to come to their decision. In conjoint analysis, the respondent makes judgements on certain characteristics of a hypothetical case. This case is also used in previous opportunity evaluation research (M. S. Wood & Williams, 2014). Afterwards, the relative contribution of each attribute and their preference can be analyzed (Lohrke, Holloway, & Woolley, 2010). Since the respondent is asked about its opinion, it is important to note that the attractiveness and the relatedness of the opportunity is the perception of the respondent.

Conjoint analysis is often used in opportunity evaluation research, by investigating entrepreneurs in their decision-making policies (Choi & Shepherd, 2004; Gruber et al., 2015; Urban, 2014; M. S. Wood & Williams, 2014). This research is using the conjoint analysis to create a deeper understanding on what characteristics of an opportunity are preferred by a decisionmaker. So, the contribution of each individual characteristic can be measured. This makes the conjoint analysis an eligible tool, instead of qualitative studies who only determine what opportunity-related factors are important and why. Furthermore, the qualitative studies often use interviews that forces the respondent to remember and replicate certain decisions made in the past. Here, the post hoc data collection can result in validity threats such as social desirability, faulty memory or the inability to reproduce complex decision processes (Lohrke et al., 2010).

An example of conjoint analysis can be given from a typical marketing study. Here, respondents can be asked to rank the order, based on preferences for buying a new television. Televisions can vary in their attributes like size, price, brand, quality etcetera. By ranking the order of several television alternatives, respondents can voice their preferences in the buying process of a television. If a respondent constantly prefers the cheapest alternative and ends up with the most expensive as the least preferred, it can be said that the consumer has a common preference for low price. This also counts for the other attributes like quality, size and so on (Priem, 1992).

3.2 Research design

In this research, the respondents make judgements about the attractiveness of a hypothetical given opportunity (see appendix I). The attractiveness of the opportunity is the dependent variable in this study and can be defined as: the viability that the opportunity, when exploited, generates a sustainable competitive advantage. The attractivity of the opportunity will be rated on a 11-point Likert scale, with the end points displayed as ‘not attractive at all’ and ‘very attractive’.

The five resource-related attributes that describe the opportunity, arising from the literature are relatedness, value, rarity, imitability and limits on competition. These attributes act as the decision criteria of the opportunity. The operationalization of these attributes is displayed in table 2 and are derived from previous research (Haynie et al., 2009). To test the combinations of these five attributes with two levels, a traditional (full factorial) conjoint analysis requires 32 profiles to evaluate (Hair, Black, Babin, & Anderson, 2009). Surveys that require more than 30 evaluations are overwhelming and cause a lot of time to complete (Hair et al., 2009). Since the research requires the input from busy managers, the number of judgements are going to be reduced. To arrange this, a fractional factorial design is applied with the help

of SPSS, which is a statistical computer program. Hereby, a total of 14 judgements are needed (see appendix II). This can be done without a decrease in the reliability because all attributes are involved in the questionnaire.

From the 14 scenarios, there are 3 scenarios replicated. This is done to control and calculate the reliability of the results. The repeated scenarios (3 and 8, 4 and 9, 7 and 14) are chosen randomly and placed within the questionnaire. These scenarios are not placed after each other, otherwise the respondent will find out.

table 2 Operationalization of opportunity attributes

Attribute	*Variables*	*Explanation*
Relatedness	High	The opportunity is highly related to the current knowledge, skills and abilities of the firm.
	Low	The opportunity is not related to the current knowledge, skills and abilities of the firm.
Value	High	The opportunity comes with significant increases in the efficiency and effectiveness of the production.
	Low	The opportunity comes with minimal increases in the efficiency and effectiveness of the production.
Rarity	High	Technical information about the opportunity is not widely accessible to others.
	Low	Technical information about the opportunity is widely accessible to others.
Imitability	High	It is likely that others can easily imitate or develop substitutes for the opportunity.
	Low	It is not likely that others can easily imitate or develop substitutes for the opportunity.
Limits on competition	High	The market position of the firm is stable after exploiting the opportunity.
	Low	The market position of the firm is unstable after exploiting the opportunity.

Post-experiment questionnaire

After completing the conjoint questionnaire, a post-experiment questionnaire is performed. In this questionnaire, other variables like gender, age, type of education, years of experience and age of the company are being measured by asking the respondents age, gender, technical or non-technical education and years of experience. This questionnaire is needed to control for these variables. Experience tends to have an influence on the entrepreneurial decision-making process (Baron & Ensley, 2006). Furthermore, the research area is set by the manufacturing industry. Hence, we controlled for the type of education, whether the education was technical or non-technical.

3.3 Sample

The focus of the research is on companies in the manufacturing industry. These companies are opting for opportunities to grow in market share or in performance. Manufacturing firms typically have knowledge and skills to produce certain products. That is also the reason to look at opportunities that match this knowledge and set of skills. Since the industrial revolution, the opportunities become more complex and diverse. Through this, the need to assess an opportunity on its feasibility and attractiveness is high. Therefore, a deeper understanding in how managers of manufacturing companies value the attributes that come with certain opportunities is needed.

The participants in this study are the managers (CEO's, Vice Presidents, Business Development managers, Sales managers or equal) of medium to large sized (50 to 500 employees) manufacturing firms that are converting raw materials into products. This includes also the assembly of semi-finished products into end-products. These managers have middle to upper level responsibilities with considerable insight in the strategic part of the organizations. That is why they should be five or more years in the manufacturing industry. The reason for this is that the opportunity evaluation task is mostly conducted by managers with a strategic position within the firm (Hilmersson & Papaioannou, 2015).

Choosing this target group has consequences for the sampling method. In this research, a non-probability sampling strategy, called 'snowball sampling' is used. This means that the researcher uses his own network to obtain respondents. These respondents suggest new respondents from their network and so on (Hair et al., 2009). By organizing the research in this way, one should mind the generalizability of the findings, because it is unlikely that the sample of manufacturing companies will be representative for all manufacturing companies over the world.

According to the literature, there is no given number for the amount of respondents in conjoint analysis. Looking at other studies (see table 3) the average number of respondents in decision-making research is 50. Therefore, the sample size goal of this study is set at 50 respondents.

table 3 Academic papers using Conjoint Analysis

Authors	*Respondents*
Franke et al. (2006), as read in Gruber (2015)	51
Wood and Williams (2014)	62
Priem & Rosenstein (2000), as read in Wood and Williams (2014)	33
Zacharakis and Meyer (1998), as read in Wood and Williams (2014)	53
Choi and Shepherd (2004), as read in Lohrke et al. (2010)	55
Franke et al. (2004), as read in Lorhke et al. (2010)	51

The questionnaire was transferred to an online version, which lowered the threshold for the respondents to fill out the questionnaire. In total 258 people were personally approached either through LinkedIn or by e-mail to participate in my research. If there was no response, a reminder was sent after 2 weeks and, after still no response, again after 2 weeks. This resulted in a total of 62 participants, which is a response rate of 24%. 10 incomplete questionnaires were filtered out and one questionnaire was deleted because of implausible control question results. In the end there 51 eligible questionnaires remained to be included in the rank ordered logistic regression analysis.

In total 38 different manufacturing firms took part in the research. The total manufacturing industry in the Netherlands with 50-500 employees consist roughly out of 1400 firms (CBS, 2018). This means that this research represents 2,8% of the total manufacturing industry. It is understandable that this has consequences for the generalizability of the results. Therefore, the research has some limitations that are further discussed in the discussion part.

3.4 Pretest

To check if all the questions were understandable and all the independent variables are interpreted the right way, a pretest was conducted. Here, 13 Sales Engineers were asked to complete the questionnaire. Afterwards the respondents were asked if they had difficulties or ran into problems when finishing the questionnaire. Statistics about the sample are given in table 4.

table 4 Pretest descriptive statistics

Variable	N	%	Mean	SD
Age			31	3.56
Gender				
Male	12	100.0%		
Female	1			
Education				
Technical	11	83.3%		
Non-technical	2	16.7%		
Experience			5.1	1.73

N = 13

What immediately strikes is that most of the respondents are male. This corresponds the numbers of the manufacturing industry, because most people who work in this sector are male. Looking at the metal sector, figures show that 13 per cent of the people in this sector are female. If we dive further into these figures, it becomes clear that only 0,9 per cent of the people in a management role are female[1]. This causes that the expectation of the sample in the research will not contain very much women.

Furthermore, the age of the respondents is not very high. This is because the Sales Engineers are obtained within one company. The reason for this is that they were accessible and feedback on the questionnaire was gained in an efficient way. The expectation for the final sample is that the average age will be higher. This is mainly due to the senior (management) function that the respondents have.

Considering the reliability of the responses, we can calculate the Spearman's Rho for the three evaluations of scenario's that were repeated. These calculations were executed, using Microsoft Excel (see appendix III) and the outcomes are stated in table 5. The results indicate that the three scenarios were highly correlated, which means that the responses of the pretest were reliable (Cohen, 1988).

[1] https://www.vhto.nl/cijfers-onderzoek/cijfers/cijfers-arbeidsmarkt/metaalbewerking/

table 5 Pretest Spearman's correlation coefficient

ρ1 (Scenario 3 and 10)	0,85*
ρ2 (Scenario 4 and 9)	0,57*
ρ3 (Scenario 7 and 14)	0,59*

**p < 0.05*

Even though the questionnaire of the pretest was printed on paper, no one noticed that it contained repeat scenario's. Considering the reliability rates, we can conclude that these are medium to high which is enough to include the repeat scenario's in the actual research.

Some minor adjustments were made according to the feedback of the pretest respondents. These adjustments were mainly made in the grammar, choice of words and communicating better what perspective the respondent should take.

3.5 Data analysis

The importance of the attributes can be estimated using multivariate statistical methods like ordinary least squares or logit regression (Lohrke et al., 2010). The choice of the method depends on the type of dependent variable namely, categorical or continuous. Since the dependent variable is measured on a Likert-scale (ordinal), a rank-ordered logistic regression model seems the best suitable method (Hair et al., 2009). These models generally have the following equation:

$$Y = X1 + X2 + X3 \ldots + Xn$$

Where Y is the nonmetric dependent variable 'opportunity attractiveness', X is the relative contribution of an attribute and 'n' stands for the number of attributes (in this case five). To estimate this linear function the independent variables (attributes) are already set by the researcher. The respondent needs to evaluate the attractiveness of a given opportunity (see appendix I) based on the combinations of all attributes. Because all attributes are included in the profiles, this is called a traditional conjoint analysis (Hair et al., 2009). After this, the researcher is able to decompose the importance of each attribute, assigned by the respondent (Lohrke et al., 2010). The relationship among all attributes is assumed to be orthogonal. This means that there is no interaction between the attributes. For this reason, an additive composition rule is appropriate. Furthermore, the attributes consist of two levels. This means that the type of relationship among the levels are linear part-worth (Hair et al., 2009).

The conjoint experiment itself includes the ratings on the different scenario's. These ratings are combined in Excel and prepared for analysis in a statistical computer program. To perform the regression analysis, the computer program Stata 14.2 is used. This program allows us to calculate the main effects of the independent variables and the correlations between the variables through rank-ordered logistic regression modelling. Although the method of evaluating the scenarios is rating, the rank-ordered method is still eligible because it permits ties in the rankings.

Before the hypotheses testing, a correlation matrix is constructed to see if the independent variables correlate with each other. If they do, another compositional model should be used. For the analysis, multiple models were used. Firstly, the main effect of 'relatedness', ´value´, ´rarity´, ´imitability´

and ´limits on competition´ on `opportunity attractiveness´ is being measured. The second model measures the interaction effect of Opportunity Relatedness on the relation between value, rarity, imitability and limits on competition and opportunity attractiveness. In the last model, the variable of the company age interacting with relatedness was included and the last hypothesis was tested.

3.6 Other methods

Other forms of analyzing the conjoint data are also found to be the case in several papers. Some scholars use Hierarchical Linear Modeling (HLM) to obtain the specific contribution of each characteristic in the dependent variable (Haynie et al., 2009; M. S. Wood & Williams, 2014). HLM is an ordinary least square (OLS) regression model that addresses the hierarchical structure of the data. Such hierarchical structure is nested data on different levels or clusters. One can compare this with a cluster of employees within organizations within specific regions. HLM enables the researcher to compare a group across different levels, for example, employees nested within organizations and age categories while these levels are not related.

HLM is used for analyzing the difference within and between groups. Therefore, the sample should meet several conditions to be used in the conjoint experiment. First of all, the sample must contain multiple levels of analysis. Thereafter, there should be sufficient amounts of within- and between- level variance of all the levels (Woltman, Feldstain, MacKay, & Rocchi, 2012). One major disadvantage of HLM is that is requires a large sample size for each level to have enough statistical power, because the variance within and between levels should be significant.

Since this research is not analyzing the difference between several groups and has a relatively small sample size, HLM is not the appropriate tool for analyzing the data. For the purpose of this research it is enough to know the contribution of the characteristics in the dependent variable. Therefore the rank-ordered logistic regression in STATA is used. An additional feature is that this function is built-in, so the use of this function is understandable and convenient.

4 Results

4.1 Reliability testing

After collecting all the results, the reliability of the repeated scenarios is tested again trough calculating the Spearman's rank correlation coefficient. The results are given in table 6 below and SPSS results are displayed in appendix III. The Spearman's rank correlation coefficient can be compared with the Pearson correlation in the interpretation (Hair et al., 2009). So, the closer the coefficient comes to one, the stronger the relationship of rating the repeated scenarios. Rule of thumb in determining the correlation is that a coefficient between 0.5 and 0.7 indicates a moderate to strong relationship. Coefficients above the 0.9 belong to relations that are very strong (Cohen, 1988).

table 6 Final reliability results

ρ1 (Scenario 3 and 10)	0,66*
ρ2 (Scenario 4 and 9)	0,44*
ρ3 (Scenario 7 and 14)	0,62*

$*p < 0.05$

Giving the significant correlations, we can state that scenarios 3, 10 and 7, 14 are strongly correlated. Scenarios 4, 9 are medium correlated. Out of this, the conclusion can be made that the responses of the questionnaire are reliable and the respondent keeps paying attention. This is desirable because some respondents noted that the questionnaire took quite some time and motivation to complete. After questioning why, the answer was that the opportunity case did cost some time to fully understand. Looking at this, the average time to fulfil the questionnaire was 19 minutes, which is an acceptable completion time to extract reliable results (Hair et al., 2009).

4.2 Correlations

table 7 shows the correlations of the variables that are included in this research. What is worthwhile mentioning is that the four independent variables are significantly correlated with the opportunity attractiveness. This implies that the higher the value, rarity, limits on competition and the lower the imitability, the higher the opportunity attractiveness could be. A negative correlation exists between opportunity relatedness and value. So, the better the opportunity fits the current skills, abilities and competences, the lower the increase in efficiency and effectiveness. Finally, the variable education (technical = 1, non-technical = 2) is significantly correlated to the variables age and experience. For this sample, it means that technical respondents are older in age and have more years of experience.

table 7 Correlations matrix and descriptive statistics

Variable	*Mean*	*Std. Dev.*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1. Opportunity attractiveness	5.7	2.67	1										
2. Value	9.0	1.77	0.527*	1									
3. Rarity	6.4	1.75	0.251*	0.267*	1								
4. Imitability	7.2	1.94	-0.187*	-0.100	-0.100	1							
5. Limits on competition	7.7	1.90	0.244*	-0.070	-0.070	-	1						
6. Relatedness	6.8	1.83	0.037	-0.270*	-0.270*	-	0.069	1					
7. Age	45.6	9.34	-0.030	-	-	-	-	-	1				
8. Education	1.4	0.49	-0.010	-	-	-	-	-	-0.206*	1			
9. Experience	21.0	9.30	-0.048	-	-	-	-	-	0.924*	-0.167*	1		
10. Company age	67	50.35	-0.062	-	-	-	-	-	0.205*	0.132	-	1	
11. Company size	252	151.69	-0.029	-	-	-	-	-	-0.008	-0.034	-	0.037	1

*n = 51, * p < 0.05, education: 1 = technical, 2 = non-technical*

As expected, the average age of the respondents is fairly high and this also has effect on the years of experience, what is also logically high. This is mainly due to the sampling frame, that consisted out of senior positions like Managing directors, CEO's, Vice Presidents, Business Development managers, Sales managers or equal. The youngest company was 16 years of age. No startups or very young firms were included in the sample. This is also expected, because the sample consisted out of medium to large sized enterprises in the manufacturing industry. To grow to a medium or large enterprise, the company needs to invest a certain amount of time to reach this goal.

4.3 Confirmatory results

Direct effects

The results of the rank-ordered logistic regression are depicted in table 8. In the first model, the direct effects are tested and proven to have a significant effect on the Opportunity Attractiveness. This allows us to provide support for hypothesis 1, 2a, 3a, 4a and 5a.

table 8 Rank ordered logistic regression results

Variable	Model 1	*Std. error*	Model 2	*Std. error*	Model 3	*Std. error*
Relatedness	1.012***	*0.125*	1.694*	*0.954*	1.480***	*0.293*
Value	2.046***	*0.148*	1.266**	*0.428*	1.812***	*0.344*
Rarity	0.746***	*0.117*	2.194***	*0.560*	0.926***	*0.278*
Imitability	-0.360**	*0.115*	-0.466	*0.392*	-0.279	*0.270*
Limits on competition	1.143***	*0.126*	1.759**	*0.547*	1.308***	*0.295*
Age of respondent	-0.020	$4*10^5$	0.034	-	0.023	-
Company age	0.283	-	-0.035	$14*10^4$	0.052	-
Company size	-0.041	-	-0.001	$4*10^4$	-0.001	-
Relatedness X Value			0.508*	*0.262*		
Relatedness X Rarity			-0.885**	*0.323*		
Relatedness X Imitability			0.115	*0.235*		
Relatedness X Limits on competition			-0.191	*0.328*		
Company age X Relatedness					-0.007*	*0.004*
Company age X Value					0.008*	*0.005*
Company age X Rarity					-0.002	*0.004*
Company age X Imitability					-0.011**	*0.004*
Company age X Limits on competition					0.002	*0.004*

**p <0.1, **p < 0.05, ***p < 0.001, Company age = 2018 - Founding date*

Dependent variable: Opportunity Attractiveness

Starting off with the first hypothesis; the higher the relatedness of a certain opportunity, the higher the attractiveness (β=1.012, p<0.001). This means that opportunities that are very well related to the current knowledge, skills and abilities of the firm are more attractive than opportunities that are not. This provides support for hypothesis 1.

Hypothesis 2a indicates the higher the value of an opportunity, the higher the attractiveness is (β=2.046, p<0.001). So, if the opportunity comes with a significant increase in the efficiency and effectiveness of the production it is more attractive. This effect also has the highest coefficient what means that this variable has the most impact on the attractiveness of an opportunity. This provides support for hypothesis 2a.

Hypothesis 3a states the higher the rarity of an opportunity, the higher the attractiveness will be (β=0.746, p<0.001). The inaccessibility of technical information about an opportunity for others, evokes a higher opportunity attractiveness. This provides support for hypothesis 3a.

Hypothesis 4a demonstrates the higher the imitability of an opportunity, the lower the evaluated attractiveness (β=-0.360, p<0.001). Here, the more likely that others can imitate or find substitutes for the same opportunity, the lower the attractiveness of that opportunity is. This provides support for hypothesis 4a.

Hypothesis 5a shows that a higher limit on competition by exploitation of the opportunity, increases the attractiveness of the opportunity (β=1.143, p<0.001). So, a higher stability in the market

position of the firm after exploiting the opportunity, the more attractive the opportunity is. This provides support for hypothesis 5a.

So, the direct effects contribute significantly in the opportunity attractiveness. To make the magnitude of the effects visible, we can draw up the equation below. What strikes is that the manager focuses on the value of the opportunity, when evaluating business opportunities. This can mean that a manager is focused on the potential gains that comes with the opportunity. In this situation it is the increase in efficiency and effectiveness of the current production. The imitability of the opportunity is the least important characteristic of an opportunity.

*Opportunity Attractiveness = 2.046*Value + 1.143*Limits on Competition + 1.012*Relatedness + 0.746*Rarity - 0.360*Imitability*

Role of relatedness

Since the opportunity evaluation process is more complicated than only the direct effects, a more sophisticated analysis is made in the second model. This model includes the relatedness as interaction variable. Looking at the results, it shows that the relatedness has a positive interaction effect on the relation between value and opportunity attractiveness (β=0.508, p<0.1). This means that the positive relationship between the opportunity value and opportunity attractiveness is greater when the relatedness of a certain opportunity is high than when it is low (see figure 4). Therefore, these results support hypothesis 2a.

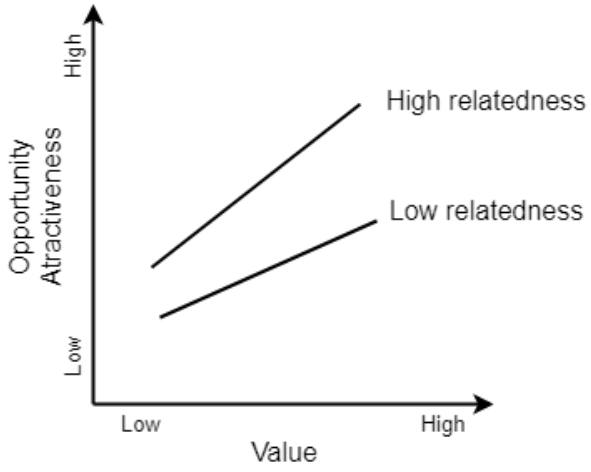

figure 4 Relatedness x Value

Surprisingly, the interaction of relatedness shows contradicting results with respect to rarity. Namely, the positive relationship between the opportunity rarity and opportunity attractiveness is *smaller* when the relatedness of a certain opportunity is high than when it is low (β=-0.885, p<0.05). This means that the opposite of hypothesis 3a is significantly proven (see figure 5).

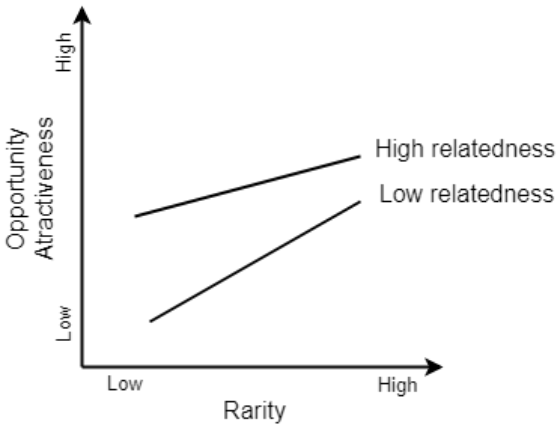

figure 5 Relatedness x Rarity

Finally, the direct effect of imitability on opportunity attractiveness is not significant anymore. So, if the opportunity relatedness comes into play, imitability has no longer a direct effect on the opportunity attractiveness. The interacting role of relatedness to value and rarity explains the model better than only the direct effect of imitability.

Role of company age

The third model in table 8 shows the importance of the company age. Hypothesis 6 says that the positive relation between opportunity relatedness and opportunity attractiveness is more positive for older firms than for younger firms. Looking at the results, the hypothesis cannot be supported, because the opposite is significantly supported. A high relatedness leads to a higher attractiveness applies to young firms instead of old firms (see figure 6). In the sample, the average company age was 67 years. So, the younger firms are below 67 years and the older firms are above that age.

figure 6 Firm age x Relatedness

4.4 Robustness test

Interestingly, some unexpected exploratory results showed op. The company age does affect the relation between value and imitability on the one hand and opportunity attractiveness on the other hand. This indicates that the positive relation between the value of the opportunity and opportunity attractiveness is greater for older companies than for younger firms. But, looking at the magnitude, the impact of this

effect is very low (β=-0.002). The same counts for imitability. The negative relation between imitability of the opportunity and opportunity attractiveness is greater for younger firms than for older firms. Again, the magnitude of this interaction effect is rather low (β=-0.011).

The variables 'age of respondent', 'company size' and 'education' can have an impact on the way opportunities are evaluated. Therefore, we control for these effects by including them in the analysis. The education variable (technical vs. non-technical) did not show any effect, because there was no difference in the evaluation between the groups: technical education vs. non-technical education (see appendix IV). So, the results of 'age' and 'company size' are shown in table 9.

The age of the respondent has a significant negative effect on the relation between the imitability and the opportunity effectiveness. So, the negative effect of imitability on opportunity attractiveness is greater for older respondents than for the younger ones. However, the size of the effect is relatively low (β=-0.03). The company size shows a significant negative effect on the relation between value and opportunity attractiveness. This indicates that the positive relation between the value of an opportunity and the opportunity attractiveness is smaller for bigger firms. So, if the opportunity increases efficiency and effectiveness of production, the opportunity becomes more attractive for smaller firms. For this effect also counts that the impact is rather low (β=-0.002).

table 9 Robustness test results

Variable	Model 1	Std. error	Model 4	Std. error	Model 5	Std. error
Relatedness	1.012***	*0.125*	0.845	0.643	0.979***	0.241
Value	2.046***	*0.148*	2.993***	0.776	2.717***	0.303
Rarity	0.746***	*0.117*	1.188**	0.595	0.646**	0.231
Imitability	-0.360**	*0.115*	-1.040*	0.571	-0.537**	0.225
Limits on competition	1.143***	*0.126*	1.767**	0.643	1.496***	0.249
Age of respondent	-0.020	$4*10^5$	0.024	-	-0.891	$3*10^5$
Company age	0.283	-	0.017	-	0.100	$2*10^5$
Company size	-0.041	-	0.000	-	0.207	-
Age of respondent X Relatedness			0.004	0.014		
Age of respondent X Value			-0.020	0.016		
Age of respondent X Rarity			-0.009	0.013		
Age of respondent X Imitability			-0.030**	0.012		
Age of respondent X Limits on competition			-0.013	0.014		
Company size X Relatedness					0.000	0.001
Company size X Value					-0.002**	0.001
Company size X Rarity					0.000	0.001
Company size X Imitability					0.001	0.001
Company size X Limits on competition					-0.001	0.001

**p <0.1, **p < 0.05, ***p < 0.001, Age = measured in years and Company size = amount of employees*

5 Discussion & conclusion

5.1 Discussion

The goal of this study was to identify how managers of manufacturing firms could evaluate opportunities that are related to the current competences of the firm. Firstly, the evaluation construct is conceptualized as the assessment on whether an opportunity can deliver competitive advantage in the future or not. Secondly, the opportunity-specific resource-based characteristics of business opportunities were determined. According to the literature, these characteristics are Relatedness, Value, Rarity, Imitability and Limits on Competition and all these variables have a direct significant impact on the Opportunity Attractiveness.

5.1.1 Expected & supported results

table 10 shows an overview of the hypotheses test results. In this table the hypothesis is displayed, together with the expected and real effect. Finally, a statement is made on whether the hypotheses are significantly confirmed or not. The first result is, as expected, that the more related an opportunity is to the knowledge, skills and abilities of the firm, the more attractive an opportunity is. If an opportunity matches the firms' competences, the firm has to invest little in resources to exploit the opportunity. The employees already possess the knowledge and the skills to exploit the opportunity in an efficient way.

Secondly, if the value of an opportunity is high, the attractiveness will be higher too. Value is the attribute with the most impact on the attractiveness. This is also competent with our expectations because opportunities that increase the efficiency and effectiveness of production in manufacturing companies are very likely to be attractive. Manufacturing firms are always busy with improving their processes to reduce the costs of production. Besides this, companies are also more fast and flexible in production allowing them to accept more orders in the same time. Finally, a company can increase the quality of the products which in turn increases customer satisfaction.

The third result shows that the higher the rarity of an opportunity, the more attractive it is. Meaning that the more technical information about an opportunity is not widely accessible to others, the more attractive an opportunity becomes. Looking at the characteristic of this attribute, it can be said that it allows managers to obtain the value of the opportunity by preventing others from doing the same. In this regard, other parties should invest their valuable resources to get all the information about an opportunity whilst the company in question already possesses it, giving them a head start.

The fourth result states that the more an opportunity can be imitated, or the more substitutes exists, the lower the attractiveness for that opportunity becomes. If competitors can do exactly the same, there is not enough distinction that can lead to a competitive advantage. Overall, imitability has the lowest utility in the opportunity attractiveness. A possible explanation is that there can be other factors that prevents the competitor from imitating the opportunity. Examples are: time compression dis-economies, asset mass efficiencies, interconnectedness of asset stocks, asset erosion, and causal ambiguity (Alvarez & Busenitz, 2001).

The last result of the direct effects is that the more an opportunity puts limits on the competition, the higher the attractiveness of the opportunity will be. This enables the firm to create advantages in, for example, developing new technologies. A firm can also use the unique tacit competences that reside within the organization (Wilcox King & Zeithaml, 2001). Through this, it becomes more difficult for

competitor firms to imitate or find substitutes for the opportunity. Ultimately, the firm can easily defend the market position through their advantages.

table 10 Summary of the results

Hypothesis	*Relation*	*Expected*	*Result*	*Confirmed*
H1	Relatedness - Attractiveness	↑	↑	Yes
H2a	Value - Attractiveness	↑	↑	Yes
H3a	Rarity - Attractiveness	↑	↑	Yes
H4a	Imitability - Attractiveness	↓	↓	Yes
H5a	Limits on Competition - Attractiveness	↑	↑	Yes
H2b	Value X Relatedness	+	+	Yes
H3b	Rarity X Relatedness	+	-	No
H4b	Imitability X Relatedness	+	*n.s.*	No
H5b	Limits on Competition X Relatedness	+	*n.s.*	No
H6	Relatedness X Company age	+	-	No

n.s. = not significant

As mentioned in the literature review, the positive effect between value and attractiveness is higher for opportunities that are related to the existing competences, than for unrelated opportunities. This effect cuts both ways, because the resources that come from exploiting the opportunity, increase the efficiency and effectiveness of the existing production process and are related to the existing competences (Helfat & Eisenhardt, 2004). So, the improvement in the competences of human capital does also add value to the opportunity.

5.1.2 Unexpected results

Surprisingly, a high relatedness does not always lead to a significant higher opportunity attractiveness. Two characteristics are influencing this relationship, namely: the rarity of the opportunity and the age of the firm (see table 10). If the opportunity is rare, or the company gets older, managers are willing to opt for opportunities that are not specifically related to their existing competences. This can be the ground for adding, reconfiguring or deleting resources or competences (Teece et al., 1997). In this situation, the manager is still interested in exploiting a promising opportunity, but it does not necessarily have a fit with the existing competences. The firm is probably looking for alternative opportunities as they become aware that they need to adapt or extend their competences in a dynamic environment.

As the rarity increases, the attractivity of the opportunity increases more for unrelated competences than for related competences. This rather contradictory result may be due to firms that have high relatedness could see the opportunity much more as common business. The company already possess the right competences to exploit the opportunity. A possible consequence could be, that these companies undervalue the opportunity. For firms with a low relatedness, the attractivity increases much

more. Reasoning behind this could be that the firm consider the opportunity as a chance for expanding their existing competences by using the rare information that is only know to them (Alvarez & Busenitz, 2001). Through this, new activities can be exploited, and the products or service range can be extended. This ultimately can lead to a spread in the risk of the firm because they are now able to operate in different environments, or deal with new production methods.

For the moderating effect of firm age on the relation between relatedness and attractiveness, the young firms find more related opportunities more attractive than old firms. A possible explanation for this might be that firms who have a long track record, fully utilize their market through the years. So, chances that really fit their competences are not really attractive anymore and they can be willing to try something new, that goes beyond the competences. They probably also have the financial resources to do this, so they can run more risk by, for example, launching a start-up next to their core activities. This is also demonstrated in the literature. When a firm reaches a secure market position in their original business, it is able to look at opportunities that go beyond their existing competences (Priem & Butler, 2001).

For younger firms an opportunity that is related to their competences is much more attractive, because they do not have to invest a lot of money to develop the competences that are necessary. Through this, they do not run a lot of risk, by performing the opportunity. However, these data must be interpreted with caution because the average firm age of the sample is 67 years. This is relatively high and might be due to the inclusion of a company with the age above the 350 years. Furthermore, some companies have their existence in the 19th century, but started again as a new entity in the late 20th century.

The controlling variable 'age' has a moderating effect on the relation between imitability and opportunity attractiveness. Results show that the opportunity becomes less attractive for older managers, when the imitability is high. A higher imitability comes with higher amounts of risk that others will imitate or find substitutes for the opportunity. Previous research show mixed results between age and risk-taking behavior (Bonem, Ellsworth, & Gonzalez, 2015). But with respect to imitability, the results of this study suggest that the older the manager, the more cautious in evaluating opportunities.

The company size shows a moderating effect between the value and the attractiveness of an opportunity. The higher the opportunity value, the more attractive it becomes for smaller firms, rather than large firms. This finding is unexpected and suggest that smaller firms are more focused on opportunities that increase the efficiency and effectiveness of the existing production processes. Previous studies suggest that the larger a firm becomes, the more likely it is that they are looking to make their production processes more efficient (Dhawan, 2001). This does not appear to be the case in this study.

5.2 Theoretical contribution

This research contributes the literature in several ways. Firstly because, to the best of our knowledge, an opportunity evaluation study amongst managers in the manufacturing industry has never been done before. Furthermore, most opportunity studies focus on entrepreneurs or students, ignoring the decision-making processes of entrepreneurial managers within firms. So, this research gives insights into how these managers within firms apply the resource-based framework in the evaluation of new business

opportunities. This also includes the reasoning behind why some managers decide to pursue opportunity A, and dismiss opportunity B.

This research contributes the resource-based theory by assessing not only the influence of future resources, but also the links between the existing human capital and future resources. There is only one study who did that before, but only with entrepreneurs as respondents (Haynie et al., 2009). A comparison of the study shows that there are overlapping results with respect to the direct variables and the interacting variables Value X Relatedness and Rarity X Relatedness. The fact that there are overlapping results may indicate that the opportunity evaluation behavior for entrepreneurs and managers within firms is similar. But, according to the existing literature there is a difference. Entrepreneurs are more sensible for biases and decision heuristics than managers, especially when not all the information is available (Busenitz & Barney, 1997).

5.3 Practical contribution

The empirical findings in this study provide a new understanding of the opportunity evaluation process of managers. These processes are important, due to the consequences that the outcomes of the decisions can have for the company. Since the scope of the research is the manufacturing industry, opportunities mostly come with a high amounts of resource investments and uncertainty. The outcomes of this research provide a grip for managers that are in the decision-making stage of opportunity evaluation.

Most managers understand the importance of their resources, but empirical work is needed to determine if and what resource-related attributes are significant in opportunity evaluation. The research points out that the value of the opportunity has the strongest effect in the evaluation process. This indicates that a manager focuses on the potential gains that an opportunity can bring in the organization. In this case, the increase in efficiency and effectiveness of the production weighs more than the rarity, imitability or limits on competition.

Many studies point out the importance of the related human capital, when entrepreneurs are opting for diversification opportunities (Helfat & Eisenhardt, 2004; Markides & Williamson, 1996). But the effect of the relatedness on the opportunity characteristics value, rarity, imitability and limits on competition remains underexposed. This study finds that a higher relatedness, lead to a higher attractiveness, except for rare opportunities and for older firms. So, if the opportunity is rare and/or the firm is old, managers tend to go for the opportunity without having the related resources to exploit it.

In conclusion, managers first look at the value a certain opportunity can bring into the firm by focusing on the increase in efficiency and effectiveness of existing processes. Also, the relation with the existing competences is important and determines the attractiveness. But rare opportunities or older firm causes managers to be attracted to opportunities that are not really related to the existing competences.

5.4 Limitations

The results of this study must be handled with care because of some limitations. Conjoint analysis has advantages is the use and applicability, but the biggest disadvantage is that it does not take all opportunity evaluation characteristics into account. This research focuses on the resource-related characteristics, while there are many more factors influencing opportunity decisions. Examples of this are knowledge (Digan et al., 2017), emotions (Foo, 2011), network (Nowiński & Rialp, 2016) and cognition (Mathias &

Williams, 2014) based on the manager who is evaluating. Furthermore, influencers based on the opportunity like business sector, capital intensity, technology maturity, market potential and ROI are not included in the research (Urban, 2014).

Secondly, the sample of the study comprises input from 51 managers of Dutch companies. For this reason, the study is limited, because it is likely that this does not represent the whole manufacturing industry. Therefore, the generalizability of the research needs to be interpreted with caution.

Thirdly, the opportunity case is a simplistic example that does not match the variety of real-life decision context. In real-life situations, many more variables are included in the decision process. The reason can be found in time restrictions and feasibility of the research. Future research could include more variables related to the cognition of the researcher and the environment of the firm.

5.5 Future research

This research throwed up some questions in need for further investigation. Many effects were expected since the literature review gave hints in this direction. But, the opportunities that are related to the existing competences of a firm showed some unexpecting effects. So, more information on the relatedness of rare opportunities would help us to establish more accuracy on this matter. This also counts for the relatedness of opportunities to the existing competences of old companies.

5.6 Conclusion

The aim of this research was twofold; (1) finding out what characteristics play an important role when evaluating business opportunities and (2) discover the impact of the relation to existing competences of the firm in opportunity evaluation. After the literature research the five resource related characteristics: relatedness, value, rarity, imitability and limits on competition found to be determining attributes in the attractiveness of the opportunity.

The results show that all the attributes are significantly influencing the opportunity attractiveness but have a different magnitude. The most important contributor is the value of an opportunity. This attribute is operationalized as the potential increase in efficiency and effectiveness of the existing production. It also indicates that the manager values the potential gains that a certain opportunity can bring into an organization. Thereafter, respectively the characteristics: limits on competition, relatedness, rarity and imitability followed.

Furthermore, the relation to existing competences is playing an important interacting role between value and rarity in one hand and opportunity attractiveness in the other hand. Opportunities with a high value are more attractive to firms that have related competences with that opportunity. A possible explanation for this could be that the firms can easily exploit the opportunity because they have the right knowledge, skills and abilities. Firms with low related competences are first investing in the right competences to capture the value of an opportunity, which decreases its attractiveness.

As the rarity of the opportunity increases, the attractivity will be higher for firms with low related competences. A likely clarification of this result could be that these firms grab the opportunity to expand their existing competences and diversify in their products and/or services. Especially when technical information about the opportunity is not widely available for others.

The last result of this research is that the higher an opportunity is related to existing competences, the higher the attractiveness especially for young firms, over old firms. This would seem to suggest that old firms that have a long track record, fully utilize their market through the years. So, chances that really fit their competences are not really attractive anymore and they can be willing to try something new, that goes beyond the competences.

This study contributes literature and practice in a better understanding of how managers within manufacturing firms make resource-related decisions in opportunity evaluation. The results correspond with the existing literature regarding relatedness and opportunity attractiveness. Except for rare opportunities or older firms. So, more fine-grained investigation is needed in the evaluation of rare opportunities and for managers within old firms.

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Appendix I - The questionnaire

Guiding letter

Dear participant,

This research is a result of finalizing my master in Business Administration at the University of Twente. The goal is to determine the importance of the characteristics linked to the evaluation of business opportunities in the manufacturing sector.

The task.
In the first part of this questionnaire, you will find a description of an opportunity based on an actual situation. You are the one to evaluate this opportunity on its attractiveness on a 11-point scale, ranging from 1 (not attractive at all) to 11 (very attractive). An opportunity is highly attractive when it is possible to set up new revenue-generating business. You may assume the following:

- You are interested in exploiting new business opportunities;
- You have full access to financial resources required to exploit the opportunity;
- Exploiting the opportunity can be realized in-house or by setting up a new entity.
- Forget your own business environment, just interpret the case for yourself.

You will be asked to rate the opportunity 14 times, in which the characteristics of the opportunity are changed with each question. The survey will take less than 15 minutes to complete.

What's in it for me?
You will be provided with the results of the research. This gives you access to meaningful insights in the decision-making process of business opportunities in the Dutch manufacturing sector.

Your personal information and survey responses will be held strictly confidential and data from this research will be reported only in the aggregate. If you have any questions about the survey or the procedures, you may contact me by telephone at [redacted] or by email at [redacted].

Thank you very much for your time and support.

Best regards,

Wilco Mensink

The case & rating part

Please read the opportunity case below:

Columbia University has announced the identification of a business opportunity based on the development of a new technology that revolutionizes the way materials are coated or plated to improve electrical conductivity and to make it easier to coat non-conductive materials.

Functional needs of the market: Materials often need to be coated or plated with metal layers to improve electrical conductivity and this is achieved via an electroplating process. This process involves passing electrical current between electrodes which results in the deposit of metal ions on the material. Non-conductive coatings prevent ions from reaching the native surface and thus metals such as aluminum and tungsten are very difficult to coat. Existing techniques to coat such metals require numerous and expensive steps.

Functional characteristics of the technology: To solve the problem and meet the needs of the market, Columbia researchers have developed a new technology called In-Situ Plating (ISP) designed to improve the process of coating non-conductive materials. The new process involves first etching the oxide film to clean up the surface of material and then applying traditional electroplating techniques to the desired metal. The new cleaning/etching process can be combined with electroplating in the same system which leads to a significant reduction in processing steps. This can lead to major reductions in processing time, raw materials, and physical space required for plating lines and could result in important cost saving benefits.

Please rate the following scenarios:

Example scenario 1:

Characteristic	*Definition*
Relation to current competences is **low.**	In-Situ plating is an opportunity that is not related to the current knowledge, skills and abilities of the firm
The potential value of the opportunity is **high.**	In-Situ plating comes with significant increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **high**.	Technical information about the In-Situ Plating opportunity is not widely accessible to others.
The imitability of the opportunity is **high.**	It is likely that others can easily imitate, or develop substitutes for the opportunity.
The limits on competition is **high**.	The market position of the firm is stable after using the In-Situ Plating technology.

Imagine that the characteristics mentioned above belong to the In-Situ Plating opportunity. Please rate the opportunity on its attractiveness by:

← Not attractive at all Neutral Very attractive →

1 2 3 4 5 6 7 8 9 10 11

Appendix II – Scenarios

1st Scenario:

Characteristic	*Definition*
Relation to current competences is **low.**	In-Situ plating is an opportunity that is not related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **low.**	In-Situ plating comes with minimal increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **low**.	Technical information about the In-Situ Plating opportunity is widely accessible to others.
The imitability of the opportunity is **low.**	It is not likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **high**.	The market position of the firm is stable after using the In-Situ Plating technology.

2nd Scenario:

Characteristic	*Definition*
Relation to current competences is **high.**	In-Situ plating is an opportunity that is highly related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **low.**	In-Situ plating comes with minimal increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **low**.	Technical information about the In-Situ Plating opportunity is widely accessible to others.
The imitability of the opportunity is **high.**	It is likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **low**.	The market position of the firm is unstable after using the In-Situ Plating technology.

3rd Scenario:

Characteristic	*Definition*
Relation to current competences is **low.**	In-Situ plating is an opportunity that is not related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **low.**	In-Situ plating comes with minimal increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **high**.	Technical information about the In-Situ Plating opportunity is not widely accessible to others.
The imitability of the opportunity is **high.**	It is likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **low**.	The market position of the firm is unstable after using the In-Situ Plating technology.

4th Scenario

Characteristic	*Definition*
Relation to current competences is **low.**	In-Situ plating is an opportunity that is not related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **high.**	In-Situ plating comes with significant increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **low**.	Technical information about the In-Situ Plating opportunity is widely accessible to others.
The imitability of the opportunity is **high.**	It is likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **high**.	The market position of the firm is stable after using the In-Situ Plating technology.

5th Scenario:

Characteristic	*Definition*
Relation to current competences is **high.**	In-Situ plating is an opportunity that is highly related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **low.**	In-Situ plating comes with minimal increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **high**.	Technical information about the In-Situ Plating opportunity is not widely accessible to others.
The imitability of the opportunity is **low.**	It is not likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **high**.	The market position of the firm is stable after using the In-Situ Plating technology.

6th Scenario:

Characteristic	*Definition*
Relation to current competences is **low.**	In-Situ plating is an opportunity that is not related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **high.**	In-Situ plating comes with significant increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **high.**	Technical information about the In-Situ Plating opportunity is not widely accessible to others.
The imitability of the opportunity is **low.**	It is not likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **low**.	The market position of the firm is unstable after using the In-Situ Plating technology.

7th Scenario:

Characteristic	*Definition*
Relation to current competences is **high.**	In-Situ plating is an opportunity that is highly related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **high.**	In-Situ plating comes with significant increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **low**.	Technical information about the In-Situ Plating opportunity is widely accessible to others.
The imitability of the opportunity is **low.**	It is not likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **low**.	The market position of the firm is unstable after using the In-Situ Plating technology.

8th Scenario:

Characteristic	*Definition*
Relation to current competences is **high.**	In-Situ plating is an opportunity that is highly related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **high.**	In-Situ plating comes with significant increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **high**.	Technical information about the In-Situ Plating opportunity is not widely accessible to others.
The imitability of the opportunity is **high.**	It is likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **high**.	The market position of the firm is stable after using the In-Situ Plating technology.

9th Scenario:

Characteristic	*Definition*
Relation to current competences is **low.**	In-Situ plating is an opportunity that is not related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **high.**	In-Situ plating comes with significant increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **low**.	Technical information about the In-Situ Plating opportunity is widely accessible to others.
The imitability of the opportunity is **high.**	It is likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **high**.	The market position of the firm is stable after using the In-Situ Plating technology.

10th Scenario:

Characteristic	*Definition*
Relation to current competences is **low.**	In-Situ plating is an opportunity that is not related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **low.**	In-Situ plating comes with minimal increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **high**.	Technical information about the In-Situ Plating opportunity is not widely accessible to others.
The imitability of the opportunity is **high.**	It is likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **low**.	The market position of the firm is unstable after using the In-Situ Plating technology.

11th Scenario:

Characteristic	*Definition*
Relation to current competences is **high.**	In-Situ plating is an opportunity that is highly related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **low.**	In-Situ plating comes with minimal increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **low**.	Technical information about the In-Situ Plating opportunity is widely accessible to others.
The imitability of the opportunity is **low.**	It is not likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **high**.	The market position of the firm is stable after using the In-Situ Plating technology.

12th Scenario:

Characteristic	*Definition*
Relation to current competences is **low.**	In-Situ plating is an opportunity that is not related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **high.**	In-Situ plating comes with significant increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **high**.	Technical information about the In-Situ Plating opportunity is not widely accessible to others.
The imitability of the opportunity is **low.**	It is not likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **high**.	The market position of the firm is stable after using the In-Situ Plating technology.

13th Scenario:

Characteristic	*Definition*
Relation to current competences is **high.**	In-Situ plating is an opportunity that is highly related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **low.**	In-Situ plating comes with minimal increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **low**.	Technical information about the In-Situ Plating opportunity is widely accessible to others.
The imitability of the opportunity is **high.**	It is likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **high**.	The market position of the firm is stable after using the In-Situ Plating technology.

14th Scenario:

Characteristic	*Definition*
Relation to current competences is **high.**	In-Situ plating is an opportunity that is highly related to the current knowledge, skills and abilities of the firm
The value of the opportunity is **high.**	In-Situ plating comes with significant increases in the efficiency and effectiveness of the production.
The rarity of the opportunity is **low**.	Technical information about the In-Situ Plating opportunity is widely accessible to others.
The imitability of the opportunity is **low.**	It is not likely that others can easily imitate, or develop substitutes for the In-Situ Plating technology.
The limits on competition is **low**.	The market position of the firm is stable after using the In-Situ Plating technology.

Appendix III – Reliability testing

Reliability results pretest in Excel

Profile	a	b	rank a	rank b	diff	diff^2		
3	4	5	1	2	-1	1		
3	5	4	2	1	1	1		
3	6	6	3.5	4	-0.5	0.25		
3	6	6	3.5	4	-0.5	0.25		
3	7	6	6	4	2	4		
3	7	7	6	7	-1	1		
3	7	8	6	9.5	-3.5	12.25		
3	8	9	8.5	11	-2.5	6.25		
3	8	7	8.5	7	1.5	2.25		
3	9	7	10.5	7	3.5	12.25		
3	9	8	10.5	9.5	1	1		
3	11	11	12	12	0	0		
						41.5	Rho	0.85
6	5	5	1	2	-1	1		
6	6	4	2.5	1	1.5	2.25		
6	6	6	2.5	3.5	-1	1		
6	7	9	5	12	-7	49		
6	7	6	5	3.5	1.5	2.25		
6	7	8	5	8.5	-3.5	12.25		
6	8	8	8.5	8.5	0	0		
6	8	8	8.5	8.5	0	0		
6	8	8	8.5	8.5	0	0		
6	8	8	8.5	8.5	0	0		
6	9	8	11	8.5	2.5	6.25		
6	10	7	12	5	7	49		
						123	Rho	0.57
8	1	1	1	1.5	-0.5	0.25		
8	2	3	3	4.5	-1.5	2.25		
8	2	2	3	3	0	0		
8	2	5	3	8.5	-5.5	30.25		
8	3	1	5.5	1.5	4	16		
8	3	6	5.5	11	-5.5	30.25		
8	4	3	9	4.5	4.5	20.25		
8	4	4	9	6.5	2.5	6.25		
8	4	4	9	6.5	2.5	6.25		
8	4	5	9	8.5	0.5	0.25		
8	4	6	9	11	-2	4		
8	8	6	12	11	1	1		
						117	Rho	0.59

Reliability results final sample in SPSS

```
NONPAR CORR
  /VARIABLES=Score3 Score10
  /PRINT=SPEARMAN TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Correlations

			Score3	Score10
Spearman's rho	Score3	Correlation Coefficient	1.000	.659**
		Sig. (2-tailed)	.	.000
		N	51	51
	Score10	Correlation Coefficient	.659**	1.000
		Sig. (2-tailed)	.000	.
		N	51	51

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

```
NONPAR CORR
  /VARIABLES=Score4 Score9
  /PRINT=SPEARMAN TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Correlations

			Score4	Score9
Spearman's rho	Score4	Correlation Coefficient	1.000	.439**
		Sig. (2-tailed)	.	.001
		N	51	51
	Score9	Correlation Coefficient	.439**	1.000
		Sig. (2-tailed)	.001	.
		N	51	51

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

```
NONPAR CORR
  /VARIABLES=Score7 Score14
  /PRINT=SPEARMAN TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Correlations

			Score7	Score14
Spearman's rho	Score7	Correlation Coefficient	1.000	.624**
		Sig. (2-tailed)	.	.000
		N	51	51
	Score14	Correlation Coefficient	.624**	1.000
		Sig. (2-tailed)	.000	.
		N	51	51

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

Appendix IV – Stata output

Direct effects

. rologit opp_att relatedness value rarity imitability limits_comp, group(respondent) ties(exactm)

Iteration 0: log likelihood = -689.44064
Iteration 1: log likelihood = -525.90201
Iteration 2: log likelihood = -518.7543
Iteration 3: log likelihood = -518.64128
Iteration 4: log likelihood = -518.64122
Refining estimates:
Iteration 0: log likelihood = -518.64122

Rank-ordered logistic regression Number of obs = 561
Group variable: respondent Number of groups = 51

Ties handled via the exactm method Obs per group:
min = 11
avg = 11.00
max = 11

LR chi2(5) = 341.60
Log likelihood = -518.6412 Prob > chi2 = 0.0000

Direct effects

opp_att	*Coef.*	*Std. Err.*	*z*	*P>z*	*[95% Conf.*	*Interval]*
relatedness	1.012121	0.1245527	8.13	0	0.7680017	1.256239
value	2.045868	0.1483975	13.79	0	1.755014	2.336721
rarity	0.745757	0.1174684	6.35	0	0.5155228	0.975991
imitability	-0.35988	0.1151383	-3.13	0.002	-0.5855513	-0.13422
age	-1.466	356786	0	1	-699290	699287
comp_age	0.908	.	.	.	.	.
comp_size	-0.024	.	.	.	.	.

Relatedness as interaction effect

. rologit opp_att relatedness value rarity imitability limits_comp c.relatedness#c.value
c.relatedness#c.rarity c.relatedness#c.imitability c.relatedness#c.limits
> _comp, group(respondent) ties(exactm)

Iteration 0: log likelihood = -689.44064
Iteration 1: log likelihood = -532.27364
Iteration 2: log likelihood = -514.41731
Iteration 3: log likelihood = -513.73413
Iteration 4: log likelihood = -513.73365
Refining estimates:
Iteration 0: log likelihood = -513.73365

Rank-ordered logistic regression Number of obs = 561
Group variable: respondent Number of groups = 51

Ties handled via the exactm method Obs per group:
min = 11
avg = 11.00
max = 11

LR chi2(9) = 351.41
Log likelihood = -513.7336 Prob > chi2 = 0.0000

Relatedness as interaction

opp_att	*Coef.*	*Std. Err.*	*z*	*P>z*	*[95% Conf.*	*Interval]*
relatedness	1.694318	0.9537192	1.78	0.076	-0.1749373	3.563573
value	1.266377	0.4278508	2.96	0.003	0.4278046	2.104949
rarity	2.194075	0.5595148	3.92	0	1.097446	3.290704
imitability	-0.46647	0.3919926	-1.19	0.234	-1.234765	0.301818
limits_comp	1.758541	0.5466408	3.22	0.001	0.6871443	2.829937
age	0.034	.	.	.	.	.
comp_age	-0.035	140096	0	1	-274583	274583
comp_size	0.000	39499	0	1	-77416	77416
c.relatedness#c.value	0.508343	0.2621246	1.94	0.052	-0.0054115	1.022098
c.relatedness#c.rarity	-0.88454	0.3232442	-2.74	0.006	-1.518092	-0.251
c.relatedness#c.imitability	0.11466	0.2347397	0.49	0.625	-0.3454212	0.574742
c.relatedness#c.limits_comp	-0.19125	0.3280531	-0.58	0.56	-0.8342214	0.451723

Company age as controlling variable

```
. rologit opp_att relatedness value rarity imitability limits_comp c.comp_age#c.relatedness
c.comp_age#c.value c.comp_age#c.rarity c.comp_age#c.imitability c.comp
> _age#c.limits_comp, group(respondent) ties(exactm)

Iteration 0:   log likelihood = -689.44064
Iteration 1:   log likelihood = -520.69173
Iteration 2:   log likelihood = -511.53839
Iteration 3:   log likelihood = -511.11759
Iteration 4:   log likelihood = -511.11505
Iteration 5:   log likelihood = -511.11505
Refining estimates:
Iteration 0:   log likelihood = -511.11505

Rank-ordered logistic regression              Number of obs     =        561
Group variable: respondent                    Number of groups  =         51

Ties handled via the exactm method            Obs per group:
                                                          min =         11
                                                          avg =      11.00
                                                          max =         11

                                              LR chi2(10)       =     356.65
Log likelihood =  -511.115                    Prob > chi2       =     0.0000
```

Controlling variable 'company age'

opp_att	*Coef.*	*Std. Err.*	*z*	*P>z*	*[95% Conf.*	*Interval]*
relatedness	1.476	0.293	5.03	0.000	0.901	2.051468
value	1.812	0.344	5.27	0.000	1.139	2.486276
rarity	0.926	0.278	3.34	0.001	0.382	1.470572
imitability	-0.297	0.270	1.1	0.271	-0.232	0.8268029
limits_comp	1.308	0.295	4.44	0.000	0.730	1.884994
age	0.023	.	.	.	.	.
comp_age	0.052	.	.	.	.	.
comp_size	-0.001	.	.	.	.	.
c.comp_age#c.relatedness	-0.007	0.004	-1.7	0.088	-0.015	0.0010722
c.comp_age#c.value	0.005	0.005	0.9	0.371	-0.006	0.0148773
c.comp_age#c.rarity	-0.003	0.004	-0.65	0.516	-0.011	0.0053046
c.comp_age#c.imitability	-0.011	0.004	-2.69	0.007	-0.019	-0.0029687
c.comp_age#c.limits_comp	-0.002	0.004	-0.54	0.589	-0.011	0.0062853

Education as controlling variable

. by edu, sort : rologit opp_att relatedness value rarity imitability limits_comp age comp_age comp_size, group(respondent) notestrhs ties(exactm)

-> edu = 0 (technical)

Iteration 0: log likelihood = -257.29006
Iteration 1: log likelihood = -192.04665
Iteration 2: log likelihood = -188.95294
Iteration 3: log likelihood = -188.87977
Iteration 4: log likelihood = -188.8797
Iteration 5: log likelihood = -188.8797
Iteration 6: log likelihood = -188.8797
Iteration 7: log likelihood = -188.8797
Iteration 8: log likelihood = -188.8797
Iteration 9: log likelihood = -188.8797
Iteration 10: log likelihood = -188.8797
Iteration 11: log likelihood = -188.8797
Iteration 12: log likelihood = -188.8797
Iteration 13: log likelihood = -188.8797
Iteration 14: log likelihood = -188.8797
Iteration 15: log likelihood = -188.8797
Iteration 16: log likelihood = -188.8797
Iteration 17: log likelihood = -188.8797
Iteration 18: log likelihood = -188.8797
Iteration 19: log likelihood = -188.8797
Iteration 20: log likelihood = -188.8797
Refining estimates:
Iteration 0: log likelihood = -188.8797
Iteration 1: log likelihood = -188.8797

Rank-ordered logistic regression Number of obs = 220
Group variable: respondent Number of groups = 20

Ties handled via the exactm method Obs per group:
min = 11
avg = 11.00
max = 11

LR chi2(7) = 136.82
Log likelihood = -188.8797 Prob > chi2 = 0.0000

Controlling variable 'Education'

opp_att	*Coef.*	*Std. Err.*	*z*	*P> (z)*	*[95% Conf.*	*Interval]*
relatedness	1.013	0.204	4.960	0.000	0.612	1.413
value	2.260	0.253	8.940	0.000	1.764	2.756
rarity	0.622	0.188	3.300	0.001	0.253	0.991
imitability	-0.442	0.193	-2.290	0.022	-0.821	-0.064
limits_comp	1.086	0.207	5.260	0.000	0.682	1.491
age	-0.070	1243742	0.000	1.000	-2437689	2437689
comp_age	0.117	.	.	.	.	.
comp_size	0.012	54123	0.000	1.000	-106080	106080

-> edu = 1 (non-technical)

Iteration 0: log likelihood = -432.15059
Iteration 1: log likelihood = -332.603
Iteration 2: log likelihood = -328.4204
Iteration 3: log likelihood = -328.36915
Iteration 4: log likelihood = -328.36913
Iteration 5: log likelihood = -328.36913
Iteration 6: log likelihood = -328.36913
Refining estimates:
Iteration 0: log likelihood = -328.36913
Iteration 1: log likelihood = -328.36913
Iteration 2: log likelihood = -328.36913

Rank-ordered logistic regression Number of obs = 341
Group variable: respondent Number of groups = 31

Ties handled via the exactm method Obs per group:
min = 11
avg = 11.00
max = 11

LR chi2(5) = 207.56
Log likelihood = -328.3691 Prob > chi2 = 0.0000

Controlling variable 'Education'

opp_att	*Coef.*	*Std. Err.*	*z*	*P> (z)*	*[95% Conf.*	*Interval]*
relatedness	1.017	0.158	6.450	0.000	0.708	1.326
value	1.924	0.184	10.480	0.000	1.564	2.284
rarity	0.830	0.151	5.490	0.000	0.534	1.126
imitability	-0.317	0.144	-2.200	0.028	-0.598	-0.035
limits_comp	1.192	0.159	7.480	0	0.880	1.504
age	0.131	.	.	.	.	.
comp_age	0.030	.	.	.	.	.
comp_size	0.004	.	.	.	.	.

Respondents age as controlling variable

. rologit opp_att relatedness value rarity inimitability limits_comp c.age#c.relatedness c.age#c.value c.age#c.rarity c.age#c.inimitability c.age#c.limits_comp, group
> (respondent) ties(exactm)

Iteration 0: log likelihood = -689.44064
Iteration 1: log likelihood = -521.66894
Iteration 2: log likelihood = -514.13848
Iteration 3: log likelihood = -514.00772
Iteration 4: log likelihood = -514.00763
Refining estimates:
Iteration 0: log likelihood = -514.00763

Rank-ordered logistic regression Number of obs = 561
Group variable: respondent Number of groups = 51

Ties handled via the exactm method Obs per group:
min = 11
avg = 11.00
max = 11

LR chi2(10) = 350.87
Log likelihood = -514.0076 Prob > chi2 = 0.0000

Controlling variable 'Age'

opp_att	*Coef.*	*Std. Err.*	*z*	*P> (z)*	*[95% Conf.*	*Interval]*
relatedness	0.84546	0.6431044	1.31	0.189	-0.4150011	2.105922
value	2.993421	0.7756958	3.86	0	1.473085	4.513757
rarity	1.187665	0.5952748	2	0.046	0.0209478	2.354382
imitability	-1.04002	0.5709947	1.82	0.069	-0.0791092	2.159149
limits_comp	1.767118	0.6426718	2.75	0.006	0.5075048	3.026732
age	0.024	.	.	.	.	.
comp_age	0.017	.	.	.	.	.
comp_size	0.000	.	.	.	.	.
c.age#c.relatedness	0.004182	0.0137177	0.3	0.76	-0.0227041	0.031068
c.age#c.value	-0.01967	0.0164648	-1.19	0.232	-0.0519436	0.012597
c.age#c.rarity	-0.00923	0.0126912	-0.73	0.467	-0.0340995	0.015649
c.age#c.imitability	-0.03039	0.0122695	-2.48	0.013	-0.0544352	-0.00634
c.age#c.limits_comp	-0.01315	0.0137432	-0.96	0.339	-0.0400861	0.013786

Company size as controlling variable

. rologit opp_att relatedness value rarity inimitability limits_comp c.comp_size#c.relatedness c.comp_size#c.value c.comp_size#c.rarity c.comp_size#c.inimitability c.
> comp_size#c.limits_comp, group(respondent) ties(exactm)

Iteration 0: log likelihood = -689.44064
Iteration 1: log likelihood = -522.02259
Iteration 2: log likelihood = -513.72638
Iteration 3: log likelihood = -513.54285
Iteration 4: log likelihood = -513.54264
Refining estimates:
Iteration 0: log likelihood = -513.54264

Rank-ordered logistic regression Number of obs = 561
Group variable: respondent Number of groups = 51

Ties handled via the exactm method Obs per group:
min = 11
avg = 11.00
max = 11

LR chi2(10) = 351.80
Log likelihood = -513.5426 Prob > chi2 = 0.0000

Controlling variable 'Company size'

opp_att	*Coef.*	*Std. Err.*	*z*	*P> (z)*	*[95% Conf.*	*Interval]*
relatedness	0.978508	0.2407632	4.06	0	0.5066202	1.450395
value	2.716915	0.3034417	8.95	0	2.122181	3.31165
rarity	0.645713	0.2306272	2.8	0.005	0.1936916	1.097734
imitability	-0.53747	0.2253164	-2.39	0.017	-0.9790821	-0.09586
limits_comp	1.496002	0.248664	6.02	0	1.008629	1.983374
age	-0.891	302472.8	0	1	-592837	592835
comp_age	0.100	166678.8	0	1	-326684	326685
comp_size	0.207	.	.	.	.	.
c.comp_size#c.relatedness	0.000198	0.0008148	0.24	0.808	-0.0013994	0.001795
c.comp_size#c.value	-0.00242	0.0009363	-2.58	0.01	-0.004251	-0.00058
c.comp_size#c.rarity	0.000417	0.0007721	0.54	0.59	-0.0010968	0.00193
c.comp_size#c.imitability	0.000677	0.0007369	0.92	0.358	-0.0007671	0.002121
c.comp_size#c.limits_comp	-0.00126	0.0007892	-1.59	0.111	-0.0028043	0.000289