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List of Abbreviations

CEO (Central Executive Officer)

EU (European Union)

GDP (Gros Domestic Product)

INV (International New Venture)

JD (Juris Doctor)

NVT (New Venture Team)

PhD (Doctor of Philosophy)

R&D (Research and Development)

ROA (Return on Assets)

ROS (Return on Sales)

SIC (Standard Industrial Classification)

TMT (Top Management Teams)

UET (Upper Echelons Theory)

USA (United States of America)

VC (Venture Capital)

VIF (Variance Inflation Factor)

1. Introduction

Top management teams and new venture teams in particular represent a special type of team and have been researched especially in strategic management literature from the beginning (Kozlowski & Bell, 2013). More precisely, the consequences of various new venture teams (NVTs) on organizational performance were primarily researched on the basis of the Upper Echelons Theory (UET) (Klotz, Hmieleski, Bradley, & Busenitz, 2014).

Back in the 1980s, the UET tried to establish a common ground for studies of different research areas which investigated different managerial characteristics. The aimed theory went even one step further and proposed that managerial characteristics are partly reflected in their organizations strategic choice and performances (Hambrick & Mason, 1984). Different further developments and several studies which refer to UET reflect the general acceptance of the theory. Whether managerial characteristics even influence the perceptual process which is further shaping management decisions as proposed have not been investigated very often (Hambrick, 2007). This led to treat this perceptual process as "black box". Over the years, the interest to study Top Management Teams (TMTs) has risen. Even though the investigation of single executives under UET still holds, a broader scope on the whole TMTs provides more explanatory power (Hambrick, 2007). Due to the fact that teams which perform actual joint decisions have to communicate at least some of their perceptions, makes the observability of certain parts of the information process simpler. The increasing interest in TMTs and the resulting openings towards researches about team-work, for example, as well as different findings from social psychological areas let brighten the "black box" to some extent. In a 2010 review on TMT diversity in the context of UET, it was revealed that UET was most often combined with social psychological theories (Nielsen, 2010).

The increasing occurrence of management groups which are responsible for major decisions in companies as well as raising interest in strategic management literature could have equally been noticed in the last three decades outside of decided UET (Kozlowski & Bell, 2013). Awareness to consider problems from different angels, more technical possibilities to illustrate them, as well as better technical support

to work in groups independent of time and space could be a few possible accelerators for this development. Following this developments, this study uses certain characteristics of executives, to investigate various team compositions, to indirectly draw conclusions on organizational performances as mentioned above (Hambrick & Mason, 1984).

1.1. Research Objective

Owed by prevalent use of secondary data and the former research interest of individual executive research on internal TMT processes has been growing slowly in the last two decades (Kozlowski & Bell, 2013). Even though secondary data constrains this thesis as well, internal processes were kept in mind during the design of the whole research approach of this study. This is furthermore reflected in the chosen subject of the research. The average NVT is a specific team where internal processes like behavioral integration, cohesion and interdependence are much higher as compared to the average TMT in big corporations. Moreover, studies on NVT on the basis of UET are rare to find. To the best of the author's knowledge, no study examined the impact of different compositions of managerial background characteristics in a team on total funding. As a result, this is interesting due to the fact that funding is one of the most important performance measures for new ventures.

Moreover, most of the studies about team characteristics used data samples which were collected before 2005. Only one study sample was found with data collected after 2010. However, it is not based on UET. The private low-cost database crunchbase pro as data source is also only used by the same study which do not use the framework of UET to investigate new ventures. Merely the technical developments which modified team work along with other developments like from social or economic nature make it especially interesting to study a sample containing new ventures which were founded after 2011.

Equally, this study used a measurement which in this context has only been used two times before. The so called transmission measure helps to distinguish between inter and intra heterogeneity of team members (Attneave, 1959; Buyl, Boone, Hendriks, & Matthyssens, 2011). Moreover, the study looks at the difference of heterogeneity and inequality on common investigated characteristics of executives (Blau, 1977).

Drawing from these gaps in recent research following research questions can be formulated:

- How do different compositions of managerial background characteristics within an NVT influence total funding of a new venture?
    - Is high heterogeneity in an NVT stimulating for organizational performance?
    - Do different heterogeneity characteristics vary in their influence on organizational performance?
    - Can total funding also be established as new venture performance measurement in UET?
- Can low cost samples drawn from private providers be sufficient to execute scientific analysis in UET?
    - Can enough quality data be gathered to analyze them as proposed by the theoretical concept of this thesis?
    - Do the characteristics of NVT members behave in the same way as the general UET would suggest?
- Do different variety concepts enrich UET?
    - Does horizontal team variety (heterogeneity) behaves in a different way as the vertical team variety (inequality)?

2. Literature Review

In the following chapter, the theoretical basis of the thesis – UET – will be explained. Firstly, the fundamental concept of UET will be elucidated. Subsequently, the shift from solely CEOs to TMTs as subject of interest in UET will be explained. By reviewing further research contributions two key mediators of UET, executive job demand and managerial discretion, will be finally illustrated in this chapter.

2.1. Upper Echelons Theory

Beside important contributions from other researchers, Hambrick is mainly responsible for the emergence of UET which the following literature review will expound.

UET examines why executives take specific decisions in various situations. The theory further attests an influence of executives' decisions on organizations which contribute considerably to an organization's outcomes like performance or strategic actions (Hambrick & Mason, 1984). In particular, a two-step approach tries to model the reasoning of why executives choose certain decisions for their organizations in particular situations. Firstly, UET states that executives decide and act based on their self-interpretations of a situation. In the second step, it claims that the interpretation of a situation is influenced by executives' experiences, values and personalities (Hambrick, 2007; Hambrick & Mason, 1984). These influences of executives' experiences, values and personalities are based on the limited cognitive base and values of decision makers which are present and influencing through the whole decision process. This decision process can be further illustrated as sequence which narrows down a hypothetical perfectly known situation to the manger's perception which will be the basis for the manager's strategic decisions. This selection process involves managers' attention to a specific situation (limited field of vision), an even greater selection of the manager to some selected aspects of the field of vision (selective perception) and the interpretation of the limited information (interpretation) (Hambrick & Mason, 1984; Hambrick & Snow, 1977). Hambrick and Mason (1984) further emphasized that managers' values are reflected in managerial perceptions but equally having direct influence on strategic choices.

The UET's conceptualization that the manager's perception of a situation is affected by personal experiences, values and personalities of managers is based on the findings by Carnegie School (Hambrick & Mason, 1984). The school with interdisciplinary approaches is known for its major contributions to behavioral economics in the 1950s and 1960s (Hosseini, 2003) and describes among others complex situations as not fully comprehensible. Thus, it especially emphasizes human limitations on decisions. Following, a large portion of the outcome of complex decisions is ascribed to the behavior of the decision makers instead of solely mathematical well-engineered decisions. One of the most famous concepts

of the Carnegie School is bounded rationality which is the assumption that people's decisions are never fully rational due to conscious and subconscious human constraints like limited knowledge or computational abilities (Simon, 1997). The described paradigm also marks the departure from the prevalent opinion of the consistently rational homo economicus of different economic theories in the 20th century.

As one of the most complex and influential management decisions strategic decisions and linked organizational outcomes are predestined to be examined with methods based on behavioral approaches like UET (Hambrick & Mason, 1984).

2.2. Top Management Teams

The conceptual idea of UET that powerful strategic decisions and organizational outcomes are influenced by CEOs raised the question whether a CEO is the only powerful person within an organization. Similar to the concepts of power-holders (Child, 1972) or dominant coalition (March, 1962) researchers began to shed light on the question who has power to influence the decision process within an organization. In other words, if other powerful persons beside the CEO can shape organizational decisions too and if UET still holds with this extension.

Finkelstein (1992) developed four dimensions of managerial power (structural, ownership, prestige and expert power). Three of these measurements – structural, ownership and prestige power – received strong empirical support. With the power dimensions a TMT can be weighted to obtain a more realistic picture of which members have how much influence on the team or on a certain project. Furthermore, subteams in different decision areas can be detected with the individual weightings of the particular TMT-members (Hambrick, 2007). Where managerial power investigates which actors have the possibility to shape organizational decisions within an organization, structural interdependence within the study of TMT shows how important actors are connected. Considering that only TMT exhibiting structural interdependences can affect each other, TMT interdependence (in more detail: horizontal, vertical and reward interdependence) represents an important moderator in the research of TMTs (Hambrick, Humphrey, & Gupta, 2015).

Behavioral integration goes one step closer and investigates the internal TMT process, i.e. how members of a TMT actually interact with each other. In distinction to structural interdependence which show if TMTs or other subgroups are structured to collaborate, behavioral integration examines the actual behavior of TMTs (Hambrick et al., 2015). The meta-construct of behavioral integration compresses information exchange, collaborative behavior and joint decision making of a team (Hambrick, 1995, 1997). Different determining factors of behavioral integration such as team diversity, age, collectivistic orientation, etc. have been found to be influential on CEO-level, team-level as well as on firm-level (Simsek, Veiga, Lubatkin, & Dino, 2005).

Behavioral integration does not only describe how team members interact among each other. As the leading executive, a CEO often has a decisive role within a TMT and is able to foster or hamper the influence of a TMT within the firm (Ling, Simsek, Lubatkin, & Veiga, 2008; Peterson, Smith, Martorana, & Owens, 2003). Behavioral integration can help the understanding of this interconnection between the CEO and their TMT and how their characteristics influence each other. One example is the influence of a CEOs ambidextrous leadership on TMT members' ambidextrous behaviors when behavioral integration is high (Luo, Zheng, Ji, & Liang, 2018). Another application of behavioral integration is as mediator between CEO characteristics and the link between TMT functional diversity and firm performances (Buyl et al., 2011). Even though the causal direction is hard to specify behavioral integration provides insights of how characteristics of a CEO, the single TMT members or the TMT as a whole influence organizational performances in the end.

Despite the fact that the meta-construct behavioral integration contains a social component with collaborative behavior, it is based on task-oriented constructs as well as on actual behavior on the social dimension. Often conceptualized with cohesion, social integration takes a decided look on social and psychological aspects. By leading to covariation between behavioral integration and social integration, they also have unique properties in describing team interactions (Li & Hambrick, 2005; Simsek et al., 2005). Although social interaction dimensions such as cohesion have often been mentioned in UET for years, solely behavioral integration, if at all, has been integrated into the study design for long time. In recent years, however, cohesion was decidedly investigated in UET (Hambrick et al., 2015). Also, measures

for cohesion like tenure were long investigated in UET but solely theorized as behavioral integration (Simsek et al., 2005). Especially the mediating effect of emotional conflict on behavioral disintegration (seen as integral of behavioral integration) as well as non-mediation effect of task conflict on behavioral disintegration shows the importance to investigate social integration (Li & Hambrick, 2005). A study, in which a moderating effect of TMT interdependence on the link between a two-factor model consisting of communication and cohesion and organizational performance is shown, (Barrick, Bradley, Kristof-Brown, & Colbert, 2007) perfectly illustrates the interaction of behavioral integration, social integration and structural interdependence.

Consequently, TMT interdependence as an indicator whether behavioral integration and/or social integration can emerge is a helpful tool thanks to simpler availability of indicators about TMT structure compared to actual lived team processes in a TMT. Despite additional interest in TMTs instead of individual CEOs, missing research on middle management as the executive layer and therefore responsible for the implementation of strategy is criticized (Wangrow, Schepker & Barker, 2015). By reviewing literature, it can be noted that even though basic UET with concentration on CEOs still holds. Although this is becoming much more complex due to internal TMT dynamics which will have to be considered further, additional attention on the TMT allow UET to gain more explanatory power to firm outcomes (Hambrick, 2007).

2.3. Managerial Discretion

No matter if the UET was applied solely on CEOs or on TMTs, the general validity of UET to predict company outcomes with characteristics of executives have been constrained by other theories. New institutional theory is one example. It mainly views the institutions and the governance as constraints, in which organizations are able to operate in (Williamson, 2000). As a consequence of this theory, the sphere of action for executives is also affected by these constraints. To address this and other contrary views, the UET has been limited by the introduction of a key mediator which is now known under the term managerial discretion (Finkelstein & Hambrick, 1990) and which will be described in the following chapter.

Managerial discretion can be seen as the latitude of executives to plan and carry out actions. Hence, managers with a greater sphere of influence in their companies work in a field of high-discretion. Companies in the surrounding of more dependencies, such as direct comparability or stricter legal requirements, will probably be embedded in a low-discretion setting for managers (Finkelstein & Hambrick, 1990). For UET high discretion settings lead to better predictability of organizational outcomes due to more direct effects of executives' characteristics on organizational outcomes. For organizations, bold and idiosyncratic actions mean, that the executive has more effect on the organizations for the good as well as for the bad (Crossland & Hambrick, 2011). In other words, it produces higher variations in outcomes.

Managerial discretion can be narrowed down to several internal and external influences on an organization. These influences can be grouped in three layers. A layer for environmental constraints or freedoms of an organization, a layer for the ability within the organizational structure to promote or impede executives in their strategic decisions, and a layer for the ability of the executives itself to assess several situations and to implement their decisions in the firm's strategy (Finkelstein & Hambrick, 1990), as well as how own managerial discretion is perceived by themselves (Carpenter & Golden, 1997). Referring to organizational research Hambrick and Finkelstein (1987) named this three determinants of managerial discretion: task environment, internal organization and managerial characteristics.

One example of organizational peculiarities is the firm size. As formulated by Lubatkin et al. (2006), TMT in small and medium enterprises often act in several fields of the organization enlarging their influence. Beside strategic decisions, they also operate often in the daily business fostering the knowledge transfer as well as the specific knowledge gain within the firm. On the other hand, TMT of larger firms are more affected by organizational influences, such as different product lines or market. This in turn enlarges the complexity of the organizational structure and shrinks their possibility to engage in each organizational level.

Since the implementation of strategic measures is dependent on resources, resources are a further influencing factor of managerial discretion on the organizational layer as well (Finkelstein & Hambrick, 1990). Nevertheless, resource-based views (Barney, 1991) are becoming more important in describing

firms performances since the 1990s. This is especially true in the service sector (Galbreath & Galvin, 2008). Moreover, industry is known as having an important influence of firm performance as well as a good measurement for environmental influences (McGahan & Porter, 1997, 2005; Porter, 1980). Depending on the different influences, actors in particular industries can be differentiated from each other as a whole or among distinctive characteristics. With a Standard Industrial Classification (SIC) based industry discretion rating (Hambrick & Abrahamson, 1995), researchers clustered numerous industries into two groups: one group with less environmental forces and one with high environmental forces. The results show that in industries with less environmental forces, so called high-discretion industries, CEOs influences on strategic decisions impact performance in contrast to CEOs influences on strategic decisions in low-discretion industries (Adams, Almeida, & Ferreira, 2005).

Beside industry, the macro-social environment also played a crucial role at managerial discretion in the last decade (Crossland & Hambrick, 2007). With knowledge from new institutional economics about informal and formal institutions, two contextual latent constructs could be formulated which further significantly load on managerial discretion, namely autonomy orientation and risk orientation of an country (Crossland & Hambrick, 2011). Despite this macro environmental view on managerial discretion being empirically under examined, other researchers found significant differences in culture on national level which affect managerial discretion (Haj Youssef & Christodoulou, 2017). Aside from cross-cultural effects, intra-cultural effects equally exhibit importance for managerial discretion. This is due to the fact that in homogenic cultures shared behavior is high which in turn enhance managerial discretion (Haj Youssef & Christodoulou, 2018).

Owing to the use of archival data, much less research has been done on the layer of internal organization and managerial characteristics as a current research review explains (Wangrow et al., 2015). Despite the less ambitious research, several characteristics have been identified as influencing managerial discretion on internal organizational level: inertial forces resource availability and internal political conditions (Hambrick & Finkelstein, 1987).

Inertia, which impedes discretion, can be expressed through forceful and diverse stakeholders or through the accessibility of resources (Finkelstein & Hambrick, 1990; Wangrow et al., 2015). A cause of inertia

can be resistance to change e.g. through a growing number of different stakeholders in an organization (Hambrick & Finkelstein, 1987) or the presence of the CEO`s predecessor on the organization's board which hamper the current CEO in her or his actions (Quigley & Hambrick, 2012). A characteristic showing inertia accompanied by increasing stakeholders is an organization's size (Sirén, Patel, Örtqvist, & Wincent, 2018). The property as archival data makes company size simple to observe too. Another example for internal organizational forces which affect managerial discretion is the organization's ideology. It has been shown that the organization's political ideology strengthen executives action if an executive follows the same political ideology as the organization (Gupta, Briscoe, & Hambrick, 2018). In other words, this is the case when the political ideologies coincide. In addition to different competing or matching internal forces, resource availability also influences inertia and consequently, discretion. Despite organizational slack being hypothesized as positively influencing discretion, due to limited available resources, no major significant influences could have been found by now (Finkelstein & Hambrick, 1990; Gupta, Nadkarni, & Mariam, 2019; McClelland, Xin Liang, & Barker, 2010; Quigley & Hambrick, 2012).

To at least the same extent as discretion on internal organizational level, managerial discretion on individual level exhibits very scattered attention at the beginning of UET. By contrast, in the last years the growing influence of psychology and the therefrom gained knowledge in different areas of economics and business administration enforced researchers to investigate psychological characteristics like behavior which were due to the challenging theoretical modeling and measurement often treated as black-box before. Therefore, researchers in the area of UETs began to investigate the individual managerial characteristics which influence managerial discretion. Some assumed characteristics from the very beginnings of research are, for example, managers aspiration level, commitment, tolerance of ambiguity, cognitive complexity, locus of control, power base or political acumen (Hambrick & Finkelstein, 1987).

Up until now, two directions which influence individual managerial discretion have been established. One is perceived managerial discretion describing the managerial discretion felt by the individual executive (intrapersonal nature), in contrast, the objective managerial discretion which illustrates the personal ability of the executives to win others over to the executives' perceptions and actions in distinctive

situations (Gupta et al., 2019). Distinctions, according to the described two paths, have already been mentioned by Carpenter and Golden (1997) as "intrapersonal" and "interpersonal phenomenon". In their pioneering research, Carpenter and Golden (1997) showed that the personal characteristic locus of control (Rotter, 1966) predicts perceived managerial discretion (intrapersonal nature) which positively influences managerial power (interpersonal nature) mainly in situations of low discretion issues. Recently, new measurements on the basis of personality traits were also tested for both paths. Moderating influences of extraversion for interpersonal properties and narcissism for intrapersonal properties on the relationship between the CEO's political ideology and their strategic actions were partly confirmed (Gupta et al., 2019).

Interpersonal characteristics as CEO's power base or CEO's structural power was conceptualized as CEO tenure (Finkelstein & Hambrick, 1990; Sirén et al., 2018) or CEO duality (Li & Tang, 2010) in literature. Even though it seems as intrapersonal managerial characteristics have found more interest in the last years. This is also reflected in the research of behavioral characteristics of executives which have to be distinguished from personality traits, which are comparatively deeper rooted in the personal. One example for behavioral characteristics is the concept of hubris (Roll, 1986), having been confirmed to influence executive's actions (Li & Tang, 2010). Furthermore, the intrapersonal managerial characteristic executive's commitment can be found in UET influenced research domains. Even though most of the research about executive's commitment to the firm's status quo was only conceptualized in reversed causal direction as dependent variable, a more recent study shows that the relationships seems to behave in the way as asserted by Hambrick and Finkelstein (1987). This study from 2010 shows that commitment to status quo is negatively linked to firm performances such as return on assets (ROA) and return on sales (ROS), when managers operate in high discretion industries (McClelland et al., 2010). This study further illustrates that managerial characteristics like commitment to status quo itself are influenced by determinants of the individual, organizational and industrial level of managerial discretion. Also the macro-environmental determinant society's cultural heterogeneity was found to influence managerial discretion (Haj Youssef & Christodoulou, 2018). This reveals the connectivity of characteristics within and across different layers of managerial discretion.

To summarize, managerial discretion is a high influential moderator between executives' characteristics and firm outcomes. Even though, many researches of the past decade demanded to do more research on the level of individual managerial characteristics recent years indicate a positive development. Nevertheless, more research has to be done on already used measures like tenure, this can stand for CEOs commitment (Hambrick, Geletkanycz, & Fredrickson, 1993) or CEOs structural power (Sirén et al., 2018), as well as on measurements which rely on data which are harder to collect like behavioral measurements. With more sophisticated measurements and increasing information about managerial discretion at all levels, attention should be also focused on how characteristics of different layers are interconnected. Following information about independency of characteristics could be used to differentiate characteristics from each other and identify better predictors for each level.

2.4. Executive Job Demand

Executive job demand is suggested to be another moderator in UET between managerial characteristics and organizational outcomes which should account for the difficulty experienced by an executive in her or his job (Hambrick, Finkelstein, & Mooney, 2005). This concept builds on the basis that distinguishes quantitative job demand – how much work is demanded – and qualitative job demand – role ambiguity and conflicting role demand (Janssen, 2001).

In line with the literature, Hambrick et al. (2005) noticed both sources of job demand but only consider the quantitative aspect of job demand in his analysis. It has further been theorized that executive job demand arises from two contextual factors (task challenge and performance challenge) and from a factor self-driven by the executive (performance aspiration) (Hambrick, 2007). The conceptualization of executive job demand proposes among others a reinforcement of the relationship of executive's characteristics and organizational outcomes as well as more extreme and wavering strategic behavior if experienced executive job demand is perceived as high (Hambrick et al., 2005). This assumption also reflects the underlying paradigm in UET of bounded rationality, postulating cognitive limitations in decision making (Simon, 1997). Specifically, high job demand that restricts deep evaluation and problem analysis in the decision process allows executives to rely more on experiences which seems to be reflected in their personal characteristics.

Although the concept of the intervening effect of executive job demand was introduced fifteen years ago, firm empirical evidence is still missing. One plausible reason for this lack of interest is the difficultly in observing executive job demand (Hambrick, 2007). To the best of the author's knowledge there is only one empirical study. The study, which investigates the reflection of CFOs' styles on firms' accounting practices, partly confirms a positive moderation effect of executive job demand (GE, Matsumoto, & Zhang, 2011).

While job demand is conceptualized as a second key moderator to UET (Hambrick, 2007), comprehensive research and empirical support is still missing. This is probably due to the difficulty of its measurement. Nevertheless, job demand is a theoretically promising attempt to open up the black-box between characteristics of executives and organizational outcomes.

The two key moderators of managerial discretion and executive job demand, as well as different TMT compositions and related concepts such as organizational interdependences and behavioral integration, express the need to examine settings, in which investigated TMTs are embedded and how they are interconnected. Further scientific interest in these intervening concepts indicates that UET opens up to other team literature (Kozlowski & Bell, 2013) which simultaneously reduces the critiques that UET miss to investigate moderating factors on e.g. team level (Klotz et al., 2014). In general, more information about the different settings of TMTs improve the validity of UET as well as predictions about how organizational outcomes will behave.

2.5. New Ventures and New Venture Teams

Given that a new venture is a specific form of an organization and a new venture team (NVT) is a distinctive type of team and TMT, the properties and peculiarities of both will be discussed in the paragraphs below.

2.5.1. New Ventures

If new ventures are seen as the outcome of entrepreneurial development (McDougall, 1989) or as the results of the creation of new organizations through individuals with entrepreneurial behavior, (Gartner, 1988) the question arises as to what entrepreneurship defines. In many circumstances, new ventures

serve more than one country due to advanced connectivity of global economy. This also correlates with a consistent level of high internationality in the San Francisco Bay Area, (Docquier & Rapoport, 2012; Saxenian, 2007; Wadhwa, Saxenian, Rissing, & Gereffi, 2007) where the investigated research sample comes from. This urges the need to consciously consider international entrepreneurship as representing its own research stream (Baier-Fuentes, Merigó, Amorós, & Gaviria-Marín, 2019; Keupp & Gassmann, 2009; Peiris, Akoorie, & Sinha, 2012; Zahra, 2005).

International new ventures (INVs), as result of international entrepreneurship, were once defined as new ventures with more than five percent of total sales derived from international activities (McDougall, 1989). Born globals, which share many similarities with INVs but are defined through even a higher foreign sales to total sales percentage (25 to 70 percentage) within the early years of foundation (Knight & Liesch, 2016; Peiris et al., 2012), accounted for almost 15 percent of young enterprises in the United States in 2008 (Eurofound, 2012). The lower threshold concerning foreign sales for INVs and referring to numbers of other countries (Eurofound, 2012) the percentage of INVs under new ventures seems to be much higher. These figures demonstrate the increasing development of new ventures with international characteristics.

In addition to entrepreneurship, the firm attributes age and/or size pop up when it comes to the term new venture or start up. Those attributes were also used for several researches (Amason, Shrader, & Tompson, 2006; McDougall, 1989; Nuscheler, Engelen, & Zahra, 2019). Even though these attributes are attached to some new ventures, it seems, that these attributes are not crucial enough to be part of a definition which should fit to as many new ventures as possible. As a result, after a decade of knowledge generation, some researchers came up with a broader definition. Therefore, the attributes of age and size, which tend to be very specific to e.g. different branches, were explicitly excluded from the definition of international entrepreneurship (McDougal & Oviat, 2000).

A definition of international entrepreneurship which highlights the opportunity to produce future goods and services (Oviatt & McDougall, 2005; Shane & Venkataraman, 2000) and value creation in different areas is the following:

> *"the recognition, formation, evaluation, and exploitation of opportunities across national borders to create new businesses, models, and solutions for value creation, including financial, social, and environmental" (Zahra, Newey, & Li, 2014, p. 138).*

Through the parenthesis about the cross national border activities, this definition is easy modifiable for international and domestic entrepreneurship. Furthermore, this definition has a profound research background and has been updated for the requirements of the current time. Hence, it fulfills all conditions to build the basis to define new ventures. Especially for those new ventures which are examined in this thesis.

2.5.2. New Venture Teams

Often new ventures are led by a group of individuals which are known as NVT. Despite grand similarities of NVT and TMT, some differences can be observed (Klotz et al., 2014). Especially in the context of this research about new ventures, it will be referred to the term of NVT as a sub term of TMT.

In the TMT, the individuals are often defined through executive titles like CEO, CFO or COO (Hambrick, Cho, & Chen, 1996). These are not that present in the early stage of development of new ventures. To specify founders as NVT members instead of employees with certain titles may also provide a solution to identify "real teams" (S. G. Cohen & Bailey, 1997). In other words, teams which are connected by its actual behavior. In general, individuals of NVT are often close relatives (Chang, Chrisman, Chua, & Kellermanns, 2008; Chua, Chrisman, & Chang, 2004) or strong supporters of the entrepreneurs (Edelman, Manolova, Shirokova, & Tsukanova, 2016), constituting an important pillar for new ventures in the early stages. However, a fact which highlight most differences is that NVT form at the birth stage of an organization. Hence, NVT has to set initial decisions on organizational goals or on how to organize the universal problems of division of labor and integration of effort (Puranam, Alexy,

& Reitzig, 2014), as compared to TMT of larger enterprises which can or must rely on already established organization structures (Ensley, Hmieleski, & Pearce, 2006). Moreover, NVT members team up together. As a result, each NVT member choses to join the team and the whole NVT choses a potential new member. Due to different stakeholders or reward systems in large organizations, TMT members do not always choose individually who to team up with. Therefore, the internal team harmony is assumed to be better in NVT than in TMT (Beckman, Burton, & O'Reilly, 2007). Another thought which summarizes all these differences caused by the nascent stage of an organization is that founders have to solve entrepreneurial decisions in the so called "prefirm", which is a development stage before the actual founding of the organization (Sarasvathy, 1998).

Summed up, most of the differences between TMT and NVT do not only seem to emanate from the uniqueness of the nascent stages of new ventures, they also stem from definitions identifying TMTs by characteristics which are not already established in NVTs.

2.5.3. Implications of NVT in UET

Drawing on the peculiarities and assumptions of new ventures and NVTs which were explained before, several implications for UET can be deduced. Especially, the prevalent internal and external environment of new ventures can be used to estimate if UET is a good method to predict organizational outcomes. These circumstances are discussed in the following paragraph.

Managerial discretion, or the latitude of action, resulting of different factors on environmental, organizational or managerial level is postulated to be very high in NVT (Klotz et al., 2014). On organizational level, for example, several characteristics of new ventures promote managerial discretion. Resultingly, new ventures organizations have a relatively low number of stakeholders. Consequently, inertia is assumed to be very low in new ventures. Furthermore, the lack of already set internal political orientations, as well as the lack of opposing political orientations of the organization and its founders reduce possible constraints. It is generally posited that founders, as some of the first individuals in the organization, substantially form the organization's culture, which can partly even persist after they leave the organization (Beckman & Burton, 2008; Mintzberg & Waters, 1985; Staw, 1991). The new venture characteristic of a small organization also allows NVTs to participate in tasks such as the implementation of

strategy; this is in contrast to TMTs (Lubatkin et al., 2006), leading to less possible intervening effects between the NVT and organizational outcomes. Additionally, resource allocation is not as predominant as in established organizations, even though it can be assumed that there are less resources in general in new ventures as compared to established firms.

High managerial discretion can be also presumed when the individual managerial level is examined. Thus, it sounds plausible if founders are linked to characteristics like high aspiration level, high commitment and tolerance of ambiguity which are further all linked to high discretion (Hambrick & Finkelstein, 1987). A current research on psychological traits in entrepreneurship proved that personality profiles, which are high in extraversion, conscientiousness, openness and low in agreeableness and neuroticism, predicts entrepreneurial activities mediated by so called characteristic adaptations (which are a span of psychological characteristics like habits or attitudes and many more) like risk-taking or internal locus of control (Obschonka & Stuetzer, 2017). Also, compared to managers in particular, founders score even higher on the personality traits of conscientiousness and openness to experience and lower on the traits neuroticism and agreeableness (Zhao & Seibert, 2006). In psychology, it is also suggested that "weak situations", which are somewhat comparable to high discretional situations, psychological personality traits are more observable than in "strong situations" (Snyder & Ickes, 1985). In total, this nascent research on personality traits and related characteristics and behaviors of entrepreneurship also supports the interpretation of high discretion on managerial level in NVT.

As already discussed in the respective section, high job demand allows executives to rely more on their experiences. In particular, founders seem to have high job demand, at least during the creation of their first new ventures. They have to challenge with initial tasks in the organization, deliver good performance as they want to fulfill their own and/or investors' goals and pursue probably high aspiration level as they have to build up their reputation.

Moreover, behavioral and social integration of NVTs can be assumed as one of the highest among different kinds of teams in an organization. This seems mainly to be indebted to the fact that NVT face circumstances which are very beneficial for TMT integration during and before the constitution of the NVT. Accordingly, each NVT member participates in the team formation, as compared to TMTs which

are often formed, for example, by owner or other stakeholders (Beckman et al., 2007). Equally, resolving entrepreneurial decisions in the "prefirm", which is a pivotal hurdle for the creation of a firm and its identity (Sarasvathy, 1998), may foster the behavioral and social integration of NVTs.

In summary, an NVT faces situations which tend to be characterized by high discretion on different levels, high behavioral integration, high social integration as well as high job demand. According to UET, such situations are ideal prerequisites for observing relationships between characteristics of the NVT, its members and organizational outcomes.

3. Research Model and Development of Hypotheses

In the following section the research model of this thesis will be developed on the basis of the literature review from the previous chapter. During the development of the research model, the individual hypotheses of this thesis will be stated in this section too.

3.1. Heterogeneity

Before closely analyzing each of the heterogeneity characteristics, which are studied in this thesis, the general concept of heterogeneity as well as its consequences will be discussed in the following paragraph.

In order to describe the occurrence and the distribution of different characteristics of people of a group such as NVT members, several similar expressions like diversity, heterogeneity and dissimilarity were used (E. Randel & Jaussi, 2003; Hambrick et al., 1996; Harrison & Klein, 2007). Referring to Hambrick and Mason (1984) heterogeneity was initially used in UET. This is also corroborated by Blau (1977) who attaches the term heterogeneity to nominal parameters of difference (such as occupation, industry, race) and graduated parameters (status parameters such as prestige, power, income) to the term inequality. Therefore, Blau distinguished between differences on horizontal level (heterogeneity) and on vertical level (inequality). Measuring inequality, however, as distance from the mean produces a paradox. Thus, if there is a maximum level of inequality, a population is divided in solely two groups. This can be imagined as one individual, who holds most of the wealth, and a group of individuals, in which each

individual holds the same small amount of wealth. Despite the occurrence of high inequality, there only exist two groups in the whole population. This low variety in groups are measured in status diversity which is the pedant to heterogeneity for graduated parameters (Blau, 1977).

Harrison and Klein (2007) also noticed inconsistent uses of the various terms of differentiation. With a special focus on diversity within units, they subdivide the umbrella term diversity into separation, variety and disparity. In this case, disparity is equal to the above described concept of inequality and variety is equal to the already mentioned concept of heterogeneity. Separation refers to the degree of dissimilarity of e.g. beliefs of members of a common group (Harrison & Klein, 2007). With this concept of variety and disparity various group properties can be investigated; such as, how members diverge based on their qualities or rank, how these different qualities or ranks are distributed overall qualities, and how the different group varieties effect group outcomes (Harrison & Klein, 2007).

The Greek term heterogeneity is often interchangeable used with the Latin term diversity, especially in social science. Even though heterogeneity was initially used by Hambrick and Mason (1984), as mentioned before, Hambrick also uses diversity as synonym in recent years (Hambrick, 2010). Based on the theoretical framework and the measurements used in this thesis the term heterogeneity and inequality will be primarily deployed. They are furthermore used to express the investigation of a specific type of diversity. Diversity is avoided and only used as an umbrella term.

Over the years, different consequences of miscellaneous organizational teams, such as TMT or NVT, were theorized and, in part, significantly confirmed (Amason et al., 2006; Buyl et al., 2011; Carpenter & Fredrickson, 2001; Hambrick et al., 1996; Nuscheler et al., 2019; Shrader & Siegel, 2007). Due to the complexity of group heterogeneity, different consequences of heterogeneity are discussed in most of the studies. These different consequences can mainly be sorted into two contradicting groups, one which highlights a greater information basis due to various team members and a second one which stresses the difficulties of sharing, identifying and valuating different information within a highly heterogenous group. The block which emphasizes the positive effect of diverse groups mainly builds on the concept that teams can source from a broader set of knowledge and experiences. Ultimately, this leads to better group outcomes (Austin, 2003; Levine & Smith, 2013). Of course internal factors within

the various teams can also have influence, if a group can draw from the full potential of its various members (Austin, 2003; Hambrick, 2007). Most recognized internal factors, which can hinder positive effects, are the behavioral integration of team members as well as the team integration on psychological and social level, often being summarized under team cohesiveness (Ensley & Hmieleski, 2005; Ensley, Pearson, & Amason, 2002; Hambrick, 1995; O'Reilly III, Caldwell, & Barnett, 1989; Simsek et al., 2005). Additional to the complexity of team member interaction, the negative aspects of various teams which are often discussed as well are rare time to tackle a problem or situations in which a problem was already solved repeatably (Hambrick & Mason, 1984). The complex interaction of benefits and detriments causes most of the studies to emphasize the simultaneous occurrence of positive and negative effects and try to describe situations in which the negative effects are low or not present and vice versa.

Summed up, positive as well as negative effects of heterogenous teams can be found in any NVT. Consequently, it is also debated in most of the studies regarding the below discussed heterogeneity characteristics. Hence, it is not discussed in each paragraph which follows. In line with most of the studies already mentioned, and those further to come, it will be assumed that benefits of various teams, in general, outweigh the burdens if NVTs manage to organize their internal factors in a way that diversity has at least the possibility to flourish.

3.2. Dependent Variables

In the following section, the dependent variable new venture performance will be described in detail.

3.2.1. New Venture Performance

To study the impact of characteristics of new venture founders on new venture performance, the following measures were used: IPO and time to IPO (Beckman & Burton, 2008; Beckman et al., 2007; Shane & Stuart, 2002; Q. Yang, Zimmerman, & Jiang, 2011), time to venture capital funding (Beckman & Burton, 2008; Beckman et al., 2007; Shane & Stuart, 2002), growth represented by employment growth (Brinckmann & Hoegl, 2011; Nuscheler et al., 2019), sales growth (Lubatkin et al., 2006; Vissa & Chacar, 2009) or a combination of different growth measures (Amason et al., 2006; Zheng, 2012). Beside those more often used and conventional measures also organizational death and survival (Aspelund,

Berg-Utby, & Skjevdal, 2005; Box & Larsson Segerlind, 2018; Headd, 2003), valuation of IPO (Lester, Certo, Dalton, Dalton, & Cannella, 2006) and many more (Klotz et al., 2014; Zhou & Rosini, 2015) were utilized as performance measures.

The acquisition of financial resources, in particular, venture capital (VC) and the IPO, which are additionally very important milestones for new ventures (Shane & Stuart, 2002), can be taken as performance measures when traditional measurements are hard to observe, like in the case of new ventures (Q. Yang et al., 2011). Although it is important to notice that reaching an IPO is also influenced by previous VC funding (Beckman & Burton, 2008; Hsu, 2006; Shane & Stuart, 2002). Moreover, capital funding seems to be a better descriptive in new venture environment. This is according to the invested financial capital at founding stage also positively influences sales turnover (Alsos, Isaksen, & Ljunggren, 2006) and organization growth afterwards on the basis of number of employees (Cooper, Gimeno-Gascon, & Woo, 1994).

Due to the important milestone character, the dependency on other measures like IPO, and the occurrence in numerous other studies, VC funding will be used as performance measure of new ventures in early stages. Nevertheless, to the best of the authors knowledge, no study was published which used total amount of raised funding capital measured in USD as dependent variable under the framework of UET. Only similar, pre-money valuation as dependent variable could be found (Chatterji, 2009; Higgins & Gulati, 2003; Hsu, 2007).

3.3. Independent Variables

In the subsequent sections the different independent variables sex, working experience, educational experience and industry experience will be discussed.

3.3.1. Sex and Gender in NVT

As expected from the sample of this thesis with new ventures operating mainly in high technology medical and software related areas male founders are prevalent (see section 4.1.2 Sample Description for more details). Even though the predominance of male founders in industry could be considered to lead to even greater disadvantages for women founders, the opposite is the case, as recent researchers proved

(T. Yang & del Carmen Triana, 2019). More female representatives in the founder team and therefore, more balanced founder teams also impacts female employees through better understanding of their employees or role model function which results in e.g. better innovative performances (Dai, Byun, & Ding, 2018).

The effect on new venture performance, however, shows a different picture. Studies based on different theoretical frameworks show a significant negative effect of female founders on new venture performance (Alsos et al., 2006; Bosma, van Praag, Thurik, & de Wit, 2004; Box & Larsson Segerlind, 2018; T. Yang & del Carmen Triana, 2019). Theoretically and methodical though, discussions are still ongoing and evolving as the field expands. Equally, a more general view on teams provides further arguments to be curious about this characteristic. For example, research on group decision making showed that even one female member in an otherwise male group would increase the quality of the decision due to the higher sharing of information in miscellaneous groups (Keck & Tang, 2017). A closer look at new venture funding performance and female founders reveals intermediates. As a result, it has been found that received funding was crucial for better performance afterwards and that female founders receive less funding than men and generated lower performance later on (Alsos et al., 2006). This may represent a deeper insight where later negative effects might come from.

Beside findings based on different theoretical frameworks, which show that female founders in new ventures has negative effects on new ventures performance (Box & Larsson Segerlind, 2018; T. Yang & del Carmen Triana, 2019), it seems as societal changes in the late 20th and early 21th century play a crucial role too. It is reported as such by Box and Larsson Segerlind (2018), in that the negative effects of female founder on performance have decreased. This allowed them to conclude that this decrease is one outcome of emerging non-discriminating especially formal and informal institutions since the late 20th century, in other words, an outcome of changing social norms. This view of more equal institutions over time is as well supported by an increase of women participating in entrepreneurship in general (Kelley et al., 2017). As Balachandra, Briggs, Eddelston and Brush (2019) currently show, capital investors are not biased by the founder's sex but more influenced by the founder's gender-stereotyped behaviors. This study confirms that feminine gender-stereotypical behaviors results in a lower finalist

rate at pitches (Balachandra et al., 2019). These findings open up further questions; firstly, whether entrepreneurship is defined in a masculine way; secondly, whether potential stereotypical-feminine behaviors, which are favorable for new venture creation, should get more attention; finally, whether the exuberant proportion of male venture capitalists (Brush, Greene, Balachandra, & Davis, 2014; Ewens & Townsend, 2020) is a source of negative perception of gender-stereotypical feminine behavior in the context of entrepreneurship. Furthermore, it shows the importance to distinguish research on the characteristics sex and gender in upper echelon theory as it is already done in other research fields as in the area of leadership in the military sector (Boldry, Wood, & Kashy, 2001).

Due to constrains of the secondary data sample, it was not possible to get data about the founder's gender, instead only the founder's sex, where coded on the basis of names and pictures as described in section 4.2.1 Sex Heterogeneity. Even though the author believes that capital givers still connect stereotypical gender roles with the founder's sexes in a setting of non-artificial research designs like secondary data. In sum of all these previous findings it is hypothesized that a negative relationship between female sex and received funding capital will be observed. Which consequently also results in a negative relationship between a sex balanced NVT and it's received funding.

H 1a: Sex balanced NVT will obtain less funding compared to sex unbalanced NVTs.

H 1b: NVT with at least one female founder will negatively influence NVTs' funding.

3.3.2. Human Capital of NVT

Some major investigated characteristics of founders of NVTs like educational experience, industry experience or working experience can be summarized as human capital. This circumstance shows that UET overlaps with other theories, such as the human capital theory (Datta & Iskandar-Datta, 2014). In line with Becker's (1964) definition, human capital can be divided into two concepts: task and non-task related human capital as well as human capital investment and the outcome of human capital investments. Task related human capital, like running a new venture in general, running new ventures in specific industries or IPO experience are always related to a concrete needed task. On the other hand, non-task related human capital are, for example, general educational experience or employment experience

which are not directly related to the current tasks of newly founded ventures according to Unger, Rauch, Frese and Rosenbusch (2011). Nevertheless, task and non-task related human capital is very specific to the different tasks which organizations has to fulfill. Accordingly, specific educational experience could be important when teams try to establish products which are new to the market. Marvel, Davis and Sproul (2016) also criticized this concept in the same way because of the oversimplification and some cases of gray area. They suggest that experience will be more or less task related dependent on how past experience is similar to the current task. Nevertheless, the critic of the concept helps to identify if human capital will immediately contribute to firm success as it does in the case of task related human capital. Compared to non-task related human capital which can eventually be from importance in later development stages or under other environmental circumstances.

The second concept of human capital investments versus outcome of human capital investments takes into account that human capital investments, such as study experience or different working experience, must not necessarily create knowledge or skills. Therefore, harder observable outcomes are better predictors for success compared to human capital investment, due to their direct way to measure skills and knowledge (Unger et al., 2011).

In the following paragraphs human capital characteristics working experience, educational experience as well as industry experience will be discussed.

3.3.2.1. Working Experience

Social networks, working methods, working culture and other experiences of working places can be summed up as outcome of "workplace socialization", as Carpenter and Fredrickson (2001) describe it. If previous working fields have some impact on founders of NVTs has also been a long-studied issue in UET. In several studies different previous work fields were compared and modeled into different measurements.

As Beckman and Burton (2008) found out founding teams functional experience is a key driver for subsequent TMTs experience. Moreover, this and a previous study show that functional experience of founding teams and TMTs is an important predictor for VC funding. They further suggest that functional

experience may be overrated by venture capitalists compared to the public market (Beckman & Burton, 2008; Beckman et al., 2007). Despite this, Zimmerman (2008) was able to find a significant positive influence between functional heterogeneity of NVT and IPO value. However, under presence of other personal characteristics like management or start-up experience the signal of a diverse founding team becomes less important (Beckman et al., 2007).

In contrary to low uncertainty, environments of high uncertainty allow associate functional heterogeneity, negative to global strategic posture, and interpreted as a shortcoming of less information exchange caused by time pressure during volatile times (Carpenter & Fredrickson, 2001). This can be interpreted as disagreement of which information and goals are relevant for strategic orientation when times become uncertain or as a back reflection on better known core markets. Another study with a combined uncertainty measurement, as well as revenue and employment growth as an explained variable, interestingly adds that functional heterogenous NVTs are superior during industry dynamism when they are led by a directive leadership style (Hmieleski & Ensley, 2007). In the same vein, CEO characteristics also influence performance when it comes to dynamic industries. Thus, it was found that CEOs with broader background, or so called generalists, as well as founder CEOs performed less profitably when they manage a functional heterogenous teams (Buyl et al., 2011). Further support for the advantages and the disadvantages of functional heterogenous teams is offered by Hambrick, Cho and Chen (1996). In their investigation it was shown that functional heterogenous teams not only need more time to execute but also to prepare and response to strategic actions. Ultimately, however, there are more positive aspects in heterogenous teams, which are reflected in higher growth of profits and market shares (Hambrick et al., 1996). This can be a result of more innovativeness through functional heterogenous teams (Dai et al., 2018). Moreover, this beneficial innovational characteristic of heterogenous teams works best if the organization concentrate on one or few products and loses on impact when more products has to be accelerated (Nuscheler et al., 2019).

This thorough investigation into the relation between heterogenous team functionality and performance outline that heterogeneity leads to better solutions on the market due to greater information and more different perspectives. The downside of this, however, is the required commitment for higher resources

of time and communication. These downsides seem to be compensated by managerial tools like directive leadership behavior which emphasizes execution and detection of time restricted possibility to not be stuck in the innovation process. Conversely in times of growing and expanding after new solutions are brought to the market it seems to be as the importance of fully heterogenous NVTs are rapidly losing ground or even imped further profitability. For a research on new ventures which develops new products with high innovation aspiration following hypothesis are set up:

H 2: NVTs which are balanced in functional working experiences will obtain more funding compared to NVTs with homogenous functional working experiences.

3.3.2.2. Educational Experience

In previous UET based researches often educational characteristics were limited on the level of formal education (Chuang, Nakatani, & Zhou, 2009; Cooper et al., 1994; Hsu, 2007; Papadakis & Barwise, 2002), on binominal measures like business non-business related education (Geletkanycz & Black, 2001; Nuscheler et al., 2019) or on comprised heterogeneity measures (Ensley & Hmieleski, 2005; Hmieleski & Ensley, 2007). Despite the insights gained from the measurements listed above, they did not investigate the influence of the full range of educational specialization on NVTs' decision basis. With this in mind, this section focuses, first on studies which have done research on a broader range of educational specialization to describe the breadth of education. Subsequent studies on formal education level will be disused to gain insights about educational depth and how it influences NVTs.

Heterogeneity in educational specialization was found to support global strategies even during uncertainty (Carpenter & Fredrickson, 2001). Facing conditions in which high novelty products and services have to be sold, heterogeneity overall as well as educational specialization in particular are negative related to sales, profitability and stock market performance (Amason et al., 2006). In line with UET, in general, educational specialization was also slower in strategic executions and reactions but, in the end, more supportive for growth in profit and market shares (Hambrick et al., 1996). Related to the IPO valuation, heterogenous educational specialization of a team is beneficial too (Zimmerman, 2008). This view on previous studies highlights the scattered findings which are very specific to particular situations. Apart from the fact that only one of the studies mentioned above looked into new ventures, it has to be

mentioned that all data were sampled in the 1980s and 1990s and therefore are difficult to compare with today's economic conditions.

As a measure of educational depth, the team's educational level measured against strategic actions and performance measures like market or sales growth follows a positive relationship (Hambrick et al., 1996). Moreover, small business and new ventures performance are positively connected with higher educational levels (Åstebro & Bernhardt, 2003; Cooper et al., 1994; Devine, Molina-Sieiro, Holmes, & Terjesen, 2019; Headd, 2003) and have a lower possibility to close the business (Fairlie & Robb, 2009). Beside some unfound relations (Dimov, 2010; Robb & Watson, 2012), there was no study found which indicates a negative relationship between the team's educational level and the firm's performance in new ventures. Only one study in new venture context was found which measured the heterogeneity of the educational level. This study exhibits a positive effect of heterogenous educational level on sales growth along with several negative influences of heterogenous educational level when the firm is selling highly novel services and products (Amason et al., 2006).

Alongside the consequences of educational background on founders' choices in their new ventures especially, the characteristic of education is further an important signal to firm outsiders like financiers. Signaling is also well known from principal agent theory and mainly coined by Michael Spence (1973, 1974). It is one way to handle information asymmetry which is omnipresent in situations of investments. By reason of their standardization and rankings, a particular educational level and universities are simple to communicate to people who are interested in founders' characteristics. Summed up under education prestige, educational level and prestigious universities were found to be positive related with IPO valuation of investors (Lester et al., 2006). A conjoint analysis on venture capitalists' valuation also revealed that heterogenous field of educations (partly engineering, partly management) and university degrees are important NVT characteristics. The latter are even more important for unexperienced venture capitalists (Franke, Gruber, Harhoff, & Henkel, 2008). In developing industries Hsu (2007) reasons further that a PhD is a positive signal for venture capitalists and the stock market.

Following these insights, it is of importance to distinguish between educational level and educational specialization, in order to identify educational breadth and depth. Furthermore, the study takes a closer

look at educational level. It does not only explore the amount of team educational level in an NVT. Hence, the study also deals with the balance (or inequality) of educational levels. This would also give some information if NVTs with individuals on different formal level of education would contribute differently to the firm's performance. One reason for difference in performance could be that different educational levels could prevent team members from communicating in specific terminology. This forces them to explain and describe their thoughts more often and maybe in other ways than usual. This could additionally promote out-of-box thinking as well as rethinking and validation of their own thoughts. In the best case, it would promote internal communication and therefore strengthen team structure. In the worst case, different levels of education within a team could be a cause for even less communication and mutual understanding which would than further result in a lower new venture performance. Additionally, it must be considered that balanced variety (or inequality) of educational level and high team educational level are contradicting. Due to numerous findings, which show a positive link between high educational level and the firm's performance, a positive influence will be assumed for this study too. This in contrast would imply a negative influence on new venture performance through NVTs which are balanced in educational level. As a result of the overall findings the following hypothesis about educational characteristics are formulated:

H 3: NVTs which are balanced in educational specialization will obtain more funding compared to NVTs with homogenous educational specialization.

H 4a: NVTs which are balanced in educational level will obtain less funding compared to NVTs with homogenous educational levels.

H 4b: NVTs with higher mean educational level will obtain more funding compared to NVTs with lower mean educational level.

3.3.2.3. Combined Experienced Qualification

Recently, it was suggested separating a universal heterogeneity measure into heterogeneity measures of different attributes as sex, working experience or educational experience (Nielsen, 2010). However, few studies combined different attributes to form an overall heterogeneity index like a heterogeneity index

composed of educational experience, functional experience and industry tenure (Ferrier, 2001). Regardless, this study tries to decompose NVTs heterogeneity into different heterogeneity attributes, one combined heterogeneity measurement was considered. However, it is not in the sense of this study to generate an overall NVT's heterogeneity measurement. The combined measurement of this study should only combine the two attributes of working experience heterogeneity and educational experience heterogeneity, which both measure the heterogeneity of experienced qualification within an NVT. Further the combined variables are theorized both as heterogeneity and therefore measure diversity in the same way. This combined measurement should assess if an overall experienced qualification heterogeneity has an impact on organizational outcome. This is further important to determine which underlying attribute is more important. Secondly, it should account for the fact that educational experience heterogeneity as well as working experience heterogeneity are measured through finished studies and past working positions which is the best proxy generated by the sample data but do not measure the actual qualifications of the NVT members. The combination of the two attributes, which is also harder to achieve for NVTs, should generate a better approximation to evaluate NVT's overall qualification heterogeneity compared to the single attributes educational and working experience heterogeneity. As a result, it is believed that NVTs which have high heterogeneity in both attributes are also more heterogeneous in other aspects as well as have a greater potential to have a high heterogeneity score of the more important outcome of human capital investments which cannot be measured with the sample data.

Relating to the theoretical thoughts of educational and working experience heterogeneity the combined measurement experienced qualification should influence total funding of new ventures in the same way. As a result, following hypothesis was developed:

H 5: NVTs which are balanced in experienced qualification will obtain more funding compared to NVTs with homogenous experienced qualification.

3.3.2.4. Industry Experience

Industry as macroeconomic determinant for organizations and people who work within was already discussed in the first work of UET (Hambrick & Mason, 1984). Knowledge creation about the peculiarities of an industry drives the basis of decision-making too. It is known that TMTs with long tenure in

engineering oriented industries execute less entrepreneurial strategies than more heterogenous TMTs with managers from outside of the industry in times of industry deregulation (Cho & Hambrick, 2006). Similarly this holds for new ventures where the amount of founders in an NVT contributes more to sales growth than the amount of NVT's industry experience, as growing industry experience hamper the identification of entrepreneurial opportunities (Kor, 2003).

On the other hand, industry experience is advantageous in gaining realistic prospects about the firm's future success of new ventures. This is especially in uncertain settings, e.g. within a high-tech industry (Cassar, 2014). It is further beneficial when resources are scarce, for example when the new venture pursues a low-cost strategy (Shrader & Siegel, 2007). In other words, industry experienced founders know which screws have to be turned to achieve the desired impact under commonly known industry conditions. Industry experience further supports new ventures survival chance and factors of growth (Bosma et al., 2004; Bruderl, Preisendorfer, & Ziegler, 1992; Cooper et al., 1994). The positive relation of industry experience on initial capital investments (Bruderl et al., 1992) is in special interest of this study. This is due to the fact that initial capital investments are the basis of further new venture success, as discussed in the section 3.2.1 New Venture Performance. Beside these links to different new venture characteristics, industry experience is also the most preferred characteristic for new venture evaluations of venture capitalists (Franke et al., 2008). Therefore, it is hypothesized that industry experience of NVT can be promising for organizations through better market knowledge, skills and identification of important opportunities and social ties of the industry (Chatterji, 2009; Delmar & Shane, 2006; Nuscheler et al., 2019). Nonetheless, it has to be mentioned that industry experience is a competitive advantage which is universal to organizations in a particular industry. Therefore NVTs can also achieve this advantage through later employment of employees experienced in the industry (Kor, 2003).

Apart from special circumstances like the above mentioned deregulation, negative influences of NVTs industry experience on new ventures could only be found very rarely so far (Shrader & Siegel, 2007). Further hypothesis regarding industry experiences in NVT appeared to be non-significant (Dimov, 2010; Schoonhoven, Eisenhardt, & Lyman, 1990; West & Noel, 2009).

Summed up, a differentiated view on the findings reveals that industry experience seems to be especially helpful in the early stages of new venture creation and in situations where resources are scarce. This could be an indication for abilities learned from industry experience like gaining and analyzing the right information, opportunity detection and effective exploitation as already discussed above. Especially in milieus of similar founders regarding formal competences like in highly specified founding scenes, these abilities may be more important than technical knowledge. Referring to these findings and considerations following hypothesis will be formulized:

H 6: NVTs with higher industry experience will obtain more funding capital compared to NVTs with less industry experience.

3.4. Control Variables

In this research, two ways to consider known confounding effects have been applied in the study design. The first one was to control for confounding effects bevor data gathering. Therefore, confounding variations were excluded before the analysis. This decision to control by excluding the data was made due to the limit scope of this work. The second method was to actively include them into the study design to control them within the multiple regression analysis. In section 4.1.1 Filtering of the Sample, it will be described why founding year (and therefore firm age), industry, location of the new ventures' head office and number of founders were controlled by excluding from the sample. Beyond these variables, one variable which is listed below was directly controlled in the multiple regression analysis.

3.4.1. Resource Requirement

Due to the fact that the data provider of this study, crunchbase, does not restrict organizations' entries to one industry sector almost every examined organization had entries of more than one industry. Therefore, organizations within the food, mental health, sports equipment as well as laboratory sector, for example, with the overall common belonging to healthcare sector are represented in the sample. This circumstance shows the difficulty to specify the new ventures to a particular subindustry as they are specified in industrial sector classification of the USA, EU or UNO. This is especially the case for new ventures, which are highly dynamic and sometimes change their business model and subsequently their

subindustries or even main industries in a short time period. This highlights the requirements to distinguish these different new ventures on another basis. Therefore, a resource-based differentiation is chosen to meet the requirements of the different environments.

By scanning the sample, it became even obvious that two different subgroups are prevalent. One can be defined as the group of biotechnology new ventures, and the other one as new ventures which fully serve their customers over the internet. Within the cluster of biotechnology new ventures representatives of both important subgroups highlighted by Casper (2000) were identified. These are platform technologies which provides products and services to other laboratories and research institutions as well as therapeutics and are dedicated to the development of biopharmaceutical medicine. Even though it is noteworthy that platform technologies are normally confronted with lower financial risk than diagnostics (Casper, 2000) this research does not aim to gain knowledge about the differences of those subgroups, in comparison to other works (Patzelt, zu Knyphausen-Aufseß, & Nikol, 2008). Consequently, no further detailed distinctions of biotechnology new ventures are made.

On the other hand, various new ventures which deliver healthcare related services via the internet as mental health applications could have been detected. Resource scarcity and the mindset and ability to borrow resources instead of owning them has been long detected at one of many characteristics of new ventures (Stevenson & Gumpert, 1985). Thus, the absence of required costly resources at the founding stage as well as the easy way to scale production due to highly standardized integration of borrowed resources (e.g. through infrastructure and/or platform as a service solutions – IaaS, PaaS) make internet based new ventures to a paragon of how to use the environment of new ventures from a resource based view.

Driven by these conceptual differences of this two major prevalent groups of the sample one can conclude that for example biotechnological new ventures require higher funding to start their business compared to fully internet based new ventures. Therefore, the whole sample was monitored by a control variable which distinguishes the respondents into environments of low and high resource requirements.

4. Methodology

In the following paragraphs the data sources, the sample as well the used measurements are described.

4.1. Data Sources and Sample

The data has been drawn from a database called crunchbase pro where new ventures are listed. This service is available via www.crunchbase.com. With 197 new ventures with 505 analyzed NVT members, the sample of this study is among the richest data sets in literature (Nielsen, 2010). To obtain the analyzed set of 197 new ventures four constraints were chosen. First, the new ventures' headquarters have to be located in San Francisco Bay Area. Second, they have to be established between 2012 and 2013. Third, their main focus has to be concentrated in the healthcare sector and, fourth, the NVTs have to contain of two or more people.

The restriction on two or more founders per new venture was needed to gain a sample which is representative for the research propose which is to investigate primarily miscellaneous NVTs. Consequently, the exclusion of single founders follows the design of the study.

The focus on San Francisco Bay Area was not only chosen because of the world famous reputation of its clusters, but also because of its economical flourishing hubs for new ventures for more than several decades (Walker & Schafran, 2015). This region, where enough new ventures growing under the same macro environment can be found, is also home to the in San Francisco located headquarters of crunchbase (crunchbase, 2019). This assumes that editors of crunchbase and its former parent company TechCrunch have more and better information about companies in their region than in comparison to for example European regions. This assumption was also confirmed by a little random sampling test which focused on available information of US and European new ventures on the website of crunchbase.

The timeframe from 1. January 2012 to 31. December 2013 has, among others, been chosen due to the assumption that under the economically extreme conditions, during and after the years of the global financial crisis from 2007 and 2008 for example, would affect the outcome of the study. This assumption was also verified by a preliminary research on the website of crunchbase. The listings of public organizations until February 2019 is used to observe if one year is different as compared to the other. As

displayed by data from preliminary research in Figure 1 after the years of the global financial crises, 2011 exhibits only one new venture which went public until February 2019. As the global financial crisis marks the lower bound of the time frame required time to establish the mean number of public organizations per year between 2003 and 2016 (3,9) is the guidance for the upper bound of this study. Apart from public new ventures as one possible success factor, the overall number of funded new venture is a second criterion which is used. Data in Figure 2 about the annual numbers of newly established new ventures illustrate also a good data basis for 2012 and 2013 and do not reflect any contradiction to the criterion of public new ventures. A further possible influence on the amount and quality of data could be the fact, that crunchbase was founded in July 2007 ("Crunchbase," 2020) and its former owner and source of data TechCrunch in June 2005 ("TechCrunch," 2020). To hold all considered effects of founding year as minimized as possible additionally a timeframe as small as possible has to be chosen. In conclusion of the above described criterions, the timeframe between 1. January 2012 and 31. December 2013 was chosen.

Figure 1: Number of IPOs of new ventures per year of establishment

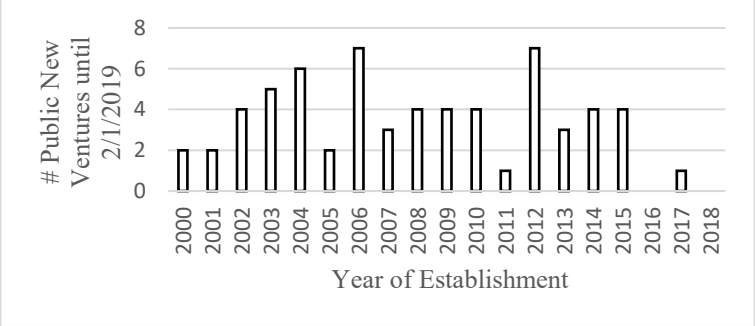
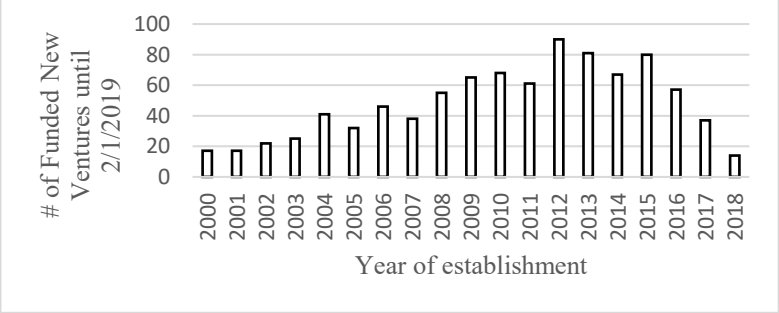


Figure 2: Number of new ventures per year of establishment



Additionally, the data structure of the sample is lagged due to the circumstances that not all data are from the same time. Which means that the dependent variable, total funding, was gathered in 2019 and

therefore between six and seven years after the collection of the independent variables which were taken from time of new ventures' foundations. This lagged structure should account for long-lasting effects of team compositions on the organizations which develop over time and would not be able to be measured immediately after the foundation of a new venture.

The decision to limit the huge dataset to the economic sector of healthcare is not singularly owed by the fact to get a rich dataset, but also one which is manageable. The healthcare sector counts as one of the biggest economic sectors in western countries with steady increases over the past decades. Measured on the gross domestic product (GDP) the EU as a whole spent 9.6 % on healthcare in 2017. On a country-wide view the shares of healthcare expenditures measured on GDP range from 11.5 % in France to 5.2 % in Romania (OECD/EU, 2018). In comparison the United States expended 17.1 % of its GDP on healthcare in 2017 which was the largest spending of all monitored countries (OECD, 2019).

4.1.1. Filtering of the Sample

After exporting the data from crunchbase and adding all needed information from other trustworthy sources like LinkedIn, company homepages or Bloomberg, for all companies it was checked if enough data was available to analyze them afterwards. Twelve companies were deleted because they either do not have enough information or were actually not operating in the healthcare sector. Insufficient data were often a result of closed firms without an active web presence where additional information could have been gathered.

4.1.2. Sample Description

Before the exclusion of single founders, the sample listed 271 new ventures. Therefrom 197 (72.7 %) are new ventures with NVTs. This confirms the above assumed high percentage of founder teams in new ventures. After excluding one outlier the sample of analysis consists of 196 new ventures. Even though the new ventures are all listed in the healthcare industry they are additionally categorized to following sub groups: consumer product (0.51 %), financial service (1.02 %), food (2.55 %), hardware (13.78 %), hardware/software (7.14 %), health (1.53 %), software (41.33 %), and technology (32.14 %). 107 (54,59 %) of the new ventures were classified to operate in an environment where high resources are demanded for their business model. In contrast, 89 (45,41 %) new ventures do not need that much

resources right from the start. Eight (4.08 %) out of 196 new ventures undergone an IPO and are now public organizations. The remaining 188 (95.92 %) new ventures are still private. In the median each new venture undergone three funding rounds. The minimum number of funding rounds is one, whereas the maximum is nine.

The 196 new ventures were overall founded by 505 founders. The median of founder per new ventures is two which also represents the minimum. The maximum number of founders per new venture are six founders. From the 505 founders 84 (16.6 %) are of female and 421 (83.4 %) are of male sex. 64 (32.65 %) of all 196 new ventures exhibit in minimum one female co-founder. Within those 64 new ventures with at least one female founder the median is one and the maximum four female founders. Within this subgroup with at least one woman the minimum number of founders per new venture is two and the maximum five whereas the median is two founders. The amount of men in groups with in minimum one woman as founder exhibit in minimum zero and is also up to four founders. The overrepresentation of men in the sample is still slightly present in the subgroup of 64 new ventures where overall 90 (51.72 %) men and 84 (48.28 %) women are counted.

The healthcare experience within an NVT is in the median at 50%. In extreme cases some teams do have no health experience at all and other teams only consist of members with former healthcare experience.

Under all new ventures 148 (29.31 %) NVT members have a PhD, 204 (40.40 %) NVT members have a graduate degree and 153 (30.30 %) NVT members have an ungraduated degree as highest degree. Under all new ventures which were identified to demand high resources for their business model 108 (38.71 %) NVT members have a PhD, 99 (35.48 %) NVT members have a graduate degree and 72 (25.81 %) NVT members have an ungraduated degree as highest degree. Whereas at new ventures which demand low resources for their business model 40 (17.70 %) NVT members have a PhD, 105 (46.46 %) NVT members have a graduate degree and 81 (35.84 %) NVT members have a ungraduated degree as highest degree.

Table 1 gives an overview of all variables which are used in the studied models. Beside information about the used diversity measures and descriptive statistics the table gives further an overview over the primary sources of the data.

Table 1: Overview of variables and descriptive statistics

Variable	Diversity Measure	Mean	SD	Min	Max	Primary Sources
Dependent variable						
Total funding (Log)		15.52	2.28	9.74	20.13	Crunchbase
Independent variables						
Sex heterogeneity	Blau index	0.14	0.21	0.00	0.50	Crunchbase LinkedIn
Educational level heterogeneity	Blau index	0.30	0.27	0.00	0.78	LinkedIn
Work. exp. heterogeneity	Attneave's transmission measure	0.88	0.15	0.54	1.25	LinkedIn
Educ. exp. heterogeneity	Attneave's transmission measure	0.91	0.16	0.56	1.69	LinkedIn
Exp. heterogeneity	Attneave's transmission measure	1.79	0.28	1.15	2.85	LinkedIn
Healthcare exp.		0.51	0.42	0.00	1.00	LinkedIn
Teams min. one woman		0.33	0.47	0.00	1.00	Crunchbase LinkedIn
Mean educ. level		1.99	0.63	1.00	3.00	LinkedIn
Control variable						
Resources		0.55	0.50	0.00	1.00	Crunchbase Firm web-sites

4.2. Measurements

When measuring various compositions of NVTs, particular measures has to be applied. All of the heterogeneity measures were conceptualized as variety of characteristics within a group. In other words, the examination of different arrangements of distinctive categories of NVTs (Harrison & Klein, 2007).

To measure these different arrangements Shannon entropy as well as Blau index were used. Blau (1977) index is often used in social science. Shannon entropy however has its origin in information science (Shannon, 1948). Whereas Blau index only measure the balance of the teams characteristics, Shannon entropy measures differences in balance and variety (Guevara, Miguel, Hartmann, & Mendoza, 2016). Accordingly, Blau index increases when categories getting more equally distributed above the entities

of observation (team members) and balance will be established. Shannon entropy rises when balance and variety in categories increases. Nonetheless, both measures show greater changes from the basis of less balanced situation than from the basis of more balanced situations (Teachman, 1980). Measuring the balance instead of for example the number of different categories within an NVT is also supported by a study from 2003. The study shows that belonging to a minority of a heterogenous group can influence individual's contribution to performance under certain circumstance negatively in contrast to individuals which belongs to majority groups (E. Randel & Jaussi, 2003).

4.2.1. Sex Heterogeneity

Sex were coded on the basis of two categories (female and male). The sexes were determined first by names as well as by pictures which were often available. Caused by the coding of NVT members to only one category Blau index can also be used as heterogeneity index where p stands for the proportion of NVT members which belongs to each sex category (i).

$$Blau\ index = 1 - \sum_{i \in I} p_i^2$$

4.2.2. Working Experience Heterogeneity

The sample which was narrowed down to one industry level made it not reasonable to set up a predefined categorization of working experience. This was due to a broad categorizations of the for example international standard classification of occupations (ISCO-08) under the responsibility of the international labor organization (ILO) which categorizes occupations of a whole economy and therefore contains categories like agricultural occupations as well. This would result in low heterogeneity measures in the end due to unmatched occupations over all companies and a narrowed measure were potential information could be lost.

Hence, the collected data on working experience of the founders were categorized inductively in an iterative process. After the collected data was coded into a very detailed categorization schemata based on the collected experiences, similar categories were compressed from eleven to six categories in the end. These six remaining categories for working experience are R&D/scientific business, business and

law, medical, university, design/creatives, computing/engineering. The categories should be representative for different working environments where e.g. different mindsets, working approaches and working cultures will be assumed.

If a founder's past experience suggests that a founder has substantial past experience in different areas, more than one category is coded in this research. Whereas this practice captures a more realistic view it challenges the prevalent measures like the Blau index which obscure information where the heterogeneity comes from.

In extreme cases for example, it would be unclear if a high value is a result of a very heterogenous team member (intrapersonal diversity) or of a very heterogenous team (interpersonal diversity). To measure those different sources of heterogeneity another index has to be calculated which was also applied in two other studies in the same context (Buyl et al., 2011; Nuscheler et al., 2019). Attneave's (1959) transmission measure (T_{xy}) is used to cope both information sources. As Shannon entropy T_{xy} is entropy-based too. To calculate T_{xy} three different sources of information have to be calculated which can be gained from a two dimensional matrix. One example is the matrix with the dimensions team members and past working experience. As listed in Table 2 those three required sources of information to calculate T_{xy} are: First, H_x which is the proportional distribution of the number of NVT members over the categories of past working experience summarized by the Shannon index (marginal entropy). Second, H_y which is the proportional distribution of the categories of past working experience over the NVT members summarized by the Shannon index (marginal entropy). Third, H_{xy} which is the mutual proportional distribution or the total entropy of the matrix (joint entropy). The transmission measure T_{xy} is the value of the calculation $H_x + H_y - H_{xy}$ (Buyl et al., 2011; Nuscheler et al., 2019). Therefore, T_{xy} represents the shared information of both information sources (Attneave, 1959). Consequently, a high transmission measure expresses that information, or in this study experience diversity, is high and uniquely distributed in the NVT (Buyl et al., 2011).

Table 2: Description of Attneave's (1959) transmission measure for working experience heterogeneity

$H_x = \sum_{i \in I} p_i \log 1/p_i$	Proportional distribution of the number of NVT members over the categories of past working experience summarized by the Shannon index (marginal entropy).
$H_y = \sum_{j \in J} p_j \log 1/p_j$	Proportional distribution of the categories of past working experience over the NVT members summarized by the Shannon index (marginal entropy).
$H_{xy} = \sum_{i \in I, j \in J} p_{ij} \log 1/p_{ij}$	The combined total entropy of the whole matrix (joint entropy).

I = categories of past working experience
J = NVT members

4.2.3. Educational Experience Heterogeneity

Often educational experience were coded on the basis of the highest completed degree (Carpenter & Fredrickson, 2001; Hambrick et al., 1996; Wiersema & Bantel, 1992; Zimmerman, 2008). As in the case of past working experience, in this research educational experience is again not restricted to one category. This requires again the use of Attneave's (1959) transmission measure T_{xy} which equals $H_x + H_y - H_{xy}$ (more detailed in Table 3). Therefore, H_x is defined as the proportional distribution of the number of NVT members of the categories of educational experience summarized by the Shannon index (marginal entropy). H_y is the proportional distribution of the categories of educational experience over the NVT members summarized by the Shannon index (marginal entropy). H_{xy} is the mutual proportional distribution or the total entropy of the matrix (joint entropy).

Table 3: Description of Attneave's (1959) transmission measure for educational experience heterogeneity

$H_x = \sum_{i \in I} p_i \log 1/p_i$	Proportional distribution of the number of NVT members over the categories of past educational experience summarized by the Shannon index (marginal entropy).
$H_y = \sum_{j \in J} p_j \log 1/p_j$	Proportional distribution of the categories of past educational experience over the NVT members summarized by the Shannon index (marginal entropy).
$H_{xy} = \sum_{i \in I, j \in J} p_{ij} \log 1/p_{ij}$	The combined total entropy of the whole matrix (joint entropy).

I = categories of past educational experience
J = NVT members

The categories of educational experience are created in an iterative, inductive process in which first all captured data are coded in a rich scheme of 33 categories and then compressed to five upper categories in the end. Those five categories are natural science, engineering and technology, medicine, social science and humanities. These five upper categories are also comparable with the ISCED–F 2013 classification of fields of education (05 natural science, mathematics and statistics, 07 engineering, manufacturing and construction, 09 health and welfare, 03 social science, journalism and information as well as 04 business, administration and law and 02 arts and humanities) by UNESCO Institute of Statistics (2015).

4.2.4. Educational Level Inequality

The educational level of the single NVT members are coded into three categories – Bachelor's degrees, Master's degrees and other graduate degrees like JD, as well as in PhD degrees. Only the highest completed title per founder is coded. There is no new venture in the sample where none of the founders has a degree. As highlighted above in the section 3.3.2.2 Educational Experience this thesis examines also the variety (or inequality) of educational level. Therefore, the team inequality of the above mentioned three categories will be measured. Due to the fact, that only the highest known title per founder is coded there is no need to calculate T_{xy}. Consequently, the simpler and more established Blau index is calculated for educational level inequality were p represents the proportion of NVT members which belongs to each category of educational level (i).

$$Blau\ index = 1 - \sum_{i \in I} p_i^2$$

4.2.5. Mean Educational Level

For the measure of mean educational level per NVT the three above mentioned categories are first weighted. Bachelor's degrees with one, master's and other degrees like JD with two and PhD with three. To be normalized the sum of the weighted score are then further divided by the number of the NVT members. Accordingly, a simple mean of the weighted categories is applied.

4.2.6. Experienced Qualification Heterogeneity

Experienced qualification heterogeneity is a meta-construct which is calculated from the simple sum of the transmission measures of educational and working experience heterogeneity (exp_Txy = w_Txy + e_Txy). Therefore, the composite possesses the same properties as the more detailed measurements of working and educational experience heterogeneity which were already discussed above. In accordance with the single measurements, higher heterogeneity of experienced qualification in an NVT is also expressed through a higher score of the composite.

4.2.7. Healthcare Experience

Healthcare experience is coded as binominal variable per NVT member where 1 indicated previous experience in the health care sector and 0 for no previous experience in the health care sector based on the information about the past working experience of each founder. Then the coding per NVT member is summed up and normalized through dividing the sum by the possible maximum of each NVT which is equal to the total number of NVT members.

4.2.8. Resource Requirement

As control variable resource requirement is used and coded as binominal variable where 1 stands for high resource requirement and 0 stands for low resource requirement. The category is chosen by the description of the firms products, services and further purposes listed on crunchbase and other sources like the company websites.

4.2.9. Total Funding

Total funding is used as dependent variable. The data is provided as continuous metric by crunchbase. It is the sum of each received funding of a new venture over the defined time span. Some data have to be transformed into USD due to different currencies. Due to the skewness of the data a logarithmic transformation is used and marked in parenthesis in all tables.

5. Results

The statistical operations were all executed in the integrated development environment RStudio and implemented in R which is a programming language especially developed for statistical usage. For the analysis following additional packages of R where used: dplyr, ggplot2, car, lmtest, hmisc, psych and readr. All executed operations and resulting outcomes are described in the paragraphs below.

5.1. Diagnostics

Outliers and influencing cases were tested with the help of a procedure in R which is suggested by Buchana (2019). It tests the sample for Cook's distance which measures the overall influence of a case on the model (Cook & Weisberg, 1982), leverage which calculates how much observed outcome values influence the predicted outcome values, as well as Mahalanobis distance which is similar to leverage (Field, Miles, & Field, 2012). In the diagnostic process all three measures were calculated. If a case exceeded a certain and pre-defined cut-off point it was listed in a table with a dummy variable value of 1. An overall measure summed up all cases which exceed any of the three thresholds. All cases which had a higher score than one (therefore two or three) were detected as influential outlier. In the sample one case had a score of two and were therefore excluded from the sample which shrinks it to 196 new ventures.

5.2. Statistical Assumptions

As multiple regression underlies different assumptions the sample has to be tested on those which will be outlined in the following paragraphs. These underlying assumptions for a classical linear model are linear in parameter, random sampling, no perfect collinearity, zero conditional mean, homoskedasticity and normality (Wooldridge, 2012). The following testing of the assumptions are done by reference to the variables which are used in the main model of this study. All other models which are analyzed in this study meet of course also the below described tests and therefore the required assumptions.

5.2.1. Independence of Errors

The independency of the errors of the model (residuals) were tested with the Durbin-Watson test. The outcome of the test statistic can range between zero and four where two indicates that the residuals are

independent or not autocorrelated. Values below one or above three indicate autocorrelation (Field et al., 2012). As the Durbin-Watson test generates a value of 1.88 and is reported to be not significant the assumption of independence of errors can be confirmed.

5.2.2. Multicollinearity

To test for multicollinearity a correlation matrix as well as different values based on VIF (variance inflation factor) were tested. Correlation values above 0.8 are a definite sign of multicollinearity (Field et al., 2012). At the values for VIF there is no broad consensus which value should rise concerns. One mention VIF values above 10 (Field et al., 2012), where others recommend values above 3.3 (Kock & Lynn, 2012). Other indicator for multicollinearity are VIF based tolerance statistic which should raise concerns if the value fell below 0.2 and the mean of VIF values which should not be extensively greater than 1 (Field et al., 2012). As the multicollinearity matrix in Table 6 shows, the measures are all below the recommendations which would suggest multicollinearity. Albeit no indication of multicollinearity, working experience heterogeneity and educational experience heterogeneity indicating higher correlation than the other independent variables.

Also, the VIF and tolerance values in Table 4 are all below respectively above all of the recommend values. Also mean VIF is not extensively higher than 1. Which indicates further that no multicollinearity exists in the model.

Table 4: VIF values

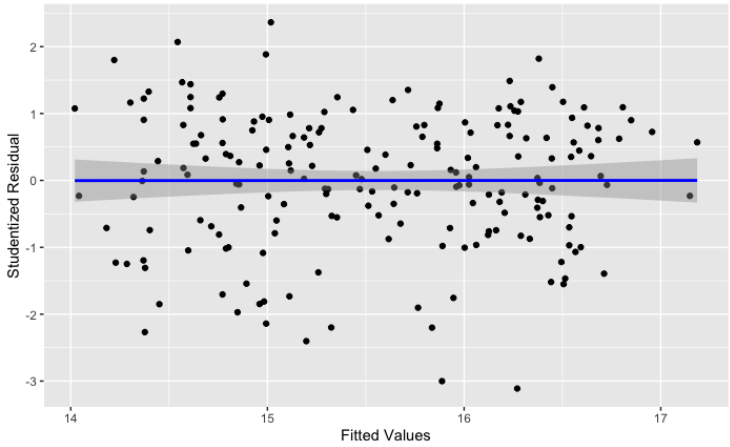
	VIF	Tolerance	Mean VIF
Resources	1.140	0.878	
s_Blau	1.028	0.973	
d_Blau	1.150	0.869	1.263
w_Txy	1.583	0.632	
e_Txy	1.486	0.673	
Healthcareexp_n	1.191	0.839	

5.2.3. Homogeneity and Linearity

To control for homogeneity and linearity to check the validity of the model a plot of the standard residuals against the fitted values were executed (Field et al., 2012). As shown in Figure 3 the assumption of homogeneity and linearity holds for the sample. Further an Breusch-Pagan test (Breusch & Pagan, 1979)

were executed which failed to reject the null hypothesis of homogeneity and therefore indicates homogeneity.

Figure 3: Plot of standardized residuals against fitted (predicted) values



5.2.4. Normality

Normality is an important assumption for general linear models like multiple regression in the case of this study. From the central limit theorem it is known that large samples are tend to be normal distributed (Field et al., 2012). Due to the large sample size of 196 organizations it can be assumed that sample size is normal distributed. Further a q-q plot with an reference line and a 95 % pointwise confidence band (Almeida, Loy, & Hofmann, 2019) and a histogram of studentized residuals was drawn to show possible deviations from normality. The interpretation of the qq-plot in Figure 4 and the histogram in Figure 5 implies a normal distributed sample.

Figure 4: Q-Q Plot with observed quantiles against normal quantiles

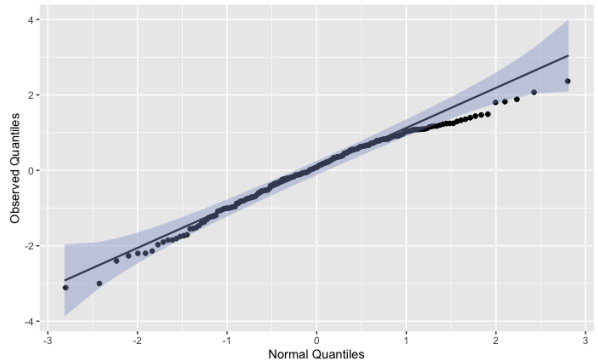
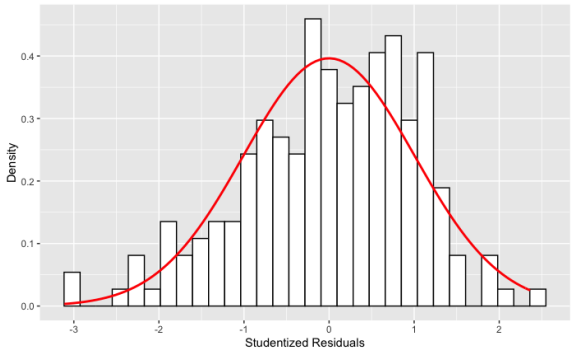


Figure 5: Histogram of the density of studentized residuals



5.3. Data Analysis

After all necessary assumptions have been shown to be met, the next paragraphs outline the analysis of the data.

5.3.1. Preliminary Analysis

Before the analysis regarding funding of new ventures correlations between funding and other performance measures which are provided by crunchbase pro and included in the sample were tested. The other performance measures within the sample are granted patents, number of employees (measured in five categories) as well as revenue. Beside the availability of the data, numerous studies also indicate a positive linkage between performance like VC funding and number of employees (Bertoni, Colombo, & Grilli, 2011; Puri & Zarutskie, 2012). Further number of employees (Brinckmann & Hoegl, 2011; Nuscheler et al., 2019) as well as sales growth (Vissa & Chacar, 2009) were also used in UET based studies of new ventures. Despite a study about granted patents which did not find an effect (Bertoni et al., 2011), there are still numerous studies which support the linkage between patents granted and VC as reviewed by Hall and Harhoff (2012). All of the mentioned studies measure VC funding with a dummy variable which accounts for received VC versus no VC received. In comparison, this study tries to detect if the linkages still hold if the sample consists of only new ventures which all received VC and be compared on the basis of the amount of funding each new venture has received.

Due to the non-normal distribution of the different funding measures and the assumption of normal distribution for Pearson's correlation (Field et al., 2012) a logarithm transformation is conducted. Unfortunately, no high correlations on total amount of received funding can be detected (controlled for outliers on the basis of total funding). More precise and based on Cohen (1992), patents granted $r(38) = .45$, $p < .01$, amount of employees $r(188) = .47$, $p < .01$ and number of funding rounds $r(196) = .48$, $p < .01$ exhibit medium correlation effects. Further it can be abstracted from the correlation matrix in Table 5 that the highest loadings of patents granted and number of employees are on total amount of received funding compared to other single funding rounds. This reinforces the purpose to use total amount of received funding as variable of interest in this study.

Even though some of the correlation coefficients shows moderate effect size, one limitation which could influence the effect size may be that granted patents and revenue data which are provided by crunchbase pro are further retrieved from external providers (IPqwery, Owler). Manual data screening on those data unveil already low data quantity and quality. Despite the small effect size, the positive correlation of revenue is at least significant which could be also an indication that it is simply too early to apply this performance measurement. Furthermore, it is assumed that number of employees in small organizations are not that precise communicated to public compared to received funding. Which is probably the reason why number of employees are reported in five categories instead of the actual number as well as why eight new ventures do not have any information about employees.

Due to the scope of the study no further efforts were invested to discover further data sources. Despite not comprehensible data collection of the third party provider and limited data quality concerning number of employees and revenue the correlation coefficients reveal linkages between total funding and number of employments as well as patents granted as theorized. This preliminary analysis caused that the multiple regression analysis were executed with total funding as dependent variable where data quality was consistent and the process of data collection was known.

Table 5: Correlation Matrix of Performance Measures

	Variables	0	1	2	3	4	5	6	7	8	9	10	11	12
0	**Total Funding**	1.00												
1	**Patents granted**	0.45 (0.01)	1.00											
2	**# Employees****	0.47 (0.00)	0.59 (0.00)	1.00										
3	**# Funding rounds**	0.48 (0.00)	0.09 (0.59)	0.29 (0.00)	1.00									
4	**Revenue***	0.21 (0.03)	0.45 (0.02)	0.08 (0.43)	0.16 (0.10)	1.00								
5	**1st funding round***	0.69 (0.00)	0.31 (0.06)	0.32 (0.00)	-0.03 (0.65)	0.11 (0.25)	1.00							
6	**2nd funding round***	0.61 (0.00)	0.32 (0.05)	0.27 (0.00)	0.53 (0.00)	0.15 (0.13)	0.13 (0.07)	1.00						
7	**3rd funding round***	0.56 (0.00)	0.10 (0.57)	0.35 (0.00)	0.68 (0.00)	0.14 (0.15)	0.08 (0.28)	0.52 (0.00)	1.00					
8	**4th funding round***	0.48 (0.00)	0.19 (0.25)	0.35 (0.00)	0.69 (0.00)	0.15 (0.13)	0.01 (0.89)	0.33 (0.00)	0.64 (0.00)	1.00				
9	**5th funding round***	0.35 (0.00)	0.23 (0.16)	0.18 (0.02)	0.59 (0.00)	0.13 (0.20)	0.00 (0.95)	0.20 (0.01)	0.37 (0.00)	0.59 (0.00)	1.00			
10	**6th funding round***	0.23 (0.00)	0.29 (0.07)	0.08 (0.29)	0.54 (0.00)	0.04 (0.68)	-0.02 (0.76)	0.14 (0.06)	0.25 (0.00)	0.40 (0.00)	0.66 (0.00)	1.00		
11	**7th funding round***	0.20 (0.01)	0.00 (0.98)	0.04 (0.56)	0.47 (0.00)	-0.03 (0.74)	-0.03 (0.65)	0.10 (0.15)	0.19 (0.01)	0.28 (0.00)	0.45 (0.00)	0.72 (0.00)	1.00	
12	**8th funding round***	0.15 (0.03)	0.11 (0.52)	0.02 (0.77)	0.30 (0.00)	0.02 (0.86)	0.04 (0.58)	0.07 (0.32)	0.12 (0.11)	0.18 (0.01)	0.31 (0.00)	0.46 (0.00)	0.62 (0.00)	1.00

Note: The numbers in parenthesis below the correlation values represent p-values.
** Variables with logarithmic Transformation*
*** measured in five categories (1-10, 11-50, 51-100, 101-250, 251-500)*

5.3.2. Multiple Regression Analysis

In the following paragraph different hierarchical multiple regressions were conducted to test the above stated different hypothesis. Table 6 exhibits the means, the standard deviations and a correlation matrix of all in the analysis used variables.

Table 6: Means, standard deviations and correlation matrix of analyzed variables

Variables	Mean	SD	0	1	2	3	4	5	6	7	8	9
0 Total funding*	15.52	2.22	1.00									
1 Resources	0.55	0.50	0.30 (.00)	1.00								
2 Sex heterogeneity	0.14	0.22	-0.11 (0.12)	0.00 (0.95)	1.00							
3 Educ. level heterogeneity	0.30	0.27	-0.06 (0.37)	-0.04 (0.59)	-0.09 (0.23)	1.00						
4 Work. exp. heterogeneity	0.88	0.16	0.10 (0.17)	0.09 (0.22)	0.08 (0.30)	0.29 (0.00)	1.00					
5 Educ. exp. heterogeneity	0.91	0.16	0.10 (0.15)	0.07 (0.30)	0.12 (0.09)	0.06 (0.38)	0.54 (0.00)	1.00				
6 Exp. heterogeneity	1.79	0.28	0.12 (0.11)	0.09 (0.19)	0.11 (0.12)	0.20 (0.01)	0.87 (0.00)	0.88 (0.00)	1.00			
7 Healthcare exp.	0.51	0.42	0.18 (0.01)	0.34 (0.00)	-0.01 (0.92)	-0.17 (0.02)	0.00 (0.97)	0.14 (0.05)	0.08 (0.27)	1.00		
8 Teams min. one woman	0.33	0.47	-0.15 (0.04)	-0.06 (0.37)	0.93 (0.00)	-0.06 (0.39)	0.10 (0.17)	0.16 (0.03)	0.15 (0.04)	0.00 (0.96)	1.00	
9 Mean educ. level	1.99	0.64	0.23 (0.00)	0.23 (0.00)	0.05 (0.45)	-0.24 (0.00)	0.17 (0.02)	0.20 (0.01)	0.21 (0.00)	0.44 (0.00)	0.02 (0.75)	1.00

Note: The numbers in parenthesis below the correlation values represent p-values.
** logarithmic transformation, N = 196*

Table 8 shows the four different models which all use the main independent variables of this study. Model 1 shows the control variable resource, model 2 adds the main variables of interest which are all investigating diversity in the NVTs (sex heterogeneity, educational level inequality, educational experience heterogeneity, working experience heterogeneity), model 3 adds the industry experience in the NVT (healthcare experience) and model 4 displays the full model with interaction effects between the resource variable and all other variables.

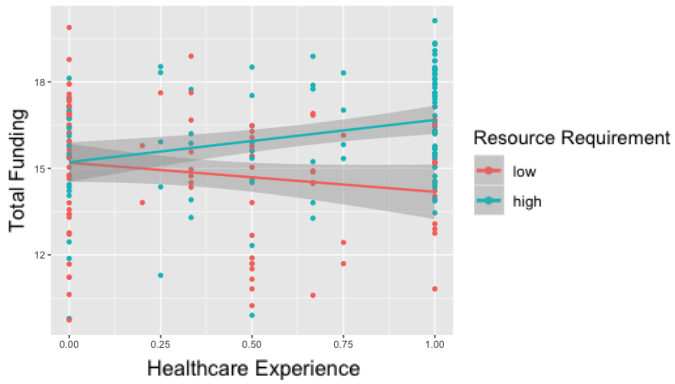
First the dummy variable for demand of resources were entered into the hierarchical regression to control for the different demand of resources at the starting point of healthcare organizations in different fields of the healthcare sector. The control model (model 1) is significant, $F(1,194) = 18.87$ $p = .08$,

R^2 = .08. As shown by the standardized coefficient, demanded resources is also a strong predictor to forecast total funding, β = .30, t(194) = 5.34, p < .001, which indicates that organization which require higher resources for their business will get also higher funding. After controlling for demand of resources four diversity indices were added in the next step. The second regression model is significant too, F(5, 190) = 5.12, p < .001, R^2 = .10. Out of the four variables of interest only one is significant. The standardized coefficient of sex heterogeneity β = -.13 t(190) = -1.91, p = .06 indicates a significant negative impact on the dependent variable total funding whereas the control variable of demanded resources stays highly significant β = .28 t(190) = 4.12, p < .001. In model 3 healthcare experience was added. This third regression model is still significant, F(6,198) = 4.40, p < .001, R^2 = .10. The additional independent variable healthcare experience is not significant. Even though, demanded resources β = .26, t(189) = 3.58, p < .001 and sex heterogeneity β = -.13 t(189) = -1.87, p = .06 stay still significant. The last model of Table 8 (model 4), F(11, 184) = 3.76, p < .001 R^2 = .14, adds demanded resources as interaction variable for all investigated variables to control for interactions between the other independent variables and demanded resources. After adding the interaction only sex heterogeneity stays significant β = -.22 t(184) = -2.06, p = .04. The significance of negative coefficients of sex heterogeneity over all three stages supports hypothesis 1a which suggest a negative relationship between sex heterogeneity and total funding. Further only the interaction coefficient of healthcare experience and demanded resources exhibit significant positive influence on total funding, β = .44 t(184) = 2.79, p = .01. This conditional insight is pivotal to partly support hypothesis 6 which states that NVTs which exhibits higher industry experience will attract more funding capital. This positive interaction of healthcare experience in NVTs in situations of high resource demand can be also observed in Figure 6 which additionally reveals that healthcare experience is even negative for new ventures in low resource demanded situations.

In Table 9 the independent variable sex heterogeneity was replaced with the binary variable which measures if an NVT consists of at least one woman (1) or if an NVT consists of just men (0). After the replacement every step of the hierarchical multiple regression was conducted like at the main model. Model 1 shows the control variable resource, model 5 adds the main variables of interest with the re-

placed dummy variable (teams with min. one woman, educational level inequality, educational experience heterogeneity, working experience heterogeneity), model 6 adds the industry experience in the NVT (healthcare experience) and model 7 displays the full model with interaction effects between the resource variable and all other variables.

Figure 6: Interaction of healthcare experience and demanded resources on total funding

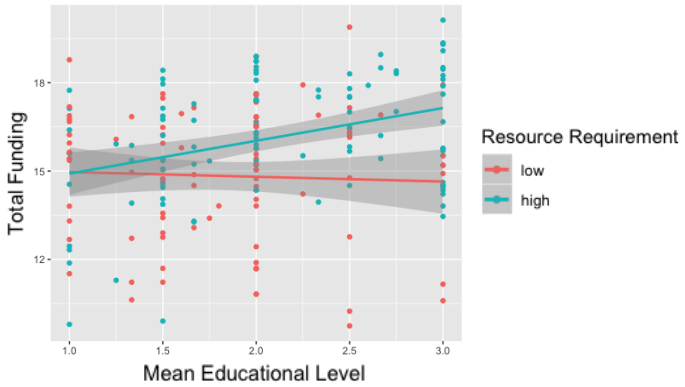


As in Table 8 the regression models in Table 9 are all significant and exhibit the same significant negative effects on total funding as before the replacement of sex heterogeneity. The models just display higher standardized coefficients with higher significances, which indicate higher influence through the dummy variable on the dependent variable total funding. Those higher influences are also in accordance with theory as the dummy responds more on female team members as the balance measurement sex heterogeneity. Those significant results of the dummy variable teams with min. one woman over all stages supports hypothesis 1 b. The higher negative standardized coefficients of the dummy variable which is more sensitive to female NVT members compared to sex heterogeneity let suppose that the negative effect is primary caused by the presence of female NVT members than by the fact of heterogeneity. As in the model 4 of Table 8 the significant positive influence of healthcare experience on total funding in high demand environments as shown in model 7 can again partly confirm hypothesis 6.

In the regression models in Table 10 the diversity measurement educational level inequality was replaced with mean educational level. Model 1 shows the control variable resources, model 8 adds all variables of interest (sex heterogeneity, educational experience heterogeneity and working experience heterogeneity) including the variable mean educational level instead of educational level inequality. Model 9 adds the industry experience variable healthcare experience and model 10 controls for the interaction effect of resources at every variable included before. All models in Table 10 are significant.

As the previous models Model 8 reports highly significant effects from demand of resources, β = .25, t(190) = 3.63, p < .001 and significant effects from sex heterogeneity, β = -.13, t(190) = -1.89, p = .06. Additionally the replaced variable mean educational level reports a significant positive influence on total funding, β = .17, t(190) = 2.38, p < .02. Model 9 does not report any significant influence of healthcare experience on total funding. Demanded resources, β = .25, t(189) = 3.43, p < .001, sex heterogeneity, β = -.13, t(189) = -1.87, p = .06 and mean educational level, β = .16, t(189) = 2.11, p = .04, remain significant. After controlling for the interaction effect of demanded resources in model 10 the multiple regression shows significant negative influence of sex heterogeneity, β = -.21, t(184) = -2.03, p = .04. The significant negative influence of sex heterogeneity at every stage supports again hypothesis 1 a. The replaced variable mean educational level which has significant positive influence on total funding in model 8 and model 9 supports hypothesis 4 b. Also the positive significant effect of the interaction coefficient healthcare experience and demanded resources remains as in the models 4 and 7 and therefore also partly supports hypothesis 6. The behavior of healthcare experience in high and low resource environments is already described above and visualized in Figure 6. Further the interaction coefficient mean educational level and demanded resources exhibit a nearly significant positive influence on total funding, β = .46, t(184) = 1.60, p = .11. The almost significant interaction effect shows a positive influence on total funding in high resource demanding environments. Figure 7 visualizes the interaction effect and shows that in high resource environments mean educational level exhibits a positive effect on total funding, whereas in low resource environments it even shows a slightly negative impact.

Figure 7: Interaction of mean educational level and demanded resources on total funding



In Table 11 the two experience heterogeneity measurements (educational experience heterogeneity and working experience heterogeneity) were aggregated to one experience heterogeneity measurement which measure the overall breadth of an NVT's experience. As in the tables before the hierarchical multiple regression was executed in four steps. After controlling for resource demand in model 1, model 11 adds three diversity measures (sex heterogeneity, educational level inequality and experience heterogeneity). Model 12 adds the variable which measure NVT's healthcare experience before model 13 controls for possible interaction effects of demanded resources. All models of Table 11 are significant.

Beside the highly significant control variable demanded resources, $\beta = .28$, $t(191) = 4.13$, $p < .001$, and the significant negative effect of sex heterogeneity, $\beta = -.13$, $t(191) = -1.91$, $p = .06$, a significant positive influence of experience heterogeneity, $\beta = .12$, $t(191) = 1.73$, $p = .09$ is shown in Model 11. After adding healthcare experience in model 12 demanded resources, $\beta = .26$, $t(190) = 3.61$, $p < .001$, sex heterogeneity, $\beta = -.12$, $t(190) = -1.89$, $p = .06$, and experience heterogeneity, $\beta = .12$, $t(190) = 1.64$, $p = .10$, remain significant. The significant positive effect of experience heterogeneity therefore supports hypothesis 5. At the last model (model 12) which controls for interaction effects of demanded resources the coefficient of sex heterogeneity stays significant negative, $\beta = -.20$, $t(186) = -1.91$, $p = .06$. Additionally healthcare experience turned into a significant negative influence of total funding, $\beta = -.20$, $t(186) = -1.73$, $p = .09$. The only significant interaction effect which could be found is the highly significant interaction effect of healthcare experience and demanded resources where the positive coefficient indicates a positive influence of healthcare experience on total funding in high resource demanded environments $\beta = .47$, $t(186) = 2.98$, $p = .01$. This supports again hypothesis 6 partly. The interaction effect of demanded resources and healthcare experience can be viewed in Figure 6 were also a negative effect in low resource demanded environments can be observed.

Additional to the listed models, calculations were done with models where sex heterogeneity and respectively the dummy variable teams with min. one woman were replaced with a variable which describes the number of females in an NVT. As expected, the models did not show any contradicting findings to the models which are presented and described above. The additional models are even quite

similar to the models with the dummy variable teams with min. one woman. Even slightly more significant. This is also in consent with the mathematical construction of the different sex measurements which both build on the number of women per NVT. In the biggest model where also all interaction effects are tested the model exhibit an adjusted R^2 of 0.14 and an F value of $F(11,184) = 3.96$, $p < 0.01$. The variable number of females exhibits a negative coefficient under following conditions, $\beta = -.24$, $t(184) = -2.47$, $p = .02$.

5.4. Summary Findings

The subsequent table summarizes the findings of the hypothesis which were explained in detail before.

Table 7: Summary of findings

Hypothesis	Findings
H 1a: Sex balanced NVT will obtain less funding compared to sex unbalanced NVTs.	**Accepted**
H 1b: NVT with at least one female founder will negatively influence NVTs' funding.	**Accepted**
H 2: NVTs which are balanced in functional working experiences will obtain more funding compared to NVTs with homogenous functional working experiences.	**Not accepted**
H 3: NVTs which are balanced in educational specialization will obtain more funding compared to NVTs with homogenous educational specialization.	**Not accepted**
H 4a: NVTs which are balanced in educational level will obtain less funding compared to NVTs with homogenous educational levels.	**Not accepted**
H 4b: NVTs with higher mean educational level will obtain more funding compared to NVTs with lower mean educational level.	**Accepted**
H 5: NVTs which are balanced in experienced qualification will obtain more funding compared to NVTs with homogenous experienced qualification. (combined experience qualification)	**Accepted**
H 6: NVTs with higher industry experience will obtain more funding capital compared to NVTs with less industry experience.	**Partly accepted**

Table 8: Main hierarchical multiple regression

	Model 1					Model 2					Model 3					Model 4				
Source	B	SE B	*β*	t	p	B	SE B	*β*	t	p	B	SE B	*β*	t	p	B	SE B	*β*	t	p
Intercept	**14.83**	**.23**	**.00**	**65.88**	**< .001**	**13.54**	**.98**	**.00**	**13.71**	**< .001**	**13.46**	**.99**	**.00**	**13.56**	**< .001**	**14.24**	**1.46**	**.00**	**9.78**	**< .001**
Resources	**1.32**	**.31**	**.30**	**4.34**	**< .001**	**1.25**	**.31**	**.28**	**4.12**	**< .001**	**1.16**	**.32**	**.26**	**3.58**	**< .001**	-.49	1.99	-.11	-.24	.80
Sex heterogeneity						**-1.36**	**.71**	**-.13**	**-1.91**	**.06**	**-1.33**	**.71**	**-.13**	**-1.87**	**.06**	**-2.25**	**1.09**	**-.22**	**-2.06**	**.04**
Edu. level inequality						-0.76	.60	-.09	-1.27	.21	-.68	.61	-.08	-1.11	.27	-.75	.86	-.09	-.86	.39
Edu. exp. het.						.85	1.13	.06	.75	.45	.69	1.14	.05	.61	.55	-1.25	1.64	-.09	-.76	.45
Work. exp. het.						1.11	1.22	.08	.90	.36	1.18	1.23	.08	.96	.34	3.00	1.88	.21	1.59	.11
Healthcare exp.											.36	.40	.07	.91	.37	-.98	.61	-.18	-1.60	.11
Sex het. x Resources																1.44	1.44	.11	1.00	.32
Edu. level ine. x Resources																-.09	1.20	-.01	-.08	.94
Edu. exp. het. x Resources																3.37	2.25	.72	1.50	.14
Work. exp. het x Resources																-2.98	2.47	-.62	-1.21	.23
Healthc. exp. x Resources																**2.21**	**.79**	**.44**	**2.79**	**.01**
F value	F(1,194) = 18.87, p = .08					F(5, 190) = 5.12, p < .001					F(6,189) = 4.40, p < .001					F(11,184) = 3.76, p < .001				
R^2 adjusted	.08					.10					.10					.14				
Model F change						- 13.75					- .72					- .64 **				
Δ R2						0.02					0					.04				
																* P < 0.1, ** P < 0.05, *** P < 0.01				

Table 9: Hierarchical multiple regression (NVTs with min. one woman)

	Model 1					Model 5					Model 6					Model 7				
Source	B	SE B	*β*	t	p	B	SE B	*β*	t	p	B	SE B	*β*	t	p	B	SE B	*β*	t	p
Intercept	**14.83**	**.23**	**.00**	**65.88**	**< .001**	**13.49**	**.99**	**.00**	**13.67**	**< .001**	**13.40**	**.99**	**.00**	**13.55**	**< .001**	**14.17**	**1.45**	**.00**	**9.77**	**< .001**
Resources	**1.32**	**.31**	**.30**	**4.34**	**< .001**	**1.21**	**.30**	**.27**	**3.97**	**< .001**	**1.11**	**.32**	**.25**	**3.43**	**< .001**	-.50	1.98	-.11	-.24	.81
Teams min. one woman						**-.73**	**.33**	**-.16**	**-2.24**	**.03**	**-.73**	**.33**	**-.15**	**-2.23**	**.03**	**-1.11**	**.48**	**-.24**	**-2.33**	**.02**
Edu. level inequality						-.76	.60	-.09	-1.27	.21	-.67	.60	-.08	-1.11	.27	-.64	.86	-.08	-.75	.46
Edu. exp. het.						.98	1.13	.07	.86	.39	.81	1.14	.06	.71	.48	-1.13	1.63	-.08	-.69	.49
Work. exp. het.						1.12	1.22	.08	.92	.36	1.2	1.22	.08	.98	.33	2.98	1.86	.21	1.60	.11
Healthcare exp.											.38	.40	.07	.95	.34	-.88	.61	-.17	-1.45	.15
T. m. o w. x Resources																.68	.66	.11	1.05	.30
Edu. level ine. x Resources																-.21	1.19	-.02	-.18	.86
Edu. exp. het. x Resources																3.34	2.25	.71	1.49	.14
Work. exp. het x Resources																-2.95	2.45	-.61	-1.20	.23
Healthc. exp. x Resources																**2.11**	**.79**	**.42**	**2.66**	**.01**
F value	F(1,194) = 18.87, p = .08					F(5,190) = 5.43, p < .001					F(6, 189) = 4.67, p <.001					F(11, 184) = 3.90, p < .001				
R^2 adjusted	.08					.10					.10					.14				
Model F change						-13.44					-.76					-.77 **				
Δ R2						.02					.00					.04				
																* P < 0.1, ** P < 0.05, *** P < 0.01				

Table 10: Hierarchical multiple regression (mean educational level)

	Model 1					**Model 8**					**Model 9**					**Model 10**				
Source	B	SE B	*β*	t	p	B	SE B	*β*	t	p	B	SE B	*β*	t	p	B	SE B	*β*	t	p
Intercept	**14.83**	**.23**	**.00**	**65.88**	**< .001**	**12.95**	**1.01**	**.00**	**12.80**	**< .001**	**12.95**	**1.01**	**.00**	**12.77**	**< .001**	**14.27**	**1.45**	**.00**	**9.82**	**< .001**
Resources	**1.32**	**.31**	**.30**	**4.34**	**< .001**	**1.12**	**.31**	**.25**	**3.63**	**< .001**	**1.10**	**.32**	**.25**	**3.43**	**< .001**	-1.65	2.02	-.37	-.82	.42
Sex heterogeneity						**-1.32**	**.70**	**-.13**	**-1.89**	**.06**	**-1.31**	**.70**	**-.13**	**-1.87**	**.06**	**-2.19**	**1.08**	**-.21**	**-2.03**	**.04**
Mean Edu. Level						**.59**	**.25**	**.17**	**2.38**	**.02**	**.57**	**.27**	**.16**	**2.11**	**.04**	.01	.43	.00	.03	.97
Edu. exp. het.						.67	1.12	.05	.59	.55	.64	1.13	.05	.56	.57	-1.03	1.60	-.08	-.65	.52
Work. exp. het.						.47	1.15	.03	.40	.69	.50	1.17	.04	.43	.67	2.41	1.77	.17	1.36	.18
Healthcare exp.											.08	.42	.01	.18	.86	-.90	.65	-.17	-1.38	.17
Sex het. x Resources																1.32	1.41	.10	.93	.35
Mean edu. level x Resources																.87	.54	.46	1.60	.11
Edu. exp. het. x Resources																3.08	2.21	.65	1.39	.17
Work. exp. het x Resources																-3.05	2.35	-.63	-1.30	.20
Healthc. exp. x Resources																**1.64**	**.84**	**.33**	**1.94**	**.05**
F value	F(1,194) = 18.87, p = .08					F(5, 190) = 6.03, p < .001					F(6, 189) = 5.00, p < .001					F(11, 184) = 4.34, p <.001				
R^2 adjusted	.08					.11					.11					.16				
Model F change						-12.84 **					-1.03					-.66 ***				
Δ R2						.03					.00					.05				
	* P < 0.1, ** P < 0.05, *** P < 0.01																			

Table 11: Hierarchical multiple regression (experience measurement)

	Model 1					**Model 11**					**Model 12**					**Model 13**				
Source	B	SE B	*β*	t	p	B	SE B	*β*	t	p	B	SE B	*β*	t	p	B	SE B	*β*	t	p
Intercept	**14.83**	**.23**	**.00**	**65.88**	**< .001**	**13.54**	**.99**	**.00**	**13.76**	**< .001**	**13.47**	**.99**	**.00**	**13.62**	**< .001**	**14.42**	**1.45**	**.00**	**9.93**	**< .001**
Resources	**1.32**	**.31**	**.30**	**4.34**	**< .001**	**1.26**	**.30**	**.28**	**4.13**	**< .001**	**1.16**	**.32**	**.26**	**3.61**	**< .001**	-.72	1.98	-.16	-.36	.72
Sex heterogeneity						**-1.36**	**.71**	**-.13**	**-1.91**	**.06**	**-1.34**	**.71**	**-.12**	**-1.89**	**.06**	**-2.08**	**1.09**	**-.20**	**-1.91**	**.06**
Edu. level inequality						-.74	.58	-.09	-1.28	.20	-.65	.59	-.08	-1.09	.28	-.39	.83	-.05	-.47	.64
Exp. het.						**1.94**	**1.12**	**.12**	**1.73**	**.09**	**1.85**	**1.13**	**.12**	**1.64**	**.10**	1.37	1.68	.09	.81	.42
Healthcare exp.											.35	.39	.07	.89	.38	**-1.05**	**.61**	**-.20**	**-1.73**	**.09**
Sex het. x Resources																1.36	1.43	.11	.95	.34
Edu. level ine. x Resources																-.53	1.17	-.06	-.45	.65
Exp. het. x Resources																.83	2.25	.17	.37	.71
Healthc. exp. x Resources																**2.35**	**.79**	**.47**	**2.98**	**.01**
F value	F(1,194) = 18.87, p = .08					F(4,191) = 6.43, p < .001					F(5,190) = 5.30, p < .001					F(9, 186) = 4.31, p < .001				
R^2 adjusted	.08					.10					.10					.13				
Model F change						-12.44*					1.13					1.01 **				
Δ R2						.02					.00					.03				
	* P < 0.1, ** P < 0.05, *** P < 0.01																			

6. Discussion

Grounded in the above reviewed scientific literature as well as further encouraged by the findings of the analysis, the influence of NVTs' managerial characteristics on new ventures performance were examined in this study. As illustrated in the literature, managerial characteristics can be used as proxy for psychological and sociological behaviors to reason managerial decisions which are further from importance for the organizational performance (Hambrick & Mason, 1984). Consequently also NVTs' managerial characteristics can be used as proxies for new venture performances.

The results of this study strengthen to some extent the general knowledge of UET that managerial characteristics are proxies of organizational outcomes. It can be noticed from the results that the non-work-related managerial characteristics sex, which in general has been less studied by now (Nielsen, 2010), has been identified as high influential factor over all models. Where the negative impact of sex heterogeneity in a team comes from can be seen in model 5 to 7 where sex heterogeneity is replaced by a dummy variable which identifies groups with at least one woman. This dummy variable exhibits an even slightly higher negative coefficient at slightly higher significance. This trend continues when the variable sex heterogeneity is replaced by the variable which counts the number of female founders. Those results allow the conclusion that the negative influence of sex heterogeneity is not primarily caused by negative effects of heterogeneity. Instead it is more plausible that the negative effects emerge due to the presence of women in NVTs. Cautions has to be given to a closer interpretation of this fact. So, it cannot be analyzed by this study why female NVTs causes negative influences on total funding of new ventures. For example, it can even not be determined if the effect is caused internally by the team or by organizational dynamics or externally by funders, environmental influences of the industry or social influences of a culture. To some extent, these findings also weaken the generalized argument that demographic heterogeneity will not increase entrepreneurial team effectiveness compared to NVTs with similar demographics like NVTs solely consisting of women (Chowdhury, 2005).

Referred to the circumstance that more than a few other researches did also not find any influences from work-related heterogeneity, it is not surprising or contradicting that the results of this study regarding

work-related variables also did not exhibit any significant influences. Even though it is especially disappointing that the transmission measure, recently introduced in UET and applied in this study, which should provide a more realistic capturing of inter- and intrapersonal heterogeneity (Buyl et al., 2011), did not have any immediate impact. A possible explanation that working related heterogeneity measures of managerial characteristics of this study did not show any impact could be a result of the available data. This cannot be differentiated into the characteristics human capital investment and outcome as well as task and non-task related human capital. As outlined by Unger, Rauch, Frese and Rosenbusch (2011) effect of human capital is higher if the measure of human capital is outcome related and for human capital which is task related. Due to the usage of secondary data of this study exact differentiations are not possible. As a result, possibilities to identify whether variables are important for the individual tasks of each new venture is not provided by the data and further efforts to collect additional data out of the scope of the current study. Further the investigated working experience heterogeneity, educational experience heterogeneity as well as educational level inequality can be classified as human capital investment. The absence to measure the outcome of those investments also inhibits the conclusion of which amount of investment deliver which outcome. Nevertheless, the general consideration of this and many other studies is that positive effects of heterogenous NVT overweight the negative effects. This can be confirmed in this study especially through another variable which was investigated and analyzed. As the more precise variables of working and educational experience heterogeneity are pretty similar in the conception as well as identical in the measurement, they were aggregated to one experience measurement. This aggregated measurement of overall heterogeneity of experience should capture the overall working related heterogeneity of an NVT without specifying where the heterogeneity comes from in the first step. As displayed in model 11 and 12 experience heterogeneity is the only working related heterogeneity variable which is significant. Consequently, the variable exhibits a positive influence on total funding. Due to the detailed documentation of how this aggregated measure was constructed and theoretical and methodical treatise it should be able to withstand possible critiques (Klotz et al., 2014). Therefore, it can be revealed that those findings show the expected behavior of a more general measurement and supports the general consideration that working related heterogeneity of NVTs is in general positively influencing new ventures. This is especially true in cases where heterogenous teams are

known to be advantageous. As in new ventures which per definition create new ways for value creation (Zahra et al., 2014) and ideally profits from heterogenous team skills and experiences especially when a new venture concentrates on the development of one new product (Nuscheler et al., 2019).

In line with many previous findings of other studies, this research also confirms a positive effect of a mean educational level on new venture performance respectively total funding. Even though the result is slightly not significant, it also suggests that higher mean educational level seems even more important for new ventures which demand high resources. This was also presumed from the previous descriptive statistic of the sample as it reveals a much higher proportion of NVT members with PhD degree in new ventures which demand high resources compared to new ventures which demand low resources. On the other hand, a negative effect of educational level inequality which was assumed due to the contrary relationship between high mean educational level and educational level inequality was not confirmed by the results. This unexpected behavior could be interpreted as being a result of predominantly signaling of NVTs to funders. This would then lend support to previous different findings (Franke et al., 2008; Hsu, 2007; Lester et al., 2006), which rate high mean educational level as one of the most important NVT characteristics. This interpretation needs to be treated with caution, as the study builds and focus on UET and not on signaling theory. Therefore, deep interpretations of signaling would not be adequate, even though it could be used as starting point to differentiate characteristics which predominantly contribute to managerial decision making where UET find its application and characteristics which predominantly influencing funders directly.

Moreover, the results of the differentiation on resource requirements as control variable exhibit high significance in all models. The control for resource requirements is necessary to consider the differences in the dependent variable total funding. In this study it was supposed that systematic differences are due to the reason that new ventures which face justified, higher starting costs would also receive more funding. This can be justified by the results. Contextual variables further often highlight the importance that in different environmental settings different managerial characteristics are of importance and should be considered. Following the same logic also the benefit of heterogeneous or homogenous NVTs and teams in general depend among others on the environment in which they are operating in (Hambrick et al.,

1996). Modeling of interaction effects also helps to increase the evidence that the importance of different managerial characteristics is depended on different environments (Nielsen, 2010). This difference in importance can be also seen in the result of this study. Healthcare experience which measure the industry experience within the NVT is not significant in any model of the whole sample. If, however, an interaction effect is modeled between healthcare experience and resource requirements the interaction effect becomes significant in all models. Interaction plots, which visualize those interaction, clearly show that healthcare experience or general spoken industry experience becomes important when the new ventures operate in environments where high resources are required. It further could be visualized that in the environment where low resources are required a negative interaction effect exists. This findings are in line with the analysis by Cassar (2014) and supports the idea that industry experience is especially important in high-tech industries compared to low-tech industries. Considering the fact that resource requirement does not measure the type of industry directly, comparisons should carefully be drawn. However, the general thought of more advanced operations in high-tech organizations which require more resources compared to operations in low-tech organizations and the applied data screening which identified numerous high-tech biotechnology new ventures which are all coded as high resource required new ventures supports the comparison. One reason why industry experience is only highly significant in high resource required new ventures could be the circumstance that more complex entrepreneurial activities are needed beside more capital also more human resources. Therefore, specific knowledge, skills and social ties are from greater value. In comparison entrepreneurial activities which are relatively known in the market do not need as much resources to stem different problems in their process of value creation.

Among other reasons the popular usage of the theocratical model may be owed by the simple collection of secondary data which also typically causes only low costs. The downside of secondary data is, as commonly known, the dependency of the quality of the data collection, which cannot be controlled. Furthermore, the secondary data used are almost entirely inputs of NVTs like demographics or educational and working experience. This primary usage of inputs to describe organizational outputs like strategic decisions or different performance measures is further one of the most discussed and criticized

downsides of the theory by now (Klotz et al., 2014; Kozlowski & Bell, 2013). Whilst social and psychological intermediaries are considered in UET right from the beginning (Hambrick & Mason, 1984), it can be observed that social and psychological intermediaries, which are an important factor between upper echelons profiles and organizational outcomes, remain to the greatest extent unobserved (Hambrick, 2007). Even though this model also uses secondary data, it tries to cope with this circumstance and focuses on NVTs. In accordance with Beckman, Burton and O'Reilly (2007) this study also sees NVTs as teams which exhibit in general much higher harmony within the team compared to TMTs in e.g. big corporations. Solving entrepreneurial problems with freely chosen peers in their "prefirm" before the new venture is established (Sarasvathy, 1998) could be a crucial factor why NVTs may exhibit higher harmony. With the underlying assumption that congruence of NVT members are in general higher than those of TMTs the model of this study focuses on NVTs. This should reduce psychological and social intermediates to some extent to overcome some downsides of the collected secondary data.

Most of the studies, which examined new ventures, were not fully randomly sampled and belonging predominantly to US based high-tech, computer, banking, electronics or semiconductor sector (Nielsen, 2010). Even though also this sample was restricted to the healthcare sector in San Francisco Bay Area the possibility of crunchbase to specify a new venture to more than one industry made it possible to investigate some environmental differences between the new ventures. These differences, which are measured on the basis of required resources, can of course not be compared to a random sampling over totally different industries. Even though it gives some information how specific environments contribute to UET as well as make it possible to compare different industries with respect to e.g. their resource demands. Therefore, this study used the critique of others to open up the model to some extend to more than one particular industry environment.

Over time several different input variables were used in UET. This is also owed by the fact that different factors are relevant to establish a successful new venture. This leads to the situation that no common input measures for heterogeneity in UET is established yet, even though more frequently tested variables can be observed (Klotz et al., 2014). Some of which are often used and therefore, also primary used in this study are educational level, educational experience and working experience. Beside of the thoughts

which heterogeneity factor is most influential also concerns about how heterogeneity can be measured has risen in the last years. Although Blau (1977) suggested two ways to theoretically describe social structures, in the same book where he also introduced his mathematical index, they are not explicitly addressed in recent studies. The Blau index, which similar to the Gini-Simpson index and alongside the Shannon-Wiener index is one of the most used heterogeneity index, can measure two different forms of diversity. Therefore a separation in horizontal level which is known as heterogeneity and in vertical level where the term inequality is used was done by Blau (1977). A similar differentiation is made by Harrison and Klein (2007). This is the main reason why this model conceptualizes working experience, educational experience, healthcare experience and sex as heterogeneity and educational level as inequality. Despite the theoretical differentiation of diversity, both concepts use the same measures. Beside the theoretical distinctions of diversity, different measures to assess diversity are also discussed. Especially when team heterogeneity is measured, it has to be distinguished between inter- and intrapersonal source of diversity. The transmission measure of Attneave (1959) which can distinguish between those two sources of heterogeneity was introduced to UET by two studies in recent years (Buyl et al., 2011; Nuscheler et al., 2019) and is also used in this study. In the model of this study different sources of heterogeneity can occur at working experience or educational experience heterogeneity where every NVT member is able to exhibit a different experience in comparison to his or her NVT member and is further able to exhibit different experiences by him- or herself.

A second theoretical differentiation, which was made by this study and considered in the model, was the separation of NVT members' gender and sex. In general not immediate working related characteristics as NVT members' sex are widely underexamined in UET (Nielsen, 2010). In context related studies where gender of team members were observed (Chowdhury, 2005; Dai et al., 2018) the measurement was binominal, whereas measurement of the actual gender of NVT members should be conducted in non-binominal measurements like continues metrics. Such a non-binominal measurement has already provided fruitful insights in entrepreneurship (Balachandra et al., 2019). Due to constrains of the data of this study, it was not possible to perform a continuous gender metric. The awareness of the problem though, reasoned the labeling of the study's binominal measurement as sex and respectively sex heterogeneity to highlight the differences between the concepts sex and gender.

In UET performance measures were often used to directly measure the impact of team characteristics on organizational outcomes (Klotz et al., 2014; Nielsen, 2010). In the context of new ventures commonly used performance measures such as sales figures or employment growth are often not available or not as precise as in the context of big corporations. To measure performance of new ventures the acquired financial resources can be used instead. Acquired VC indicates also an important milestone for new ventures (Shane & Stuart, 2002) and influences the achievement of an IPO (Beckman & Burton, 2008; Hsu, 2006; Shane & Stuart, 2002) and other common known performance measures of organizations in higher development stages likes sales or organizational growth (Alsos et al., 2006; Cooper et al., 1994). To measure the study's dependent variable with the continuous metric total received funding is to the best of the author`s knowledge unique in UET and a major characteristic of the used model. Until now some recent UET studies only used following funding measures as dependent variables: VC (as dummy variable) (Beckman et al., 2007), time to VC (Beckman & Burton, 2008) and pre-money valuation (Chatterji, 2009; Hsu, 2007).

7. Conclusion

As one of the most complex and influential management decisions, strategic decisions and linked organizational outcomes are predestinated to be examined with methods based on behavioral approaches like UET (Hambrick, 2007; Hambrick & Mason, 1984). The core of the theory centers around the upper echelons which are responsible for powerful decisions. The theory especially highlights the human behavior in the process of decision making. This human behavior is basically modeled into a two-step approach which first states that upper echelons decide and act based on their interpretation of a situation and second claims that the self-interpretation is influenced by experiences, values and personalities of the upper echelons (Hambrick & Mason, 1984).

This constitutes a perfect theoretical foundation to examine the heterogeneity of NVTs based on secondary data which is the main objective of this study. Also the literature reviewed confirms that UET is used as primary model to hypothesize the influence of NVTs characteristics on organizational outcomes (Klotz et al., 2014). On this basis, the research model of this study which investigates heterogeneity in NVTs is developed. Due to many observable characteristics and different environmental settings no

universal model is developed by now. Built on existing literature this study has its primary focus to gain knowledge in the heterogeneity of teams and especially of new ventures where UET lacks on knowledge. Therefore, four different hierarchical models are developed to analyze different heterogeneity and other managerial characteristics. First, the study takes a look at one of the most discussed heterogeneity measures in literature: educational and working experience heterogeneity, educational level inequality and the non-work-related sex heterogeneity. The second hierarchical model replaced the variable sex heterogeneity with a variable which focus on NVT with at least one woman as team member to investigate where negative influences might come from. The third hierarchical model replaces educational level inequality with mean educational level to observe the tensions between specialization and variation. The last model combines educational and working experience heterogeneity to an aggregated experience heterogeneity measure which picture the overall experience heterogeneity of the evaluated NVTs and its effect on new ventures' total funding.

The underlying data which is used for the research of this master's thesis is retrieved from crunchbase pro a premium product of crunchbase and supplemented by other freely accessible data of NVT members. 283 new ventures are retrieved from crunchbase which represent new ventures within the healthcare sector in San Francisco Bay Area and founded between 2012 and 2013. After adding additional data, controlling for data quality (loss of 12 new ventures) and eliminating new ventures which were founded by single founders (loss of 74 new ventures) 197 new ventures with overall 505 NVT members remain. Those new ventures build the basis for the analysis of this study.

The outcome of the hierarchical multiple regression attests a negative impact on total amount of received funding from sex heterogeneity. Additional research into sex, where the variable sex heterogeneity is replaced by a dummy variable measuring whether an NVT has more than one woman, as well as another variable which measures the number of women in an NVT confirm even higher negative effects on total funding. This tendency allows the supposal that most of the negative influence is driven by women in NVTs than by negative influences of heterogeneity per se. Moreover, the results show that educational level inequality do not show any effects in this sample whereas mean education level do confirm a positive effect on total funding. Despite the effect is slightly not significant, results show further that

mean educational level plays a particular important role at new ventures which demand high resources for their activities. The combined heterogeneity measure which measures the overall work-related heterogeneity within NVTs in this sample exhibits significant positive effects on total funding. This allows the conclusion that work-related heterogeneity in NVTs is helpful. Nonetheless, the source of overall heterogeneity remains still unfound. Further in all observed models healthcare experience of NVTs is highly significant for new ventures with high resource demand like biotechnological new ventures. This confirms the general view of the literature that more complex organizational activities, which also demand higher resources, are in greater need of specific knowledge, skills and social ties.

7.1. Theoretical Contributions

This study is conducted to contribute to NVT heterogeneity research within UET. As one of the greatest needs almost all studies formulate the black box which still remains and let many interaction processes go unexplored (Hambrick, 2007). Due to the scope of this master's thesis, a collection of the therefore needed primary data was not possible. As a consequence, the unit of analysis is the NVT as literature defines an NVT as management team with the smallest interfering interaction processes and therefore highest impact on organizations compared to other TMTs. This enriches the different types of analysis in literature and offers results from managerial teams where interaction effects are kept as small as possible.

As this research differs between different concepts of diversity it also contributes to the theoretical development of UET. Differentiations are made especially between heterogeneity and inequality which are different in their behavior. Grounded in a substantial theoretical basis which has existed for decades (Blau, 1977; Harrison & Klein, 2007), this differentiation is well researched and easy to use as it is demonstrated in this research. For this reason, it is surprising, that the differentiation is not used more often in literature as it has the potential to sort UET findings of diversity in organizations which are by now often described as inconsistent.

Further this study contributes to the methodological differentiation of diversity measurements. It is shown that, Blau index (which is the same as Gini-Simpson index) can be still used for diversity con-

structs where an entity is assigned to only one single category. When entities, however, can be categorized into more than one category, the index becomes problematic in UET as it does not differentiate between intra- and interpersonal diversity of NVT as Attneave's transmission measure does. Among one of the first studies which used Attneave's transmission measure to distinguish intra- and interpersonal source of diversity, it contributes to the establishment of this measurement practice and tries to develop discussion about the validity of diversity indices in UET. Therefore, this study adds to the theoretical and methodological development of diversity in UET as demanded by different reviews (Nielsen, 2010).

The reasoned aggregation of two different heterogeneity measures to an overall work-related experience heterogeneity measure shows a positive effect for high heterogeneity on new venture's total funding. Consequently, the study provides support to the thoughts which claim positive effects due to high team heterogeneity in work-related experiences. Therefore, these findings may help to further maintain the investigation of possible positive effects of heterogeneity in NVTs and enrich the literature to show which measures have the most potential for further research.

A major point of this analysis is the usage of total amount of received funding as dependent variable as first study in UET. Preliminary analysis also shows that the variable correlates with already in literature used organizational performance measures like number of employees, patents granted and number of funding rounds. The revealing on using total amount of received funding as organizational performance measure is that it gives insights about how diversity in NVTs influence one of the most important milestones of new ventures (Shane & Stuart, 2002). As previous studies often just used IPO or received funding as binary dummy variable, a continuous performance measure allows to take a closer look at new ventures which has already got the obstacle to get any funding. On the other hand, it does not exclude new ventures which have not reached the IPO yet or do not even strive to reach an IPO. Consequently, it also contributes to study new ventures which are not stars or even unicorns in their industry and tries to prevent mythologization as most of the new ventures do not reach an IPO. Additional total funding and especially VC funding is a predictor of reaching an IPO (Shane & Stuart, 2002) and therefore total funding contains as well information about the possible reach of an IPO.

As second study, using crunchbase as starting point of the data collection to investigate team diversity (Nuscheler et al., 2019), it provides further important insights on collecting data from completely private databases. The advantage of crunchbase is the very rich dataset compared to other private data services. Even though it is necessary to combine and verify the data which are retrieved from crunchbase with data from other web sources, it provides data material from very young and unestablished new ventures. This is a substantial factor to get datasets where e.g. 197 NVTs can be analyzed even within a predetermined industry and within a set timeframe like in this study. Meeting the requirements of multiple regression and findings which are not surprisingly different from other studies which used more common data sources like government-organized data show the possibility to reach high quality with the help of this data pool.

7.2. Managerial Implications

Considering the ongoing discussion and fundamental development of UET in the sector of NVT diversity it is very hard to estimate possible implications of diversity in NVT at the moment. Consequently, special attention must be given when expressing decided proposals from a theoretical, economical perspective. The findings of this study suggest that heterogenous experiences of NVT members are beneficial for the outcome of new ventures. In particular NVTs which are rich in various educational and working experiences achieve higher new venture funding. Accordingly, an eye on NVT's diversity can be beneficial. Beyond diversity it can be said that higher mean educational is beneficial for new ventures outcome. Especially for new ventures which pursue more complex business projects as new ventures in the biomedical sector, for example. Additional helpful for such new ventures are NVT members which possess healthcare experiences. Such healthcare experiences of medical physicians or medical doctors, for example, highly influence the organizational outcome of new ventures in the healthcare sector. Accordingly, it is advisable for healthcare new ventures in high resource demanded environments to form teams which exhibit high mean educational levels as well as are rich on healthcare experiences.

7.3. Limitations

This study is not without limitations. First the data of this study is restricted to a specific industry and region which limits the generalizability of the findings. Despite this restriction to the health care industry, the controlling variable of resources which is controlled for allows to draw possible conclusions for high and low technology areas. In addition, the study takes only a look at new ventures which limits the generalizability on established organizations too. Even though entrepreneurial strategies can also emerge in larger organizations in volatile times where prevalent strategies are challenged or when entrepreneurial strategies are still reflected in latter strategies (Mintzberg & Waters, 1985).

One major concern of UET is the prevalence of team member's demographics as explanatory variable (Hambrick, 2007; Klotz et al., 2014; Nielsen, 2010; Priem, Lyon, & Dess, 1999). This concern is owed by the reason that UET is based on the assumption that manager's decisions are influenced by their experiences, values and personalities through the managerial perception of a distinctive situation. Nonetheless, most of the studies do not investigate whether this conceptualization holds. In other words, if managers' perceptions as well as their actual behavior during the strategic decision process are indeed influenced by their demographics. Therefore, it is often suggested to include also psychographics to increase the validity of the measurements (Priem et al., 1999). In NVTs additional social influences play a crucial role. Even though it seems as they are more often considered compared to psychological influences additional, research is still required for social influences too. This discrepancy which emerge when demographics are used as proxy for psychological, social and behavioral processes as well as increased interest of this black box when demographic proxies appear to be significant were already considered at the beginning of UET (Hambrick & Mason, 1984). Furthermore, the findings of this study build on NVT's demographic proxies sourced from secondary data which clearly limits the study. Relativizing, it must be mentioned that the chosen subject of interest NVT attempts to minimize known social and psychological noises to a minimum compared to investigations on TMTs of big organizations for example.

A third major bias from which the study suffers is also owed by the sample source. Thus, a positivity bias in favor of successful new venture will be assumed due to the fact that a predominant part of organizations which are listed on crunchbase will be listed after their first funding has been published. This implies that new ventures which do not get any funding are not listed in the database. Following, conclusions cannot be drawn whether more heterogenous than homogenous NVTs reach the first funding stage. Consequently, all conclusions of the findings have to be made under the assumption that the examined new ventures already have overcome some obstacles.

Finally, the measurement of educational and work experiences is based on formal education and work experience. This leads that in reality owned human capital can differ from which the study concludes from formal experiences. One prominent example is if a serial entrepreneur has gained substantial managerial experiences in the sector of founding even though their formal experiences do not reveal such human capital. Another striking example would be one of a career jumper who has built up their knowledge and skills in their leisure time.

7.4. Further Research

As with almost all studies in UET, this study also proposes to address the greatest limitation of UET and design studies in which the black box will be further brightened to learn how managerial characteristics and organizational outcomes interplay. To mitigate this limitation the theory is in need of psychology and social psychology as already mentioned in the in the establishing paper of UET (Hambrick & Mason, 1984). Most promising in a first step would be to integrate for example methods and knowledge from related research fields like team decision behavior. In a second step multilevel theory and statistical methods seems to be very promising (Nielsen, 2010). As a necessity of those proposals and also beneficial for the whole UET literature the collection of rich primary dataset would be of great importance.

In the view of the author the approach of this research to differentiate diversity on theoretical (e.g. heterogeneity and inequality) and methodical (e.g. Blau index and Attneave's transmission measure) level is very promising and could easily be applied in further studies. Additionally, it would be beneficial to have concentrated more on measuring task-related and outcome related managerial characteristics as

they are more promising to show effects on short-term organizational outcomes in times where the environment is relatively stable. Those considerations, which are suggested above, could result in better insights into which type of diversity is most useful or harmful for organizations and have the potential to unravel inconsistent findings about diversity in organizations.

The high significance of the control variable demanded resources provides an approach to control for environmental and organizational differences of the analyzed new ventures. This is especially when the dataset contains new ventures which differentiate substantially from each other, even though they belong to the same industry or when new ventures in early stages have not already defined which industry they want to serve with their products or services. Moreover, it is imaginable to pursue such an approach when industries become indistinct and organizations serve due to the limited barriers e.g. owed by the internet, more than one industry even after distinctive development stages. Therefore, it is suggested to further researchers who struggle with such problems about industry to use variables which are already known as important industry characteristics as control variables. Beyond resources required, possible examples are market rivalry or for instance the speed of product cycles.

8. References

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9. Appendix

Appendix A: German Abstract

Das zentrale Anliegen dieser Masterarbeit ist die Erforschung von Teamdiversität in Jungunternehmen im Gesundheitssektor. Primär werden hierfür Charakteristika von Teammitglieder sowie deren Zusammensetzung in Teams untersucht. Ziel der Arbeit ist die Erforschung von positiven und negativen Effekten auf das Betriebsergebnis durch die jeweilige Teamzusammensetzung in Jungunternehmen.

Die Theorie der Arbeit basiert auf der Upper Echelons Theorie, die aufgrund eines zweistufigen Prozesses einen Zusammenhang zwischen den Charakteristika von Führungskräften und Betriebsergebnissen herstellt. Erstens wird davon ausgegangen, dass die Führungskräfte auf Grund ihrer individuellen Einschätzung entscheiden. Im zweiten Schritt wird angenommen, dass die Selbsteinschätzung von Führungskräften von ihren Erfahrungen, Einstellungen und Persönlichkeiten beeinflusst werden (Hambrick & Mason, 1984). Aufbauend auf diesem Konzept wird in dieser Studie die Diversität von Charakteristika innerhalb eines Gründungsteams betrachtet und in Zusammenhang mit den Betriebsergebnissen gestellt. Anhand einer ausgeprägten Literaturrecherche werden häufig untersuchte Charakteristika für die Studie ausgewählt sowie zur Verbesserung beitragende theoretische und methodologische Verfeinerungen vorgenommen.

Die Ergebnisse der multiplen Regression zeigen einen negativen Effekt von Geschlechterheterogenität in Gründungsteams. Hierbei ist der negative Effekt hauptsächlich auf den Frauenanteil in Gründungsteams zurückzuführen und hängt nicht primär von der Teamheterogenität ab. Weiters kann festgestellt werden, dass Gründungsteams mit heterogenen, arbeitsbezogenen Erfahrungen positiv auf das Betriebsergebnis wirken. Genauer definierte Variablen wie Heterogenität der Arbeitserfahrung oder der Ausbildungserfahrung weisen leider keine Effekte auf. Infolgedessen kann die Herkunft positiver Effekte arbeitsbezogener Erfahrungen nicht verifiziert werden. Industrieerfahrung, in dieser Studie im Gesundheitssektor, ist vor allem für Organisationen relevant, die ressourcenintensive Geschäftsmodelle aufweisen, wie zum Beispiel Jungunternehmen im biotechnologischen Sektor.

Schlagwörter: Diversität / Heterogenität / Gründungsteams / Jungunternehmen / Arbeitserfahrung / Ausbildungserfahrung / Führungskräfte / Führungsteam / Gesundheitssektor / Upper Echelons Theory

Appendix B: English Abstract

The central attempt of this master's thesis is the research of team diversity in new ventures in the healthcare sector. In this attempt, primary managerial characteristics of team members as well as their composition in teams were examined. The aim of the study is the investigation of positive and negative effects on organizational outcomes caused by the respective compositions of the new venture teams.

This master's thesis is based on upper echelons theory which connects managerial characteristics with organizational outcomes with the help of a two staged process. It first claims that executives decide based on their self-interpretations of a situation. In the second step, it claims that this self-interpretation of a situation is motivated by executives' experiences, values and personalities (Hambrick & Mason, 1984). Based on this concept this study takes a look at the diversity of characteristics within a new venture team and connected with organizational outcomes. In reference to a distinctive literature research, commonly used managerial characteristics are chosen for this study as well as improving theoretical and methodological refinements made.

The results of the multiple regression exhibit a negative effect of sex heterogeneity in new venture teams. The negative effect results from the share of women within the new venture teams and cannot be primarily connected to negative consequences of heterogeneity. Further it can be observed that new venture teams with work-related experience heterogeneity show positive effects on organizational outcomes. Unfortunately, more precisely formulated constructs such as working experience heterogeneity or educational experience heterogeneity do not exhibit any effects. Consequently, the source of the positive effect of work-related experience heterogeneity cannot be verified. Industry experience, i.e. healthcare industry in this study, is of greater relevance for new ventures which use resource intensive business models as for example new ventures in the biotechnical sector.

Keywords: Diversity / heterogeneity / new venture teams / new ventures / working experience / educational experience / executives / healthcare sector / upper echelons theory

Appendix C: Calculation Attneave's transmission measure in R

This representative code lines show how Attneave's transmission measure as well as Blau index are calculated in this study. Except of little adaptions, every single measure are calculated on this basis.

```
#----READ IN DATA
library(dplyr)

##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union

library(readxl)
working_experience <- read_excel("~/Desktop/working_experience.xlsx")

## New names:
## * OrganizationName -> OrganizationName...2
## * OrganizationName -> OrganizationName...3

test = split(working_experience, working_experience$OrganizationName...2)

#----Code Area
x = 1
Result <- matrix(0, nrow = length(test), ncol = 5)
Company <- character(length(test))
while(x <= length(test)){
  #COMPANY NAME
  Company[x] <- test[[x]][[2]][1]

  #CALCULATION OF BLAU
  proportions <- c(0,0,0,0,0,0)
  #Vector for the calculated proportion values of each functional group
  #<---------- CREATE FUNCTION ---------------------->
  #Start: Get amount value of functional group
  for (i in test[[x]][[6]]) {
    proportions[1] <- proportions[1] + i
  }
  for (i in test[[x]][[7]]) {
    proportions[2] <- proportions[2] + i
  }
  for (i in test[[x]][[8]]) {
    proportions[3] <- proportions[3] + i
  }
  for (i in test[[x]][[9]]) {
    proportions[4] <- proportions[4] + i
  }
```

```
  for (i in test[[x]][[10]]) {
    proportions[5] <- proportions[5] + i
  }
  for (i in test[[x]][[11]]) {
    proportions[6] <- proportions[6] + i
  }
  #End

  #Calculation of the proportion for the functional group : Sum of team me
mber values divided by the amount of members
  #count for functional groups
  proportionsbase = (proportions[1] + proportions[2] + proportions[3] + pr
oportions[4] + proportions[5] + proportions[6])
  count = 1
  while(count < 7){
    proportions[count] = proportions[count]/(proportionsbase)

      proportions[count] = (proportions[count]^2)

    count = count + 1
  }
  #Blau
  Blau <- (1-sum(proportions))

  #CALCULATION OF Hx
  proportions <- c(0,0,0,0,0,0)
  #Vector for the calculated proportion values of each functional group
  #<---------- CREATE FUNCTION ---------------------->
  #Start: Get amount value of functional group
  for (i in test[[x]][[6]]) {
    proportions[1] <- proportions[1] + i
  }
  for (i in test[[x]][[7]]) {
    proportions[2] <- proportions[2] + i
  }
  for (i in test[[x]][[8]]) {
    proportions[3] <- proportions[3] + i
  }
  for (i in test[[x]][[9]]) {
    proportions[4] <- proportions[4] + i
  }
  for (i in test[[x]][[10]]) {
    proportions[5] <- proportions[5] + i
  }
  for (i in test[[x]][[11]]) {
    proportions[6] <- proportions[6] + i
  }
  #End

  #Calculation of the proportion for the functional group : Sum of team me
mber values divided by the amount of members
  #count for functional groups
  count = 1
  while(count < 7){
    proportions[count] = proportions[count]/length(test[[x]][[5]])
```

```
    if (proportions[count] == 1) {
      proportions[count] <- 0.999999
    }
    if(proportions[count] > 0.000000){
      proportions[count] = proportions[count]*log(1/proportions[count])
    } else {
      proportions[count] = 0.000000
    }
    count = count + 1
  }
  #Hx
  Hx <- sum(proportions)
  #CALCULATION OF Hy
  length(test[[x]][[5]])
  tmp <- length(test[[x]][[5]])
  amount_fg <- length(test[[x]]) - 5
  count_hy = 1
  hy_vec <- replicate(tmp,0)
  while(count_hy <= tmp){
    hy_vec[count_hy] <- ((test[[x]][[6]][count_hy])/amount_fg) + ((test[[x
]][[7]][count_hy])/amount_fg) + ((test[[x]][[8]][count_hy])/amount_fg) + (
(test[[x]][[9]][count_hy])/amount_fg) + ((test[[x]][[10]][count_hy])/amoun
t_fg) + ((test[[x]][[11]][count_hy])/amount_fg)
    if(hy_vec[count_hy] == 1){
      hy_vec[count_hy] <- 0.999999
    }
    if(hy_vec[count_hy] > 0.000000){
      hy_vec[count_hy] <- hy_vec[count_hy]*log(1/hy_vec[count_hy])
    } else {
      hy_vec[count_hy] <- 0.000000
    }
    count_hy = count_hy + 1
  }
  #Hy
  Hy <- sum(hy_vec)

  #CALCULATION OF Hxy
  hxy_matrix <-matrix(0, nrow = length(hy_vec), ncol = length(proportions)
)
  x_values = 1
  y_values = 1
  while(x_values <= length(proportions)) {
    while(y_values <= length(hy_vec)) {
      hxy_matrix[y_values,x_values] <- hy_vec[y_values] * proportions[x_va
lues]
      y_values = y_values + 1
    }
    y_values = 1
    x_values = x_values + 1
  }
  #Hxy
  Hxy <- sum(hxy_matrix)
  #Txy
  Txy <- (Hx + Hy) - Hxy
```

```
  Result[x,1] <- Hx
  Result[x,2] <- Hy
  Result[x,3] <- Hxy
  Result[x,4] <- Txy
  Result[x,5] <- Blau

  x <- x + 1
}

Result <- data.frame(Result)

#Changes the column labels
Result <- Result %>%
  dplyr::rename(w_Hx = X1,
         w_Hy = X2,
         w_Hxy = X3,
         w_Txy = X4,
         w_Blau = X5)

Company

df <- data.frame(Company,Result)
print(df)

readr::write_excel_csv(df, "workingexperience.csv")
```

Appendix D: Multiple Regression Output R

```
model1.1 = lm(TotalFundingLog ~ Resources, data = noout)
summary(model1.1)

##
## Call:
## lm(formula = TotalFundingLog ~ Resources, data = noout)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.3652 -1.4577  0.2069  1.6557  5.0547
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  14.8339     0.2252  65.884  < 2e-16 ***
## Resources     1.3239     0.3047   4.344 2.25e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.124 on 194 degrees of freedom
## Multiple R-squared:  0.08866,    Adjusted R-squared:  0.08397
## F-statistic: 18.87 on 1 and 194 DF,  p-value: 2.249e-05

"Confidential Intervals"

## [1] "Confidential Intervals"

confint(model1.1)

##                  2.5 %    97.5 %
## (Intercept) 14.3897981 15.277912
## Resources    0.7228677  1.924869

"Standardized Beta β"

## [1] "Standardized Beta β"

lm.beta::lm.beta(model1.1)

##
## Call:
## lm(formula = TotalFundingLog ~ Resources, data = noout)
##
## Standardized Coefficients::
## (Intercept)   Resources
##   0.0000000   0.2977653
```

REGRESSION 1.2

```
model1.2 = lm(TotalFundingLog ~ Resources + s_Blau + d_Blau + e_Txy + w_Txy , data = noout,
na.action = na.exclude)
summary(model1.2)

##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + d_Blau +
##     e_Txy + w_Txy, data = noout, na.action = na.exclude)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.3897 -1.3320  0.2374  1.6001  4.7461
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept)  13.5408     0.9875  13.712  < 2e-16 ***
## Resources     1.2544     0.3048   4.115 5.77e-05 ***
## s_Blau       -1.3564     0.7117  -1.906   0.0582 .
## d_Blau       -0.7619     0.5997  -1.270   0.2055
## e_Txy         0.8518     1.1301   0.754   0.4519
## w_Txy         1.1055     1.2242   0.903   0.3676
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.111 on 190 degrees of freedom
## Multiple R-squared:  0.1187, Adjusted R-squared:  0.09554
## F-statistic:  5.12 on 5 and 190 DF,  p-value: 0.0001986
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model1.2)
```

```
##                   2.5 %      97.5 %
## (Intercept) 11.5928840 15.48876828
## Resources    0.6530974  1.85572860
## s_Blau      -2.7603339  0.04747863
## d_Blau      -1.9447648  0.42099556
## e_Txy       -1.3772744  3.08086796
## w_Txy       -1.3092151  3.52022176
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model1.2)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + d_Blau +
##     e_Txy + w_Txy, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
## (Intercept)   Resources      s_Blau      d_Blau       e_Txy       w_Txy
##  0.00000000  0.28214342 -0.13148809 -0.09167067  0.06183221  0.07720764
```

REGRESSION 1.3

```
model1.3 = lm(TotalFundingLog ~ Resources + s_Blau + d_Blau + e_Txy + w_Txy + Healthcareexp
_n , data = noout, na.action = na.exclude)
summary(model1.3)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + d_Blau +
##     e_Txy + w_Txy + Healthcareexp_n, data = noout, na.action = na.exclude)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.3667 -1.3502  0.1671  1.6295  4.8710
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)      13.4576     0.9923  13.563  < 2e-16 ***
## Resources         1.1569     0.3234   3.577 0.000441 ***
## s_Blau           -1.3328     0.7125  -1.870 0.062962 .
## d_Blau           -0.6761     0.6074  -1.113 0.267022
## e_Txy             0.6929     1.1441   0.606 0.545452
## w_Txy             1.1808     1.2276   0.962 0.337332
## Healthcareexp_n   0.3602     0.3971   0.907 0.365509
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## Residual standard error: 2.112 on 189 degrees of freedom
## Multiple R-squared:  0.1225, Adjusted R-squared:  0.09469
## F-statistic: 4.399 on 6 and 189 DF,  p-value: 0.0003464
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model1.3)
```

```
##                       2.5 %      97.5 %
## (Intercept)     11.5002578 15.41487617
## Resources        0.5189487  1.79478506
## s_Blau          -2.7383438  0.07275371
## d_Blau          -1.8742065  0.52194048
## e_Txy           -1.5638411  2.94972427
## w_Txy           -1.2406900  3.60224179
## Healthcareexp_n -0.4231352  1.14360135
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model1.3)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + d_Blau +
##     e_Txy + w_Txy + Healthcareexp_n, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
##     (Intercept)       Resources          s_Blau          d_Blau
##      0.00000000      0.26020329     -0.12919722     -0.08135296
##           e_Txy           w_Txy Healthcareexp_n
##      0.05030086      0.08246462      0.06745793
```

REGRESSION 1.4

```
model1.4 = lm(TotalFundingLog ~ Resources + s_Blau*Resources + d_Blau*Resources + e_Txy*Res
ources + w_Txy*Resources + Healthcareexp_n*Resources , data = noout, na.action = na.exclude
)
summary(model1.4)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau * Resources +
##     d_Blau * Resources + e_Txy * Resources + w_Txy * Resources +
##     Healthcareexp_n * Resources, data = noout, na.action = na.exclude)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -5.9655 -1.3674  0.2822  1.5674  4.2455
##
## Coefficients:
##                             Estimate Std. Error t value Pr(>|t|)
## (Intercept)                  14.2404     1.4562   9.779  < 2e-16 ***
## Resources                    -0.4850     1.9869  -0.244  0.80742
## s_Blau                       -2.2474     1.0924  -2.057  0.04107 *
## d_Blau                       -0.7446     0.8633  -0.863  0.38952
## e_Txy                        -1.2465     1.6352  -0.762  0.44684
## w_Txy                         2.9971     1.8805   1.594  0.11270
## Healthcareexp_n              -0.9746     0.6093  -1.600  0.11140
## Resources:s_Blau              1.4364     1.4407   0.997  0.32007
## Resources:d_Blau             -0.0919     1.1960  -0.077  0.93884
## Resources:e_Txy               3.3720     2.2494   1.499  0.13556
## Resources:w_Txy              -2.9749     2.4676  -1.206  0.22953
## Resources:Healthcareexp_n     2.2071     0.7926   2.785  0.00592 **
```

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.065 on 184 degrees of freedom
## Multiple R-squared:  0.1834, Adjusted R-squared:  0.1345
## F-statistic: 3.756 on 11 and 184 DF,  p-value: 7.344e-05
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model1.4)
```

```
##                                 2.5 %      97.5 %
## (Intercept)                11.3674535 17.11327003
## Resources                  -4.4050710  3.43504024
## s_Blau                     -4.4026479 -0.09211637
## d_Blau                     -2.4477284  0.95857543
## e_Txy                      -4.4725724  1.97952202
## w_Txy                      -0.7129993  6.70714261
## Healthcareexp_n            -2.1767399  0.22745941
## Resources:s_Blau           -1.4060201  4.27877126
## Resources:d_Blau           -2.4515906  2.26779307
## Resources:e_Txy            -1.0658551  7.80983001
## Resources:w_Txy            -7.8433391  1.89354293
## Resources:Healthcareexp_n   0.6432870  3.77100595
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model1.4)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau * Resources +
##     d_Blau * Resources + e_Txy * Resources + w_Txy * Resources +
##     Healthcareexp_n * Resources, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
##                (Intercept)                  Resources
##                0.000000000               -0.109089991
##                     s_Blau                     d_Blau
##               -0.217854587               -0.089588138
##                      e_Txy                      w_Txy
##               -0.090485675                0.209313541
##            Healthcareexp_n           Resources:s_Blau
##               -0.182512986                0.113838007
##           Resources:d_Blau            Resources:e_Txy
##               -0.009855279                0.716591763
##            Resources:w_Txy Resources:Healthcareexp_n
##               -0.618434976                0.437471615
```

REGRESSION 1.21

```
model1.21 = lm(TotalFundingLog ~ Resources + GroupsWithWomen + d_Blau + e_Txy + w_Txy , dat
a = noout, na.action = na.exclude)
summary(model1.21)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + GroupsWithWomen +
##     d_Blau + e_Txy + w_Txy, data = noout, na.action = na.exclude)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -6.421 -1.246  0.221  1.572  4.655
##
```

```
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)      13.4859     0.9845  13.698  < 2e-16 ***
## Resources         1.2094     0.3048   3.968 0.000103 ***
## GroupsWithWomen  -0.7324     0.3267  -2.241 0.026160 *
## d_Blau           -0.7575     0.5965  -1.270 0.205650
## e_Txy             0.9761     1.1303   0.864 0.388901
## w_Txy             1.1232     1.2198   0.921 0.358299
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.103 on 190 degrees of freedom
## Multiple R-squared:  0.125,  Adjusted R-squared:  0.102
## F-statistic: 5.429 on 5 and 190 DF,  p-value: 0.000108
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model1.21)
```

```
##                       2.5 %      97.5 %
## (Intercept)     11.5439155 15.42795099
## Resources        0.6082592  1.81056425
## GroupsWithWomen -1.3768699 -0.08783955
## d_Blau          -1.9340532  0.41905909
## e_Txy           -1.2533767  3.20552707
## w_Txy           -1.2828416  3.52933368
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model1.21)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + GroupsWithWomen +
##     d_Blau + e_Txy + w_Txy, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
##     (Intercept)       Resources GroupsWithWomen          d_Blau
##      0.00000000      0.27202171     -0.15514613     -0.09114275
##           e_Txy           w_Txy
##      0.07085362      0.07844677
```

REGRESSION 1.31

```
model1.31 = lm(TotalFundingLog ~ Resources + GroupsWithWomen + d_Blau + e_Txy + w_Txy + Hea
lthcareexp_n , data = noout, na.action = na.exclude)
summary(model1.31)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + GroupsWithWomen +
##     d_Blau + e_Txy + w_Txy + Healthcareexp_n, data = noout, na.action = na.exclude)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.3987 -1.3313  0.1833  1.5502  4.7835
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)      13.3988     0.9890  13.548  < 2e-16 ***
## Resources         1.1074     0.3231   3.428 0.000747 ***
## GroupsWithWomen  -0.7287     0.3268  -2.229 0.026965 *
## d_Blau           -0.6694     0.6037  -1.109 0.268966
## e_Txy             0.8116     1.1436   0.710 0.478791
```

```
## w_Txy             1.2033     1.2230   0.984 0.326420
## Healthcareexp_n   0.3770     0.3954   0.953 0.341572
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.104 on 189 degrees of freedom
## Multiple R-squared:  0.1292, Adjusted R-squared:  0.1016
## F-statistic: 4.674 on 6 and 189 DF,  p-value: 0.0001858
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model1.31)
```

```
##                       2.5 %      97.5 %
## (Intercept)     11.4478994 15.34969077
## Resources        0.4701116  1.74467622
## GroupsWithWomen -1.3734098 -0.08393731
## d_Blau          -1.8602805  0.52155865
## e_Txy           -1.4443085  3.06745364
## w_Txy           -1.2091426  3.61572944
## Healthcareexp_n -0.4029427  1.15690485
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model1.31)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + GroupsWithWomen +
##     d_Blau + e_Txy + w_Txy + Healthcareexp_n, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
##     (Intercept)       Resources GroupsWithWomen          d_Blau
##      0.00000000      0.24907579     -0.15436629     -0.08053813
##           e_Txy           w_Txy Healthcareexp_n
##      0.05891232      0.08403723      0.07059419
```

REGRESSION 1.41

```
model1.41 = lm(TotalFundingLog ~ Resources + GroupsWithWomen*Resources + d_Blau*Resources +
e_Txy*Resources + w_Txy*Resources + Healthcareexp_n*Resources, data = noout, na.action = na
.exclude)
summary(model1.41)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + GroupsWithWomen *
##     Resources + d_Blau * Resources + e_Txy * Resources + w_Txy *
##     Resources + Healthcareexp_n * Resources, data = noout, na.action = na.exclude)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -5.9757 -1.3823  0.2964  1.5464  4.1641
##
## Coefficients:
##                             Estimate Std. Error t value Pr(>|t|)
## (Intercept)                  14.1713     1.4509   9.767  < 2e-16 ***
## Resources                    -0.4772     1.9748  -0.242  0.80934
## GroupsWithWomen              -1.1099     0.4766  -2.329  0.02095 *
## d_Blau                       -0.6409     0.8584  -0.747  0.45623
## e_Txy                        -1.1282     1.6318  -0.691  0.49020
## w_Txy                         2.9762     1.8619   1.598  0.11165
## Healthcareexp_n              -0.8831     0.6090  -1.450  0.14873
## Resources:GroupsWithWomen     0.6840     0.6548   1.045  0.29760
```

```
## Resources:d_Blau           -0.2160     1.1917  -0.181  0.85637
## Resources:e_Txy             3.3426     2.2511   1.485  0.13930
## Resources:w_Txy            -2.9479     2.4485  -1.204  0.23015
## Resources:Healthcareexp_n   2.1081     0.7915   2.664  0.00842 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.057 on 184 degrees of freedom
## Multiple R-squared:  0.1891, Adjusted R-squared:  0.1407
## F-statistic: 3.902 on 11 and 184 DF,  p-value: 4.357e-05
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model1.41)
```

```
##                                 2.5 %     97.5 %
## (Intercept)                11.3087020 17.0338392
## Resources                  -4.3734333  3.4190802
## GroupsWithWomen            -2.0501911 -0.1696750
## d_Blau                     -2.3345546  1.0526816
## e_Txy                      -4.3477516  2.0912953
## w_Txy                      -0.6971857  6.6495561
## Healthcareexp_n            -2.0845224  0.3183738
## Resources:GroupsWithWomen -0.6079315  1.9759455
## Resources:d_Blau           -2.5670820  2.1350925
## Resources:e_Txy            -1.0987492  7.7838723
## Resources:w_Txy            -7.7784990  1.8827989
## Resources:Healthcareexp_n   0.5465997  3.6696769
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model1.41)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + GroupsWithWomen *
##     Resources + d_Blau * Resources + e_Txy * Resources + w_Txy *
##     Resources + Healthcareexp_n * Resources, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
##               (Intercept)                 Resources
##                0.00000000               -0.10732688
##           GroupsWithWomen                     d_Blau
##                -0.23513444               -0.07711808
##                     e_Txy                      w_Txy
##                -0.08189845                0.20785484
##           Healthcareexp_n Resources:GroupsWithWomen
##                -0.16536618                0.11420890
##          Resources:d_Blau           Resources:e_Txy
##                -0.02316341                0.71033837
##           Resources:w_Txy Resources:Healthcareexp_n
##                -0.61281211                0.41784751
```

REGRESSION 1.22

```
model1.22 = lm(TotalFundingLog ~ Resources + s_Blau + MeanEducationalLevel + e_Txy + w_Txy
, data = noout, na.action = na.exclude)
summary(model1.22)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + MeanEducationalLevel +
##     e_Txy + w_Txy, data = noout, na.action = na.exclude)
##
```

```
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.1132 -1.3526  0.0488  1.4780  4.5600
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)           12.9500     1.0117  12.800  < 2e-16 ***
## Resources              1.1201     0.3084   3.632 0.000362 ***
## s_Blau                -1.3185     0.7009  -1.881 0.061470 .
## MeanEducationalLevel   0.5876     0.2470   2.379 0.018347 *
## e_Txy                  0.6656     1.1211   0.594 0.553411
## w_Txy                  0.4661     1.1540   0.404 0.686727
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.089 on 190 degrees of freedom
## Multiple R-squared:  0.137,  Adjusted R-squared:  0.1142
## F-statistic:  6.03 on 5 and 190 DF,  p-value: 3.324e-05
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model1.22)
```

```
##                           2.5 %      97.5 %
## (Intercept)          10.9544295 14.94557465
## Resources             0.5117317  1.72848087
## s_Blau               -2.7009740  0.06398682
## MeanEducationalLevel  0.1004118  1.07480119
## e_Txy                -1.5457968  2.87702287
## w_Txy                -1.8102376  2.74251376
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model1.22)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + MeanEducationalLevel +
##     e_Txy + w_Txy, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
##          (Intercept)            Resources               s_Blau
##           0.00000000           0.25193507          -0.12781087
## MeanEducationalLevel                e_Txy                w_Txy
##           0.16819670           0.04831707           0.03255478
```

REGRESSION 1.32

```
model1.32 = lm(TotalFundingLog ~ Resources + s_Blau + MeanEducationalLevel + e_Txy + w_Txy
+ Healthcareexp_n , data = noout, na.action = na.exclude)
summary(model1.32)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + MeanEducationalLevel +
##     e_Txy + w_Txy + Healthcareexp_n, data = noout, na.action = na.exclude)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.1182 -1.3521  0.0576  1.4921  4.5765
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)          12.95197    1.01433  12.769  < 2e-16 ***
```

```
## Resources             1.10409    0.32179   3.431 0.000738 ***
## s_Blau               -1.31390    0.70312  -1.869 0.063217 .
## MeanEducationalLevel  0.56845    0.26956   2.109 0.036277 *
## e_Txy                 0.63943    1.13336   0.564 0.573296
## w_Txy                 0.49866    1.17104   0.426 0.670717
## Healthcareexp_n       0.07616    0.42348   0.180 0.857471
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.094 on 189 degrees of freedom
## Multiple R-squared:  0.1371, Adjusted R-squared:  0.1097
## F-statistic: 5.005 on 6 and 189 DF,  p-value: 8.768e-05
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model1.32)
```

```
##                             2.5 %     97.5 %
## (Intercept)          10.95110995 14.9528254
## Resources             0.46932768  1.7388440
## s_Blau               -2.70087705  0.0730763
## MeanEducationalLevel  0.03672157  1.1001803
## e_Txy                -1.59623625  2.8750918
## w_Txy                -1.81132298  2.8086467
## Healthcareexp_n      -0.75920181  0.9115201
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model1.32)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + MeanEducationalLevel +
##     e_Txy + w_Txy + Healthcareexp_n, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
##          (Intercept)            Resources               s_Blau
##           0.00000000           0.24833174          -0.12736562
## MeanEducationalLevel                e_Txy                w_Txy
##           0.16271361           0.04641627           0.03482622
##      Healthcareexp_n
##           0.01426171
```

REGRESSION 1.42

```
model1.42 = lm(TotalFundingLog ~ Resources+ s_Blau*Resources  + MeanEducationalLevel*Resour
ces + e_Txy*Resources + w_Txy*Resources + Healthcareexp_n*Resources, data = noout, na.actio
n = na.exclude)
summary(model1.42)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau * Resources +
##     MeanEducationalLevel * Resources + e_Txy * Resources + w_Txy *
##     Resources + Healthcareexp_n * Resources, data = noout, na.action = na.exclude)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -5.5977 -1.3588  0.3305  1.4359  4.1895
##
## Coefficients:
##                               Estimate Std. Error t value Pr(>|t|)
## (Intercept)                   14.26815    1.45313   9.819   <2e-16 ***
## Resources                     -1.64649    2.01676  -0.816   0.4153
```

```
## s_Blau                           -2.18469    1.07674  -2.029   0.0439 *
## MeanEducationalLevel              0.01389    0.42930   0.032   0.9742
## e_Txy                            -1.03393    1.60368  -0.645   0.5199
## w_Txy                             2.41085    1.76890   1.363   0.1746
## Healthcareexp_n                  -0.89619    0.65009  -1.379   0.1697
## Resources:s_Blau                  1.31458    1.41413   0.930   0.3538
## Resources:MeanEducationalLevel    0.87289    0.54409   1.604   0.1104
## Resources:e_Txy                   3.07849    2.21199   1.392   0.1657
## Resources:w_Txy                  -3.04644    2.34697  -1.298   0.1959
## Resources:Healthcareexp_n         1.64098    0.84396   1.944   0.0534 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.036 on 184 degrees of freedom
## Multiple R-squared:  0.2059, Adjusted R-squared:  0.1584
## F-statistic: 4.337 on 11 and 184 DF,  p-value: 9.123e-06
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model1.42)
```

```
##                                     2.5 %     97.5 %
## (Intercept)                    11.40122399 17.1350829
## Resources                      -5.62544252  2.3324607
## s_Blau                         -4.30903315 -0.0603413
## MeanEducationalLevel           -0.83310645  0.8608788
## e_Txy                          -4.19789314  2.1300258
## w_Txy                          -1.07908814  5.9007845
## Healthcareexp_n                -2.17878225  0.3864009
## Resources:s_Blau               -1.47542590  4.1045780
## Resources:MeanEducationalLevel -0.20056374  1.9463400
## Resources:e_Txy                -1.28563419  7.4426090
## Resources:w_Txy                -7.67687554  1.5839994
## Resources:Healthcareexp_n      -0.02409995  3.3060650
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model1.42)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau * Resources +
##     MeanEducationalLevel * Resources + e_Txy * Resources + w_Txy *
##     Resources + Healthcareexp_n * Resources, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
##                    (Intercept)                      Resources
##                    0.000000000                   -0.370329860
##                         s_Blau           MeanEducationalLevel
##                   -0.211777130                    0.003974782
##                          e_Txy                          w_Txy
##                   -0.075053585                    0.168372071
##                 Healthcareexp_n                Resources:s_Blau
##                   -0.167822372                    0.104184948
## Resources:MeanEducationalLevel                Resources:e_Txy
##                    0.456728302                    0.654219129
##                 Resources:w_Txy      Resources:Healthcareexp_n
##                   -0.633307022                    0.325254027
```

REGRESSION 2.2

```
model2.2 = lm(TotalFundingLog ~ Resources + s_Blau + d_Blau + exp_Txy, data = noout, na.act
ion = na.exclude)
summary(model2.2)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + d_Blau +
##     exp_Txy, data = noout, na.action = na.exclude)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.3750 -1.3185  0.2445  1.5889  4.7473
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  13.5442     0.9846  13.756  < 2e-16 ***
## Resources     1.2556     0.3039   4.131 5.39e-05 ***
## s_Blau       -1.3581     0.7098  -1.913   0.0572 .
## d_Blau       -0.7442     0.5806  -1.282   0.2015
## exp_Txy       0.9721     0.5616   1.731   0.0851 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.105 on 191 degrees of freedom
## Multiple R-squared:  0.1187, Adjusted R-squared:  0.1002
## F-statistic: 6.429 on 4 and 191 DF,  p-value: 7.116e-05
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model2.2)
```

```
##                   2.5 %      97.5 %
## (Intercept) 11.6021360 15.48630733
## Resources    0.6560958  1.85502028
## s_Blau      -2.7580813  0.04187257
## d_Blau      -1.8892923  0.40095009
## exp_Txy     -0.1357122  2.07985219
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model2.2)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + d_Blau +
##     exp_Txy, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
## (Intercept)   Resources      s_Blau      d_Blau     exp_Txy
##  0.00000000  0.28240097 -0.13165063 -0.08953936  0.12165517
```

REGRESSION 2.3

```
model2.3 = lm(TotalFundingLog ~ Resources + s_Blau + d_Blau + exp_Txy + Healthcareexp_n, da
ta = noout, na.action = na.exclude)
summary(model2.3)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + d_Blau +
##     exp_Txy + Healthcareexp_n, data = noout, na.action = na.exclude)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.3396 -1.2791  0.1603  1.6008  4.8693
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept)      13.4667     0.9890  13.616  < 2e-16 ***
## Resources         1.1622     0.3218   3.611  0.00039 ***
## s_Blau           -1.3367     0.7106  -1.881  0.06147 .
## d_Blau           -0.6453     0.5915  -1.091  0.27662
## exp_Txy           0.9257     0.5644   1.640  0.10259
## Healthcareexp_n   0.3487     0.3931   0.887  0.37613
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.106 on 190 degrees of freedom
## Multiple R-squared:  0.1223, Adjusted R-squared:  0.0992
## F-statistic: 5.295 on 5 and 190 DF,  p-value: 0.0001407
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model2.3)
```

```
##                       2.5 %      97.5 %
## (Intercept)     11.5157846 15.41753032
## Resources        0.5273983  1.79690805
## s_Blau          -2.7383368  0.06488645
## d_Blau          -1.8120194  0.52134592
## exp_Txy         -0.1874785  2.03895146
## Healthcareexp_n -0.4266562  1.12409083
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model2.3)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau + d_Blau +
##     exp_Txy + Healthcareexp_n, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
##     (Intercept)       Resources          s_Blau          d_Blau
##      0.00000000      0.26139228     -0.12957819     -0.07764752
##         exp_Txy Healthcareexp_n
##      0.11585650      0.06530147
```

REGRESSION 2.4

```
model2.4 = lm(TotalFundingLog ~ Resources + s_Blau*Resources + d_Blau*Resources + exp_Txy*R
esources + Healthcareexp_n*Resources, data = noout, na.action = na.exclude)
summary(model2.4)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau * Resources +
##     d_Blau * Resources + exp_Txy * Resources + Healthcareexp_n *
##     Resources, data = noout, na.action = na.exclude)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -6.079 -1.355  0.388  1.548  4.277
##
## Coefficients:
##                            Estimate Std. Error t value Pr(>|t|)
## (Intercept)                 14.4237     1.4519   9.934   <2e-16 ***
## Resources                   -0.7177     1.9839  -0.362   0.7179
## s_Blau                      -2.0779     1.0868  -1.912   0.0574 .
## d_Blau                      -0.3903     0.8250  -0.473   0.6367
## exp_Txy                      0.6829     0.8419   0.811   0.4183
## Healthcareexp_n             -1.0507     0.6075  -1.729   0.0854 .
```

```
## Resources:s_Blau            1.3600     1.4320   0.950   0.3435
## Resources:d_Blau           -0.5281     1.1645  -0.454   0.6507
## Resources:exp_Txy           0.4139     1.1272   0.367   0.7139
## Resources:Healthcareexp_n   2.3445     0.7876   2.977   0.0033 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.067 on 186 degrees of freedom
## Multiple R-squared:  0.1724, Adjusted R-squared:  0.1323
## F-statistic: 4.305 on 9 and 186 DF,  p-value: 4.228e-05
```

```
"Confidential Intervals"
```

```
## [1] "Confidential Intervals"
```

```
confint(model2.4)
```

```
##                                2.5 %     97.5 %
## (Intercept)               11.5594189 17.2879797
## Resources                 -4.6315524  3.1960840
## s_Blau                    -4.2219406  0.0662154
## d_Blau                    -2.0179144  1.2372427
## exp_Txy                   -0.9779757  2.3438045
## Healthcareexp_n           -2.2493130  0.1478264
## Resources:s_Blau          -1.4650830  4.1850382
## Resources:d_Blau          -2.8254203  1.7691756
## Resources:exp_Txy         -1.8097511  2.6375753
## Resources:Healthcareexp_n  0.7906500  3.8982863
```

```
"Standardized Beta β"
```

```
## [1] "Standardized Beta β"
```

```
lm.beta::lm.beta(model2.4)
```

```
##
## Call:
## lm(formula = TotalFundingLog ~ Resources + s_Blau * Resources +
##     d_Blau * Resources + exp_Txy * Resources + Healthcareexp_n *
##     Resources, data = noout, na.action = na.exclude)
##
## Standardized Coefficients::
##               (Intercept)                 Resources
##                0.00000000               -0.16143327
##                    s_Blau                     d_Blau
##               -0.20142187               -0.04696557
##                   exp_Txy           Healthcareexp_n
##                0.08546716               -0.19676418
##          Resources:s_Blau          Resources:d_Blau
##                0.10778319               -0.05663616
##         Resources:exp_Txy Resources:Healthcareexp_n
##                0.17277032                0.46468972
```