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“Cooperation Patterns.  
A study in the area of management, strategy and  
organization in the top 40 Business Schools in the U.S.”

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# 1 Introduction

*„Some think that cooperation is **the** question [...]. However, a very large number of tasks that people do alone would be more efficiently completed by some joint effort. Efficiency through specialization and the division of labor is a common principle. Capitalization through the pooling of resources is a necessity for many projects and purchases. Why don't more people join in business partnerships of various kinds? [...] In the writings of many major theorists, the question of why cooperation does or does not occur occupies a prominent place.”*

- Gerald Marwell and David Schmitt (Marwell G. & Schmitt D., 1976, p. 2)

The current paperwork concentrates on analyzing cooperation patterns within and between organizations. Furthermore, the thesis tries to shed light on the different ways employees cooperate with each other and the effect of cooperation on productivity and quality adjusted productivity. It provides a better understanding of the importance of cooperation activity within and in-between organizations. The article also suggests that the results based on gathered data from the top 40 business schools in the U.S, could be applied beyond academics, where managers target to improve the overall performance of the organization in both qualitative and quantitative sense.

The topic of cooperation is a topic of significant importance, which has been discussed broadly by scholars for decades (e.g. Coase, 1937, Deutsch, 1949a, Janis 1982, Hillebrand & Biemans, 2003, Franco & Pinho, 2017). However, no research observing cooperation patterns in the top 40 business schools has been conducted yet. This is one of the facts, which distinguishes the current article from the rest of the literature on the topic of cooperation. Another reason the current article adds up to the whole topic of cooperation is that it brings up new observations and additional evidence on the benefits and disadvantages on collaborating with colleagues from the same organization, inter-organizational cooperation and on cooperating with someone, who finds themselves on the same, on lower or on higher hierarchical level.

Some of the findings of the current paperwork suggest that most of the employees in the discussed environment are cooperative and most of them collaborate with so-called “outsiders” (employees working in a different organization) more often than with colleagues from the same organization. However, cooperating with colleagues increases the quality of the end product. Furthermore, almost none of the cooperation activities, which have resulted in a low-quality output, were completed together with co-workers. After considering the

experience of the research objects (every individual whose data has been included in the analysis), the findings in the current article suggest that more experienced employees are by far the most preferred cooperation partners when it comes to accomplishing a qualitative work. Some of the observations made also refer to the rank of the organization (business school) and take a closer look at the dependency of cooperation and position in a global ranking.

The database of the current employees in the top 40 business schools in the U.S. is one of a kind and provides comprehensive and diversified information with high quality on all research objects included. All of the analyses made are of quantitative nature. The most important variables in this research are the position of the research objects (assistants, associates or professors) and the number of articles published. They play a significant part of each observation made in the current paperwork. It is also worth mentioning that the data is suitable for further in-depth analysis of research topics in diverse academic areas.

The current paperwork is organized as follows. Literature review on the topic of cooperation is presented in the beginning of the article. An overview of the academic articles on relevant topics such as cooperation theory (Deutsch, 1949), internal and external cooperation (Hillebrand & Biemans, 2003), knowledge transfer and knowledge creation between universities (McFadyen M. & Cannella A. 2005, Franco & Pinho, 2017) is provided in the first part of the thesis. Chapter three provides the reader with information about a research gap in the academic literature. Afterwards the aims and goals of the current paperwork are discussed. Extensive information about the database and definition of the terms used in the article are outlined in the next part of the thesis. Chapter four presents descriptive statistics and sets some expectations for the observations made in the consequent part of the thesis. An in-depth analysis followed by a discussion is present in section five. The conclusion summarizes the results and rounds of this thesis. Limitations of the analysis and propositions for further research are presented in the last chapter of the article.

## 2 Literature Review & Research Gap

‘What makes people cooperate with others? Does it make sense and how do they choose their partner?’

These are questions, which have been on scholar’s radar for a long time (Janis, 1982, Gupta et. al., 1986, Turner & Pratkanis, 1998). It can be stated that the relationship between organizations has been recognized by Coase’s (1937) well-known work – “The nature of the firm”. This was the first step in developing the transaction cost theory. Furthermore, the author was one of the pioneers, who have built the foundations of the theory why people seek partnerships.

### 2.1 Defining Cooperation

The first attempts to define the term “cooperation” have been made by Maller (1929) in his experiment on motivation. He suggested that a cooperative situation is based around striving towards a goal object, which will be shared among all participants equally. In May and Doob’s (1937) description of collaboration could be noticed that both authors seek to define the concept by closely relating it to competition and stating that “competition and cooperation is directed toward the same social end at least by two individuals” (May & Doob, 1937, p.6). In their article, they elaborate both terms and suggest that the concepts depend on the following:

- nature of the goal - whether the aim is complementary and could be shared or not
- rules of the game - when all participants are required to cooperate or respectively to compete
- performance - when participants are better off performing alone than vice versa
- psychological affiliation between individuals - whether the individuals have few or many common psychological contacts

Another publication in the same year written by Mead (1937) observes cooperation broadly as a shared goal. The author also states that it connects the participants and is a reason for keeping them together. Bernard (1938) was able to recognize one of the most important reasons for the existence of cooperation – the biological limitations of each individual. He suggests the “most effective method to overcome these limitations” is to cooperate and ally with others (Mead, 1937, p. 60). A couple of years later Lewis (1944) developed these views further by suggesting a more psychological perspective for the phenomenon of cooperation. She includes the ego demands of each individual in the theory and presents team work as a situation in which the personal

needs of each participant cannot interfere with the common aim of the task. Cooperation in this sense would mean putting personal objectives aside in case they are not part of the jointly goal.

After taking a look at a more recent modern view of the term cooperation, it can be stated that scholars are still researching the topic and are still developing various different concepts based on cooperation. Nowadays there is research, which concentrates on studying intragroup and intergroup interactions (Gao et. al., 2018, Masuda, 2012) or strategic alliances (Xu et. al., 2014). These terms are strongly connected to cooperation and represent a collaboration activity between individuals in organizations. For example, Gao et. al. (2018) creates a link between cooperation and evolution of the human society. The author suggests that the phenomenon of co-working exists for a long time and it was there to help individuals, who are experiencing difficulties with doing a certain task or activity by themselves.

The point made in Gao et. al. (2018) article is similar to one Bernard (1938) made almost 80 years earlier. As already stated in the beginning of the chapter, the “modern” scholars are attempting to extend the meaning of the word cooperation. Gao et. al. (2018) has an own perspective of the concept and refers to collaboration between individuals as “grouping”. Furthermore, the author distinguishes between group membership based on affiliation between members and membership not based on affiliation factors. By “affiliation between members” he means some characteristics of the individuals such as ethnicity, language etc. Those are all demographic characteristics, which contribute to the successful grouping of people. After forming a group, it is easy to distinguish whether the activity or interaction is between participants of the same group or between individuals from different groups. The first case is defined as intragroup interaction whereas the second one is intergroup interaction. The authors of the paperwork research the concept further as they come across the importance of globalization in cooperation. They investigate migration and leadership and their influence of global cooperation (it turns out that migration has almost no effect on global cooperation). Their study sheds light also on the topic of ethnocentrism (Gao et. al., 2018).

It is important to mention that internal group transactions do not necessary bring benefits to the participants. Individuals often take part in conflicts and suffer because of that (Gao et. al., 2018, Masuda, 2012, Hillebrand & Biemans, 2003). Scholars suggest that there are two types of participants in a collaborative environment – individuals willing to cooperate with outsiders and individuals who are rather more or less skeptical regarding outsiders and prefer co-workers form the same group or organization. The first type of people can be very advantageous for the team as their behavior could maximize profit for all participants (because of diversity,

different mindsets etc.). On the other hand, there is evidence that groups or working environments consisting of the second type of individuals mentioned, have a higher probability of performing possibility to perform better (because of lower transaction costs, similar mindsets etc.) (Gao et. al. 2018).

Masuda (2012) also discusses evidence of how individuals tend to collaborate with other individuals in a situation where a social dilemma is present. He stresses that in an occasion in which a withdrawal from the co-working union is more beneficial feasible for all participants, individuals tend to cooperate regardless of that fact. The more interesting suggestion that the author makes is that in some cases the pairs collaborate for some time and afterwards create a cooperating environment. However, in other situations where participants don't often communicate intensively, achieving a cooperation environment is also possible.

Nevertheless, Masuda (2012) develops his research topic further and involves the reputation of the individuals participating in the collaborative environment. He states that participants are highly motivated to work together with someone in order to achieve high performance and higher reputation rate. After being acknowledged, individuals can use their reputation in order to reward someone. Furthermore, they will be able to cooperate with others, who have the same reputation level leading to higher social acknowledgment or simply higher performance. The author of the paperwork calls this concept is "indirect reciprocity". Reputation is a term which is hard to measure, but nevertheless seems to have a significant impact on cooperation patterns (Masuda, 2012).

A study made by Nowak (2006) analyses cooperation between individuals as a critical part of the human society. His approach is more theoretical than the residual work done in this academic area. He suggests that there are five mechanisms (e.g. group selection, network reciprocity etc.), which influence the evolution of cooperation. The author makes a clear statement of his view on the topic of cooperation as a whole: "Humans are the champions of cooperation [...] cooperation is the decisive organizing principle of human society" (Nowak, 2006, p. 1560). However, Nowak's theory goes in the direction of the biological perspective of the concept. His mechanism creates a linkage between cooperation and natural selection.

Overall, scholars are constantly trying to improve the definition of the term cooperation and more importantly they show evidence of linkage between the phenomenon and other topics (e.g. globalization, ethnocentrism, reputation etc.). It seems that there hasn't been a significant change in the main concept of "cooperation" since the beginning of theorizing it. There is also no unified definition of the term. Nevertheless, most scholars agree on two elements of the phenomenon - firstly cooperation is a behavioral decision of the participants and

secondly this decision concerns “whether to promote the objectives of the team” (Sinclair, 2003, p.75). Most researchers take a critical look at the advantages and disadvantages of working together with someone in a certain environment or under certain conditions. This way they develop hypothesis and theories which help managers making the decision whether, and more importantly - how to enhance cooperation between employees in the organization.

## **2.2 Cooperation Theory**

The so-called “cooperation theory” was firstly developed by Morton Deutsch (1949a). It states that individuals perceive their goals negatively when it comes to competition and positively in a cooperation situation. Deutsch’s theory overall investigates a cooperative environment, what could influence it and also some expectations regarding performance of the group. Some of the observations made build the basis for the cooperation pattern discussed in the current article.

After shedding light on the topic and leaving some open questions from his first paperwork, Deutsch conducted an experiment the same year he published his theory. The author had the idea to further analyze the discussions, which arose from his first paperwork. He also backed up his thesis with quantitative data. The experiment he conducted was on the effects of cooperation and competition upon group process (Deutsch, 1949b). The author divided students in a competitive and cooperation groups. The research objects which had to cooperate were discussing friendly with each other, were feeling influenced by other’s ideas and had an overall positive experience working in the group. Contrary to that, the residual participants did not seem to be in the same position, as they felt misunderstood and were partly aggressive. The results of the experiment show that there was no significant difference in the productivity of both groups, but only in the individuals’ perception of the task (Deutsch, 1949b, Tjosvold, 1984).

After Deutsch’s initial contribution to the topic of cooperation, scientists were able to publish a couple of discussion papers and were able to challenge Deutsch’s theory (Tjosvold, 1984, Johnson & Johnson, 2011). They summarize the academic literature regarding the whole concept and furthermore question the complexity of the work written by one of the pioneers in this specific academic field.

Deutsch (1949a) recognized that at the time being the terms “cooperation” and “competition” were present in every environment consisting of inter-personal or inter-group relationships.

Deutsch (1949a, 1949b) was able to identify that despite the significance of the topic, there were not many attempts on theorizing the concept and almost no experimental studies. Without having much neither qualitative nor quantitative data, Deutsch “sketches” the basic concepts of collaborating and competing. He suggests that there are two types of social situations – cooperative and competitive. The first social environment consists of participant’s goals, which could “co-exists” and do not hinder the realization of one another. Contrary to that, the individuals in a competitive social situation have aims, which are contrient (Deutsch, 1949a). Nevertheless, the author also discovers that such environments are rather a rear occasion. In most of the cases, the individuals have aims or sub-aims that are more complex. They also act depending on the nature of the situation and could be cooperative regarding one goal (e.g. being a co-author of a published paperwork in the top 50 business journals, who speaks about the quality of the research) and act competitively when they want to achieve a sub-goal (e.g. building a strong social relationship with the more experienced co-authors, which would increase the chances of taking part in a possible high-quality publications by those same individuals in the future). This is one of the limitations of the cooperation theory, which was recognized also by the author himself. All discussed situations there are weighted rather in the direction of individuals having one interdependent aim (Tjosvold, 1984).

Tjosvold’s (1984) work suggests that there is empirical support for the cooperation theory. In his paperwork, the author also sees implications of the concept in the organizational practice. When individuals cooperate with each other, they are able to accomplish their goals. Cooperative groups execute complex tasks with more success than individuals working alone. Nevertheless, organizations seem to discourage co-working in groups. The main argument is the resources needed to coordinate a team, which might exceed the profits of the organization. This leads to a so-called loss in the process (Steiner, 1972).

In their book “The intellectual legacy of Morton Deutsch” Johnson and Johnson (2011) present a more recent view on Deutsch’s work. In one of the chapters both scientists describe the theory as a “well formulated” and able to “describe complex observations in abstract” (Johnson & Johnson, 2011, p. 42). After conducting a large literature review on the topic, they suggest that the essence of the theory allows its implication in interpersonal, intergroup or international environment. This makes it a multi-level theory, which puts in the center relationships rather than individuals (Johnson & Johnson, 2011).

According to Deutsch’s theory there are seven factors influencing cooperation. He establishes his hypothesis mainly on the following influencers – **organization** (homogeneity, flexibility and interdependence of the

group), **motivation** (direction and strength of individual's motivation), **communication** (quantity and "common language"), **orientation** (communality and orientation between participants), **group productivity** (entity produced), **interpersonal relations** (attitude, valence of actions, perception of the group or individual), **individual behavior** (individual characteristics) and **the course of development over time**. Unfortunately, his work does not provide enough empirical data to back his theoretical concept and this is considered as a disadvantage of his study (Deutsch, 1949a). The current paperwork recognizes the importance of the variables, which influences the level of cooperation between individuals and takes some of them into account. The essence of the database used does not take into account the psychological aspect of the concept – orientation, interpersonal relations, motivation and individual behavior. It contributes to the theory of cooperation by making observations based on quantitative data, where the measurement of the interaction between individuals was not possible.

It is of high importance to state that the cooperation activities between the research objects in the current database are occurring in rather small groups. Therefore, the theory sketched by Deutsch (1949a) could be implied in the current research, as the scientist takes a critical look exactly at the so-called face-to-face groups. These kinds of groups are characterized by the small number of participants (Deutsch, 1949a, p.129). In this case, an article, which is published by university's employees, should be considered as a face-to-face cooperation activity, where just a couple of authors take part.

### **2.3 Cooperation, Productivity and Nature of the Task**

There have been experiments done, which had the goal to observe directly the productivity in a cooperative situation. Depending on the experimental set up (test environment, moderator, mediator etc.) the results differ<sup>1</sup>. For example, Sharan (1980) and Laughlin (1978) have found evidence that cooperation induces productivity, whereas Michaels (1977) suggested that competition does. Furthermore, Hayes (1976) measured individualization (an environment, which has neither competitive nor cooperative activities) in his experiment and found out that this is the right way to strive for achievement. There are also meta-analysis studies, which had the aim to summarize the academic knowledge on the topic of productivity (Johnson et. al., 1981). After

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<sup>1</sup> An experiment conducted by Tanev and Hausmann (2017) at the University of Vienna analyzed some cooperation patterns as well. The experiment showed that cooperating with a "friend" would most likely have a positive influence on the joint success than working on your own. However, the prime goal of the study was to examine the link between cooperation and creativity.

taking a look at more than 100 studies, Johnson et. al. (1981) was able to observe that overall higher cooperation means higher productivity among groups. The authors compare analyses about cooperation, competitiveness and individualism. The statement they made holds for experiments, which observe memory, knowledge acquisition and problem-solving tasks. One of the limitations of the article is that the meta-analysis does not include correction related tasks (Tjosvold, 1984). Pointing out that the essence of the task was the moderator in the article is necessary. This leaves the readers space for interpretation of the results.

As already mentioned there is proof of the oppose statement – cooperation does not necessary results into higher productivity or performance. Scot and Cherrington (1974) found out that if groups are assigned a correction task, they would do worse than participants in the experiment, which work on the task alone. The authors argue that one of the problems with cooperation is the time spent on coordination and management. On the contrary competitors do not have to invest part of their time in dividing the tasks, which in some cases leads to time wasting. For this reason, Tjosvold (1984) argues that individuals tend to perform better alone when it comes to simple tasks that do not necessary need coordination.

Similar to the topic of “cooperation induces productivity” there are meta-analysis studies, which show support for the contrary. There is proof that when the task relates to number of generated ideas individualists perform better than groups (Dunnette et.al., 1963; Taylor et. al., 1958). However, groups still produce the higher number of ideas with high quality. This leads to the conclusion that the task plays a significant role as a moderator in all academic analysis. Its nature determines whether the cooperation or working alone will be the right strategy for reaching better outcomes.

In his article on Deutsch’s cooperation theory (see chapter 2.2), Tjosvold (1984) mentions the importance of meta-analysis for the management board of organizations. He states that companies with complex core-tasks will need to take into account the outcomes of the analysis and decide whether to encourage or discourage cooperation in the organization. The author also discusses the drawbacks and possible implications of the articles. Managers should be aware that most of the experiments made were mainly conducted in order to help the educational and socio-psychologic academic environment. They are of high interest for psychologists and all kinds of teachers willing to instill knowledge in a group of people. Furthermore, organizations are in most cases more interested in the employee’s performance over a long extent of time. The studies made by scholars reflect a situation that does not take so much time. Some of the experiments observe participants for a couple of weeks, but this is still considered as a short period (Tjosvold, 1984). Implementing results and

recommendations based on “short-period tasks” in an organization, which strives to achieve a long-term success, may not always be the right approach.

Overall, there is proof for both sides of the argument. Some of the scholars suggest that cooperation and productivity are negatively correlated whereas others argue the opposite. One is sure – the nature of the task has a significant role in the setup of the analysis made. Managers have to take into account the complexity and durability of the assignment and based on that decide which approach to use (cooperative, competitive or individualistic) (Puck & Pregernig, 2014).

Furthermore, conflicts that could arise from the essence of the task also need to be considered. The disagreement between group members could be beneficial to the whole process. In case the nature of task is complex it will most probably require the critical thinking of participants. This could lead to a conflict in the group, which might result in positive or negative way or it might also not have any impact at all (Ayub & Jehn, 2006; De Dreu, 2006; De Wit et al., 2012). In their sample of 92 team-task observations Puck and Pregernig (2014) were able to make a statement about executing complex tasks while cooperating and what was the effect on performance. The authors have split their database into decision-making and creative tasks. They furthermore use cooperation as a mediator. Results show that a task-conflict will decrease cooperation and therefore decrease performance. Promoting cooperation within the group would result into more qualitative outcome. The study confirms that it is better for more complex assignments to be executed in a cooperative environment. However, both authors describe as limitations the small sample of the experiment, the lack of diversity with the research objects and the short-term tasks. They state that it is of high importance to consider these limitations when interpreting the analysis made (Puck & Pregernig, 2014).

Taking into account the academic view described, publishing an academic article could be considered as a task:

- with high complexity – conducting an academic paperwork with high quality and peer-based review approval process is considered as a task with high complexity. Opposite to that a correction or copying task is considered as an assignment with low complexity.
- with long durability – the analysis of the current thesis shows that research objects publish 1,6 articles per year on average. This means that the task takes on average around 8 months to accomplish (further

analyses are discussed in chapter five of the paperwork). An assignment with short durability is considered a task which does not take more than a couple of weeks (Tjosvold, 1984)

Additionally, the current thesis measures not only the productivity, but also the performance of the participants. It is not surprising that results based on quantitative and qualitative data differ from one other. This paperwork argues that it is a fundamental part of the analysis to observe both quality adjusted productivity and productivity in order to underline the effects of cooperation on the outcome of a certain activity (see chapter 5).

All things considered, there are still some uncertainties when it comes to the topic of cooperation and productivity. Depending on the set up of the database, collaborating with someone might enhance or decrease productivity. The same goes for the relationship between collaborating and performance. It seems that the essence of the task also has an impact on the group's participants.

## **2.4 Psychological and Social Aspects of Cooperation**

Explaining social and psychological phenomenon such as groupthink, indirect reciprocity and group-structure population is important for the current research. Although sometimes cooperating seems to be the more efficient approach to increasing the performance of all participants, people still prefer working alone. Furthermore, some of them do not take advantage of all the benefits of working with someone outside of your group and feel more comfortable cooperating only within the group.

### **2.4.1 Intra- and Intergroup Collaboration**

Global collaboration between institutes and even industries is gaining importance lately. Globalization is a fact and is for sure responsible for some of the successful cooperation relationships on the market. Global migration, leadership and ethnocentrism influence how people interact. Roughly described there are overall two strategies that could be perceived by institutions – either global cooperation or ethnocentrism (Gao et. al., 2018). Contrary to common belief, it seems that global migration as a part of the process of globalization could cause ethnocentrism and therefore could have a negative impact on the cooperation as a whole. Gao et. al. (2018) widely discussed the issues of grouping. Conflicts which arise from inter- or intragroup communication lead to a situation where individuals have to decide what kind of cooperation strategy they will use – will they prefer acting with in-group members or will they be altruistic with regards to the out-group members?

Sometimes people tend to act irrationally and choose the “wrong” strategy in terms of maximizing profit for the whole population (Masuda, 2012).

### **2.4.2 Reputation**

Indirect reciprocity with someone who has higher reputation also plays a role in situations where social dilemma is present. This refers to the circumstance where individuals decide to cooperate with someone they do not know, who is also not part of the individual’s group and has a good reputation. This mechanism works only in the case where the population’s structure persists of groups. Nevertheless, participants did not always follow the theoretical models which already exist. They tend to deviate from the standard approach (Masuda, 2012). Masuda’s (2012) work showed that individuals are keener on cooperating within their own group rather than fully cooperate with all participants. In his model, the author suggests that the characteristics of a member, who is not part of the group, are being automatically perceived by others as the characteristics of the group he or she belongs to. This refers more specifically to one’s level of reputation (Masuda, 2012).

In the case that employees of a certain company decide to cooperate with someone who is not part of their group, they will most likely expect that the cooperation partner will have the same characteristics. For example, having a collaboration partner who is employed at Harvard University will set high expectations in terms of their abilities, as their group (in this case Harvard University) has high reputation among other institutions in the same industry.

### **2.4.3 Groupthink**

There is already a substantial body of research describing the phenomenon of group thinking (Janis 1982, Turner & Pratkanis, 1998). The theory behind this research is the following – groups of people working together may not be so open to work with other groups or in other words to cooperate externally. These research objects are influenced by the so-called groupthink and therefore sometimes they are not able to perceive ideas different than the ideas created in their group. The information which differs from their ideas is often not taken into account. Such behavior could lead to lower performance. This raises 2 questions – does groupthink influence performance or productivity and does internal cooperation cause groupthink? Most of the academic paperwork on the first question presents mixed results, which would mean that the effect of this phenomenon

is still not completely clear to scholars (Park, 1990). There is also not a lot of evidence on the second point mentioned.

It is important to mention that by stimulating internal cooperation a situation where groupthink is present could arise. Moreover, it is considered that encouraging employees to work closely together logically would lead to the case where external cooperation will not occur often. Thus, such strategies have a negative effect on external cooperation. However, it is of high significance to mention that cooperating internally would not necessarily lead to groupthink (Hillebrand & Biemans, 2003), as the psychological and behavioral characteristics of the participants also play a role.

The literature presented in the current chapter argues that it is difficult to measure whether the individuals were cooperating because of a psychological phenomenon such as groupthink or they were simply striving to increase their reputation by co-working with someone who has a better performance index and reputation. Nevertheless, the current paperwork recognizes that there are psychological and social aspects of the way people collaborate with each other. It also suggests that some of the results presented in the article could be explained simply by the presence of external collaboration preference or groupthink.

## **2.5 Cooperation in Universities**

As we know, universities are established institutions with traditions. In most cases, they have a distinct structure, which is nowadays being challenged by the phenomenon of globalization (Wit, 2010).

Analyzing cooperation in universities is a topic, which has also been discussed in the academic world (Franco & Pinho, 2017; McFadyen & Cannella, 2005). The knowledge transfer process in an industry based on researching and exchanging information is of high importance for researchers. There are once again intergroup (between colleagues from the same university or research center) and intragroup (between colleagues from different universities) cooperation activities. Furthermore, scholars have identified the significance of the so-called university-industry cooperation, where companies seek help from research centers or university departments for industry-related matters. This kind of collaboration could be beneficial for all parties involved (Muscio, 2010).

### 2.5.1 Knowledge Transfer

One of the main objectives of universities is to create knowledge in the form of publications (in refereed journals as well as in non-refereed ones). Further goals are the transmission of the knowledge in forms of teaching or educating (Berbegal-Mirabent et. al., 2015). These institutions use different strategies to increase their overall production of academic paperwork. Similar to companies, they function by encouraging or discouraging cooperation between employees. Universities are aware that creating knowledge on an individual level is not always efficient and possible. This is the reason why they build communication channels. The institutions develop internal mechanisms that allow them to communicate with other research centers and exchange information. It is considered that large research centers have more resources than smaller ones and cooperate more on global basis (Franco & Pinho, 2017). In this case universities can be seen as a knowledge transfer global networks. The collaboration between scholars leads to observation of new topics. It also makes it possible for universities employees to exchange information with higher quality in a more rapid way (Franco & Pinho, 2017). Managing this process and its efficiency seems to be of high importance for universities.

What is also worth mentioning is that university networks are a valuable resource. These institutions have limited number of employees and it is logical that having a strong relationship with others will increase their research capacity. This leads to a higher knowledge production in research centers and is considered as one of the measurement for success in each university (Olcay & Bulu, 2017)

There is also paperwork on the topic of universities in developed countries and the cooperation strategy they should use. Numprasertchaia and Igel (2005) argue that it is vital for such institutions to have a collaboration strategy with other universities from developed countries. This will increase both quality and quantity of the research and will also make them more competitive despite having low amount of resources. Such studies are proof for the ongoing internalization of this particular labor market. Both authors argue that scientific research is an important part in the knowledge-creation process and universities should strive to gain a competitive advantage by investing in “global research relationships” (Numprasertchaia & Igel, 2005).

Location of the cooperating universities also has its role in creating new studies. McFadyen and Cennella (2005) studied the effect of distance between knowledge exchange partners from universities. They basically examined the experience of the exchange partners (tenure), the uniqueness of the knowledge exchanged

(quality) and the costs and risks of the exchange. Similar to the current paperwork both authors measured knowledge creation by the number of articles written by each person.

One of the main points made in the article written by McFadyen and Cannella (2005) is suggesting that it is a rare case for an associate or even a professor to possess the whole information needed for the conduction of the research. Furthermore, the study distinguishes between local and geographical partners. Close and distant exchange partners have a greater effect on new knowledge creation than intermediate distances. Short distance relationship is defined as a partnership between two colleagues from the same department. Such partnerships are known for fast error catching, less resource spent in coordination and more mutual support than in the residual cases. Long distance one (also known as invisible relationship) is basically collaborating with someone from another university. This would of course mean less sharing of the knowledge, because of the physical barrier between participants. Intermediate exchange partners are characterized by two co-workers at the same university, but in a different department and also in two different institutions which are geographically located close one another. (McFadyen & Cannella, 2005).

The findings suggest that long distance partnerships are costly in terms of effort and time. There is also evidence that working together with someone from a distant location would yield higher productivity. However, the support for the hypothesis presented in the study isn't strong. Both authors give the example that in one of the institutions there was no evidence that distant collaboration creates new knowledge and at the same time, there was support for the same hypothesis in a university of similar rank. Conclusively, the article refers to the implementation of the findings beyond organizational boundaries. Although sometimes costs of a long-distance partnership exceed the benefits, partners recognize the opportunity to obtain unique know-how and therefore get engaged in such collaborations (McFadyen & Cannella, 2005).

## **2.5.2 Choice of Partners, Institutional Culture and Financial Incentives**

### **2.5.2.1 Choice of Partners**

Franco and Pinho (2017) published a paperwork that analyzed the advantages and disadvantages of cooperation between research centers. Both authors determine a research center to be any formal part of the university, which has the goal to research a certain topic and contains employees from different departments of the institution. They argue that cooperation has its pros and cons. The research based on qualitative data considers

the choice of partner, culture of the university, dimensions of knowledge transfer and financial incentives. Results show that choosing your cooperation partner and having a financial incentive to collaborate successfully influence cooperation between research centers. Contrary to common belief, difference in the culture of the universities is not considered as a disadvantage, but rather a bonus to cooperation (Franco & Pinho, 2017).

Also, other scientists state that choosing the appropriate partner is a very important step in achieving a high quality collaboration (Jones et.al., 2008; Melin, 2009). When it comes to universities, it is of high significance for the collaborative relationship that the participants have similar background. However, it is also crucial that both parties complement each other in order to tackle arising issues from the main research topic. Partners should also be able to trust in each other. Franco and Pinho's (2017) qualitative research outlines that the participants in the survey (described in the study as university coordinators) also specify the choice of co-worker as a major part of a successful cooperation relationship. Some of them state that nowadays choosing your cooperation partner is mostly based on previous experience with that same person or institution. If the collaboration between universities or employees was successful, the likelihood that this same cooperation will occur once again is high. Another strategy that scholars use is to target an institution that has a higher rank in the academic sphere (Franco & Pinho, 2017). Overall it can be stated that having the possibility to choose your partner is positively influencing cooperation by increasing the profit for both parties.

#### **2.5.2.2 Institutional Culture**

As already mentioned above, the entity's culture has also an impact on the collaborative environment. According to the academic literature, not only the cultural difference of the participants, but also opposing cultural views of universities could be a problem for achieving a profitable cooperation. How institutions are used for teaching their history and the official language they use are one of the barriers that could hinder cooperation (Beerkens & Derwende, 2007). However, qualitative data suggest the complete opposite. Actual professors describe the cooperation with people from foreign institutions as successful and more importantly as relationships, which did not have any problems of cultural nature at all (Franco & Pinho, 2017). Results on this topic in the academic literature often differ. It can be argued that examining entities only in one country (e.g. the U.S.) is a possible solution to this issue. This way the impact of the cultural difference would be brought to minimum. Furthermore, sometimes it is subjective whether there is a cultural difference between

participants. Most of the objects observed do not have any data in their CVs regarding their nationality, ethnicity or cultural specifications. False assumptions regarding the nationality of a person might lead to distorted results. The current thesis takes into account the described observations in the academic literature and perceives all employees in one university as participants who have the same institutional culture. The cultural barrier between universities is also lowered as all of them are part of the same geographical region and therefore share similar history and perspectives.

### **2.5.2.3 Financial Incentives**

It is a common practice for governments not to interfere in the financial structure of a university (especially when talking about the United States or Europe). It can be observed that these institutions function in way similar to private entities. They follow their own financial strategy and perceive accordingly their goals. Governments offer funding for ongoing projects and research topics. The European Union also engages into funding activities. The subsidies are based on the quality of the research and cooperation might help scientists achieve higher performance. All this leads to the conclusion that scholars need to become more entrepreneurial in order to get higher financial support and increase their research budget (Geuna, 2001). This will give them more possibilities and will influence the outcome of the project most likely in a positive way. Furthermore, the financial incentives give the researchers the possibility to hire specialists in a certain area, who could help them with content which is unfamiliar to them. There is also empirical proof that higher budget would mean increased likelihood of collaboration (Bozeman & Gaughan, 2007).

All points considered, it seems that cooperation in universities is driven by the co-workers, the possibility of knowledge transfer, specifics with regards to the culture of universities and the financial incentive brought by governments and unions. Nevertheless, scholars are still not completely sure whether encouraging cooperation in such institutions is the right approach.

### **2.5.3 The case of University-Industry Cooperation**

Academic literature suggests that one of the disadvantages of research created at the university is that sometimes they are more theoretical and lack practical application. Companies are interested in finding a faster and more practical-oriented solution for their issues. Scholars in certain disciplines do not have much

experience in market and are more or less theorists (Franco & Pinho, 2017). Nevertheless, cooperation between universities and firms might bring benefits not only to both parties, but to the whole society in general. The practice dates back from 80's and is actually an own research topic in the academic world. Governments also take a look at this relationship with interest and engage in different activities in order to increase the level of cooperation between industry and universities (Franco & Haase, 2015).

Franco and Haase (2015) examined the motivation of researchers and the different interaction channels with regards to the collaboration between university and industry. The gathered qualitative data shows that traditional communication channels are important for this kind of relationship. However, more intriguing is the fact that this type of cooperation does not have any influence on the career prospects of university's employees and therefore could have a negative impact on the motivation of the researchers (Franco & Haase, 2015).

Creating a quantitative database and providing proof for the mentioned arguments also seem challenging (Siegel et. al., 2004). The analysis of the university - industry relationship requires quantifiable data on which articles were conducted in such constellation. However, companies could be considered as "outsiders" although they are not in the same industry as universities. It can be argued that cooperating with someone outside of your research center will have similar advantages and disadvantages as cooperating with someone from a different type of industry.

### **3 Literature Gap & Research Questions**

#### **3.1 Literature Gap**

The management literature on internal and external cooperation is overall scarce. It sheds light on only a couple of the main issues in this complex relationship (Hillebrand & Biemans, 2003). A more comprehensive and critical look at the topic is needed in order to understand its importance for an organization. The cooperation patterns concerning collaboration between hierarchical levels within a university and between universities contributes to a better understanding of this matter's significance and therefore fills in an existing gap in the research literature.

The article written by Hillebrand and Biemans (2003) is one of the indicators that further research in the topic of cooperation is needed. It provides a review on the literature of the matter at that point in time and clearly

states that there is the need for empirically “stronger case and further investigation” between the internal and external types of cooperation (Hillebrand & Biemans, 2003, p. 739). The current article refers to one of the propositions made in the paperwork written by both authors – that extending a study on cooperation with some kind of efficiency and success variables would really help for a better understanding of the efficiency and performance of an organization and the impact cooperation could have. Furthermore, the current work provides a collection of empirical results which is based on a diverse set of variables. It observes a high number of organizations (e.g. Franco and Pinho (2017) observe the cooperation between university research centers whereas only six universities participate), which have both employees who are more cooperative with colleagues and participants who engage in less cooperative activities and have the preference to publish articles by themselves. However, Hillebrand and Bieman’s (2003) analysis also proposes that future works should concentrate on the influences such as the complicatedness of the task, what is the working environment like (e.g. is it dynamic) and how significant is the competition. In this case it is also important to take into account the difference between cooperation and more or less a simple involvement. All of the aspects mentioned above will be considered in the analysis of the current paperwork. However, the complexity of the issue makes some of the assumptions disputable.

It is also very important to mention that the current data offers interesting insights in an industry, where collaboration is of high significance. The prior goal of most of the research centers at universities is to stimulate and promote cooperation between the participants (Boardman & Corleyb, 2008, Berbegal-Mirabent et al., 2015, Guan & Liu, 2016). They also tend to give more attention to topics such as knowledge transfer (Chataway & Wield, 2000, Sabharwal & Hu, 2013, Guan & Liu, 2016). Having this in mind, it can be stated that exactly these institutions rely on cooperation between employees (professors, assistants or associates) because of the higher rate in innovation when it comes to working in a group. Nowadays this is possible mainly because of globalization and lower transaction costs in comparison to the time before information technology was even possible. The fast transfer of information between universities makes it more tempting for employees to explore opportunities to work with someone, who can add up to the whole performance of the task and is not part of the same institution (Franco and Pinho, 2017).

Similar to McFadyen and Cannella’s work, the current paperwork distinguishes between internal and external cooperation. The first one is addressed as “cooperating with colleagues”, whereas the second one as “cooperating with outsiders”. The reason for generalizing in only two types of cooperation relationship is the

fact that all objects observed are employees of universities in the U.S. Despite the long geographical distance between some of the Business Schools observed (e.g. University of Wisconsin - Madison and University of Texas – Dallas) all institutions share similar culture, have similar goals and are part of the same “organizational chain”. Furthermore, including a variable describing an intermediate collaboration between partners will require a definition of the term “intermediate”. As there are many propositions on what “intermediate” in geographical sense could mean, deciding on only one of them might lead to manipulation of the results and assumptions made. One of the main aims of the current thesis is researching whether the cooperation strategy based on provoking knowledge transfer with “colleagues” or “outsiders” makes a Business School in a country better than its competitors on national level.

The present literature on knowledge transfer between universities does not cover the whole topic of cooperation. Franco and Pinho (2017) did recently a review on the topic of knowledge transfer, which was based on qualitative data – interviews and documentary analysis. Both authors found out that being able to choose your partner and also monetary incentives influence cooperation positively. More interestingly, they stated that external cooperation between researchers with different cultures had a positive effect on knowledge transfer (Franco and Pinho, 2017). These findings create a stable foundation for the observations made in the current article. It is based on quantitative results and this can contribute to the confirmation or rejection of some of the assumptions made in the academic literature of cooperation.

Overall results show that teams consisting of diversified participants in terms of functions, experience and position are highly cooperative. This leads to an improved quality of the product, lower costs and lower time to market resulting in an overall improvement of the performance (Janis, 1982, Hillebrand & Biemans, 2003). A study written by Griffin and Hauser (1996) about literature review on the topic of research, development and marketing suggests that there is a strong evidence that internal cooperation influences overall performance in a positive way. Both authors also argue that the results are consistent across different types of methodologies (Griffin & Hauser, 1996). Nevertheless, some scholars describe the issue of accomplishing a high level of cooperation within the organization as a difficult task (Hillebrand & Biemans, 2003). Scholars were also able to notice the negative sides of both types of cooperation. Some studies describe group thinking as an issue when it comes to collaboration (Janis 1982, Turner & Pratkanis, 1998). Hillebrand and Biemans (2003) classified the overall findings on the literature of external and internal cooperation. The conclusion of their paperwork consists of the so-called “Agenda for future research”, where both authors make a couple of

propositions to scholars and identify weak spots and literature gaps. In one of their propositions the researchers acknowledge that it is not necessary that internal group cooperation and norms would lead to groupthink (Hillebrand and Biemans, 2003, p.740). This leads to the conclusion that there is still need for empirical evidence in order to understand the effect of external and internal cooperation in an organization.

It is also worth mentioning that in terms of hierarchy universities as organization have similar structure to companies in the private sector. Professors could be seen as senior managers whereas assistants as employees who are granted with junior position. The articles written alone are similar to stand-alone projects in a company from diverse industry and the paperwork, which is published in collaboration with someone, could be identified as a group project. Having a clear strategy on whether a current project should be done alone or within groups is considered as important topic in many companies around the globe. Therefore, the observations made in the current paperwork could serve managers in other industries as help for choosing the correct cooperation strategy for their organizations.

All of the research mentioned above sets the expectations for the results discussed in the current thesis. One of the prime tasks of academic employees in business schools is to publish articles. Therefore, it could be stated that analyzing the activity of publishing referred journal articles will contribute to the academic literature by introducing new observations on the topic of cooperation within the top echelon of an industry with a traditional hierarchical composition. The long durability and high complexity of the task also contribute to the uniqueness of the conducted research. Collecting and harmonizing a large sample of observed objects, which are employed only at business schools and therefore represent one certain discipline in science, also makes the current analysis exceptional. There is no data on departments that are devoting their time to studying areas different from managerial science. Finally, the presence of a well-structured hierarchy based on a hierarchical ladder (assistants, associates, professors) enables the diversity of the observations made.

Overall, the current thesis tries to fill in a gap in the academic literature by

- **first**, reviewing internal and external cooperation in the top 40 institutions in the chosen industry
- **second**, establishing the relationship between cooperation, productivity and quality adjusted productivity within the top 40 institutions in the chosen industry
- **third**, analyzing cooperation between different hierarchical layers in the top 40 institutions in the chosen industry
- and **fourth**, presenting results based on task with high complexity and long durability

## 3.2 Research Questions

The current paperwork accounts for the productivity of the objects included in the overall database. Each of the employees in the top 40 business schools in the U.S. has an individual “productivity profile” based on the number of articles he/she has published. The analysis also accounts for the number of individuals in the business school, employee’s tenure, working alone or publishing in cooperation with someone, etc.

The broad goal of the current thesis is to study and analyze the influence of cooperation on productivity and quality adjusted productivity. More precisely, it aims at finding cooperation patterns in the area of management, strategy and organization in the top 40 U.S. business schools. The research questions and the following results are narrowed down to this specific research setting.

The literature review in the previous chapter of the paperwork showed that dependent on the database cooperation might have positive or negative influence on normal and quality adjusted productivity of individuals (Tjosvold, 1984, Ayub & Jehn, 2006; De Dreu, 2006; De Wit et al., 2012, Puck & Pregonig, 2014). Furthermore, scientists still argue about the influence of distance on collaboration relationships. It is not always the case that cooperation with outsiders influences positively the qualitative outcome of the task (Franco & Pinho, 2017, Numprasertchaia & Igel, 2005, McFadyen & Cannella, 2005). Deutsch’s (1949a) cooperation theory was able to set some ground expectations for performance of overall collaborative groups based on the durability and complexity of the task. However, scholars question these outcomes as tasks have different complexity and durability, which leads to diverse and controversial statements. The results presented in most of the articles written on the topic of cooperation are based on short-term experiments (Tjosvold, 1984, Johnson & Johnson, 2011), whereas the current thesis investigates an activity which takes a lot of time to accomplish (publishing an article in refereed journal). These arguments in the academic literature helped determine the direction of the three main research questions analyzed in the current thesis. The observations made at the end of the paperwork aim to answer the addressed questions below.

All points considered the first research question of the current paperwork aims to answer whether cooperating with colleagues is more beneficial than collaborating with outsiders in the setting of the business and strategy departments in the top 40 U.S. universities. The second research question refers to the topic of collaboration between different levels of hierarchy in an organization - do individuals prefer cooperating with someone, who finds themselves higher in the hierarchy of the university? Conclusively, the study will describe what makes

some universities perform better than other. With the help of correlation analysis, it will try to find out some of the reasons for the higher-ranking positions of some of the business schools.

## **4 Database Creation**

The following chapter gives some insights about the information needed for conducting this study. Only secondary data was used in it. The database consists explicitly of quantitative data gathered from the top 40 Business Schools of the U.S. (Appendix I). It is important to mention that this article observes only departments, with academic activity which relates to studying the discipline of business, strategy and organization. The research objects of this study are limited to university's employees, who have a position as assistants, associates and professors. Furthermore, the main information source used for the creation of the variables is the available curriculum vitae of the different individuals. One of the main reasons for choosing to analyze data from universities is easy access to detailed data about the research objects, as CVs are made available to the public. Cooperation, productivity and quality adjusted productivity are the main variables derived from the initial database. The level of cooperation is determined by the number of articles written together with someone. Productivity is the overall number of publications created by an individual and quality adjusted productivity represents the number of articles published in an academic journal with high reputation. The chapter consists of details about the course of development of the idea behind the thesis. It also describes the choice of a suitable and reliable ranking classification of the best business schools in America. Conclusively the reader can find information about the variables used in the thesis.

### **4.1 Data Quality & First Ideas**

The current study required the establishment of a roadmap including all steps needed to create comprehensive database. It contains the steps that needed to be followed while collecting the data. The database used consists of detailed information about the individuals and their publications, which dates back to 1960. Such plan of action assured the quality and correctness of the gathered data about all 900 observed objects.

After going through the first necessary step, which was choosing the research topic by assessing a gap in the academic literature, there was the need to define the assumptions and the variables needed to confirm or reject them. In order to be able to use any statistical program for the analysis, the construction of an appropriate frame for the database also had to be considered. The next step in the process was the collection of the raw

data directly from all 900 CVs and adjusting it to the chosen framework. With the help of automatized scrips, the data was automatically transferred in the framework, which assured surpassing of plausible errors in the data caused by manual actions. Afterwards a data quality check of all 900 individuals was made. In case of missing information, external sources were used in order to fill in the gap. If there was no data about the characteristics (age, full name, etc.) and working history (previous positions, location and topic of the PhD, etc.) of the person, a look up in the profile of that same individual in reliable social networks such as linkedIn and xing<sup>2</sup> was the next necessary step. When there were uncertainties and missing data in the academic work of the object, Google Scholar<sup>3</sup> as an extensive online library with scholarly literature help filling in some of the gaps in the database such as publishing date, name of the article, journal where the referred article was published, co-authors, etc.

The last of the data quality checks was comprised of assuring the uniform naming of business schools and other institutions in the research objects' CVs. There was often the issue that university's name varied. For example, some of the research objects indicated "University of Harvard" as their previous position, whereas others "Harvard University". This was a major issue in the statistical evaluation of the cooperation within the business school, the number of articles written together with assistants/associates/professors or percentage of articles written inside/outside the current business school. Establishing a list with unified names for the universities was the solution to this issue. Therefore, the "as-is" official names of the universities were collected and manually applied in the database in order to ensure its uniformity.

Strictly following the steps described above and the presence of a roadmap severely increased the quality of the data used for analyzing the cooperation patterns. Collaboration was technically measured with the help of number of co-authors and their names. Therefore, it was of high importance for the research to have a "clean" database without any errors, where names or years are duplicated, and names of universities slightly differ from one another. However, some of the limitations of the current study relate to the collected data. These are addressed in chapter seven ("Limitations and further Research") of the thesis.

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<sup>2</sup> The social networks [www.linkedin.com](http://www.linkedin.com) and [www.xing.com](http://www.xing.com) are reliable source of information about career paths of individuals. Profiles of the users consist of detailed information about positions held by the owner of the profile.

<sup>3</sup> Google Scholar was used as a database where names, journals and issue dates of separate articles examined.

## **4.2 Universities Rankings and Business Journal Rankings**

The current study takes into account two rankings – firstly, a ranking, which considers the top 40 Business Schools in the U.S. (Appendix I) and secondly, a list where the most important business journals are evaluated (Appendix II).

Most of the information used in this article was directly extracted from the internet pages of the universities, business social networks and Google Scholar. However, taking an already established and recognized ranking was needed, in order to be able to create observations based on comparison between universities and also between the quality of articles published.

### **4.2.1 Universities Ranking**

The current thesis had to use an acknowledged ranking which lists the best universities in the U.S. in order to determine the top echelon of this industry. The ranking created by US News and World Report is used as the core ranking of the top 40 business schools in this paperwork. The reasons for this choice are two-fold.

First of all, the internet site is well known for the establishment of various comprehensive rankings (e.g. colleges, hospitals, schools etc.). It is considered to be one of the most popular ranking sites in America (Griffith & Rask, 2005). Although the literature on the topic of taking a decision where to study is scarce, there is an academic proof, which supports the statement that US News and World Ranking is an important influencer in this area (Griffith & Rask, 2005). Griffith and Rask's (2005) work on the importance of US News and World Ranking (USNWR) suggests that universities should consider this ranking and should try improving their standings there. Statistical results show that the majority of individuals who are investigating where to enroll are looking at this ranking in some point of their research (Griffith & Rask, 2005). This suggests that the USNWR is a reliable ranking and colleges seem to pay attention to it.

The second point, which influenced the choice of this particular ranking list, was the methodology<sup>4</sup> used in the statistical analysis. There are both qualitative and quantitative primary data in this database. The multi-method analysis contributes to the correctness and reliability of the results (Morse & Hines, 2017).

A total of 380 responses out of 480 examined Business Schools were analyzed. There are overall three types of assessments considered. The qualitative assessment includes peer score, which represents the self-made

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<sup>4</sup> The information on methodology was retrieved from the official internet site of US News and World Rankings

ratings of deans and directors from business schools. It also includes the opinion of corporate recruiters and company contacts. Thereby the ranking takes into account the view of both university and industry. Furthermore, the placement success is also evaluated and included in the study. The mean starting salary of graduates including bonuses is one of the variables used, whereas the employment rates represent the second variable used for the evaluation of placement success. The last assessment is described as student's selectivity. GMAT and GRE scores of both matriculated students and also individuals who were not accepted in the business school are taken into account. The GPA scores also influence the ranking. Last but not least, the acceptance rate from last year in the business school was considered (Morse & Hines, 2017).

One of the reasons for preferring the USNWR to other acknowledges rankings such as the Financial Times is the comprehensive methodology and the number of significant factors taken into consideration. For example, the Financial Times observes simply the number of faculty publications published. Afterwards points are awarded to the business school at which the author is currently employed and the results are weighted for faculty size.

The brief overview of the ranking itself shows that the business school at Harvard University named after the university itself takes the leading position followed by Wharton Business School (University of Pennsylvania) and Booth School of Business (University of Chicago). University of Texas at Dallas with business school Naveen Jidal and University of Florida with Hough business school can be found at the bottom of the ranking. It is important to mention that the gathering of data (and more important the analysis) for the current paperwork started in 2017. This is the reason why the 2017 Business School ranking created by US News and World Ranking is the one used for making the statistical analysis.

#### **4.2.2 Business Journal Ranking**

The current thesis distinguishes between productivity and quality adjusted productivity of the individuals. This division of data is considered as a way to measure the quantity and quality of the work done by employees. Overall, the number of refereed journal articles published by a professor, assistant or associate counts as "quantity of work", whereas the number of refereed journal articles published in one of the top 50 business journals represents the quality of the work. This kind of separation makes sense as not all of the articles written by an individual get published in an academic journal at all. Furthermore, not all of the research ends up in a business journal which is influential, important and recognized for the academic world. It is considered that

the top 50 business journals tend to publish research that are more meaningful and significant than others. Moreover, it is fair to state that all scientists strive to get their articles published in a journal of higher rank. That way their work is being recognized and more important they gain better reputation. Masuda (2012) already addressed the issue of cooperation and reputation by stating that sometimes individuals with higher reputation are more preferable as cooperation partners. In this case the phenomenon could be explained by the experience of the individual whose work is being published in a top ranked journal. It could be argued that people seeking cooperation partners perceive that there is a correlation between the quality of the articles and the tenure of the future partner (Masuda, 2012).

Researching the topic of business journal rankings shows that there are not a lot of studies in the academic literature on this issue. For example, Linton (2013) created a ranking of his own, which considered a lot more than 50 journals and their quality adjusted productivity over the last 5 years. However, he states that his work is more or less an update on the most famous business journal ranking created by Financial Times on yearly basis (Linton, 2013). The methodology used by the Financial Times for creating their official ranking is the following – 140 business schools are asked to participate in a questionnaire. After a yearly response rate of around 70% the list of top 50 is updated accordingly (Ortmans, 2016).

Another point that was considered is that US News and World Rankings does not conduct statistical analysis on the best academic journals. So, taking into account the unavailability of data from USNWR, the acknowledgment received by the Financial Times with regards to their ranking and the methodology they used, the current thesis measures the quality of an academic article by the Financial Times rank of the journal where it was published. This study labels articles to have high quality in case they are published in one of the top 50 journals. The exact rank of the journal does not have any meaning in the analysis. Thus, quality is being measured on a binary scale – the end product is of either high quality or low quality. On the contrary, a university's position in the Business Schools ranking plays a role in the results presented in the consequent chapter of the thesis.

All points considered, the top 50 business journals ranking by the Financial Times makes it possible to measure the quality work of the university's employees. Thus, the current thesis was able to make observations which address the “meaningfulness” of cooperation based on the current setting of the analysis.

### **4.3 Database**

The data used for this study was taken from the top 40 business schools in the U.S. The decision of researching exactly business schools was based on the undergraduate's high demand of perusing an MBA in the U.S. This kind of popularity ensures that business schools across the country have enough budget to sustain a successful organizational environment, which makes them an interesting and reliable (in terms of disclosed information) object to observe.

It is important to state that gathering information exactly from universities as institutions was essential for the current thesis. Being able to analyze secondary data, which is comparable, from one single industry is not always the case. When it comes to acquiring detailed information of someone's productivity and performance, collecting data from CVs is one of the most efficient ways to do this. Universities provide easy access to information about their employees out of informative and prestige purpose. There is disclosed information on the hierarchy of the business school, on the history of employees (previous positions, current courses, etc.), their publications and areas of interest. Furthermore, the accuracy of the disclosed data is very high, as CVs are being updated by employees themselves. It is also in professors' own interest to keep the information about them actualized, as this is their presentation to both internal and external parties looking for cooperation partner.

However, one of the limitations described in more details in chapter six (Limitations & Further Research), is that there were a couple of CVs which were not up-to-date. As already explained in the previous chapter this issue was tackled by gathering information from business networks and Google Scholars. Nevertheless, the current database has some small statistical error because of missing information in some CVs (e.g. a total of 58 individuals were lacking a more detailed information on their publications), which couldn't be found anywhere. A good example is missing data about previous positions, which leads to excluding the object from some of the variables.

#### **4.3.1 Observed Objects – gathered Information**

The current paperwork observes three types of hierarchical positions in the American universities – assistants, associates and professors. There is also information on associates with tenure, but for simplification reasons

of the model those individuals were counted as associates in the analysis. Furthermore, the database also distinguishes between employed professors and visiting professors.

It is also important to mention that not all departments of the business schools were taken into account. In order to stay consistent, the current study analyzes data only from the departments of the top 40 business schools in the U.S., which observes the topics of management, strategy or organizational behavior. Departments, which concentrate on studying other disciplines such as marketing, finance, accounting, etc. were intentionally excluded from the research. Analyzing cooperation between groups, which are working in the same area, is meaningful, because most scholars stay active in their own field of studies. Around 62% of the employees in the observed departments had PhD in business studies. Logically there is less possibility and probability of a collaboration relationship between partners working in distinct areas. It could be argued that one of the main reasons for cooperation between partners with different backgrounds is the need for two specialists in a complex topic, which requires knowledge from several disciplines.

The variable used for measuring the productivity and quality adjusted productivity of the individuals is the number of refereed articles written. Professors' CVs often include written books, chapters in books, conditionally accepted articles, forthcoming paperwork, reviews and edits of both books or articles and also other types of publications. Articles, which were not officially published into a journal, were not taken into account in the current study, as there is still an ongoing reviewing process. The database also excludes books, chapters in books and edited articles or edited books. First of all, in most cases only professors publish books or chapters in them, which means narrowing the observed objects only to those individuals. Second, most of them are not peer-reviewed which makes their quality hard to assess. On the other hand, refereed journal articles are written by scholars and are reviewed by other experts before being published. This happens in order for the quality of the paperwork to be assured – does it have reasonable conclusions, is it scientifically valid, etc. In most cases, the reviewing of the articles is an anonymous process, where the reviewers do not know who the writers of the article are. That way their reputation does not matter and the reviewing process is not biased. The database includes detailed information about the title, co-authors, year of publishing, name of the scientific journal and its volume.

The current study distinguishes between “outsiders” and “colleagues”. This was needed in order to determine the cooperation level of working with employees from the same university and being in a cooperation relationship with professors, associates or assistants from other universities. The results account for the case

where two collaboration partners worked together when one of them was an “outsider”, but after some years became a “colleague” working at the same university. Such cooperation articles are counted as cooperation with outsiders. Basically, all participants have to be employed at the same university and at the same time in order to consider an internal cooperation process.

Descriptive variables such as “current position”, “year of entry into the Business School”, “previous position” and “previous university” ensure the possibility of following each individual’s career steps in detail. Furthermore, it makes it possible to figure out whether and also when exactly multiple individuals were employed at the same university.

There is detailed information on each article written by an individual. The database includes the title of the published article, the journal that was published in, its volume and year of disclosure. Most important there is information about the co-authors of each refereed paperwork. This was the main variable used to identify the cooperation level of university’s employees. The statistical model accounts that some of the articles are present more than once in the database. For example, considering the case where two individuals worked together on a study, both of them include that mutual article in their CVs. The only difference would be the switched writer and co-author of the articles. That way both research objects will score one article in which they cooperated. Thus, the case where only one of them takes credits for collaborating with someone does not exist.

The database also includes information about PhD program of the research objects - year of acquiring the title and university where the study was finished. There is also a variable that marks whether the individual did a PhD in business related topic or not. The position number of articles represents the overall number of refereed paperwork published by the object. Productivity is being measured with its help. Quality adjusted productivity refers to the number of qualitative articles, which were published by the top 50 business journals.

<b>Category</b>	<b>Variable</b>
<b>Characteristics</b>	Name, Gender
<b>Current Position</b>	Current Position, University, Rank of the Business School according to US News, Department, Current Position Starting Date, Year of Entry in Business school, Current Position Years
<b>Previous Positions</b>	Previous Position as (Visiting) Assistant, Associate, or Professor, Starting Date of Position, Position Until, University, Years Previous Position, Location of PhD, Year of finishing PhD, PhD in Business
<b>Articles</b>	Overall Number of Articles Published, Title of the Article, Co-Authors, Journal, Volume, Year of Publication
<b>Rankings (University and Journal)</b>	- Financial Times Top 50 Business Journal Ranking (2017) - US News & World Report Top 100 Business Schools in the U.S. (2017)

Table 1: Overview of the data gathered from CVs.

After presenting the data that was collected during the study, the following chapter will outline the derived variable in more details.

### 4.3.2 Derived Variables

In order to derive a conclusion from the database, the calculation and establishment of additional variables was needed.

Distinguishing between overall amount of articles written and articles written while being employed in the current business school (*Articles published within the Business School*) is quite important, because in this industry it is common for individuals to change the university they are working in at least once during their carrier.

Deriving the overall number of articles in which he or she has cooperated (overall cooperation) shows one's "flavor" and readiness to cooperate in general. The variable was also narrowed down to the number of articles in which the object has collaborated with someone from the top 40 business schools or a colleague from the same business school. Moreover, it was crucial to count the number of articles in which the individuals have collaborated with a colleague while being at the current business school (*Cooperation within Business School*).

That way the studies conducted in a cooperative environment between assistants, associates or professors before they were actually colleagues, are excluded. Furthermore, the percentage of articles written alone and articles where cooperation has occurred was also derived in the current analysis. The overall percentage of

articles where individuals have cooperated is presented in the variable *Percentage Quantitative Cooperation*. Deriving the percentage of cooperative articles within the current business school (*Percentage Quantitative Cooperation in Business School*) was also part of the calculations made.

The analysis also offers the variable mentioned above, but on a qualitative basis – e.g. percentage of high quality articles written in cooperation with colleagues or the over number of high quality articles published. In this case “quality” means whether the paperwork has been published in one of the top 50 business journals or not. Discovering exactly how many of the publication were written while working at the current business schools (*Percentage articles written inside the Business School* and *Percentage Articles written outside the Business School*) was also a necessary calculation.

The analysis of the data required the calculation of publications with low quality – their overall percentage, the number of publications written in cooperation with someone, the number of publications written in cooperation with a colleague and with an outsider.

The derived variables created the foundation for distributing the productivity and quality adjusted productivity over the different levels of hierarchy at the university (assistant, associate, professor). Deriving the number of articles written in collaboration with all three observed positions was also part of the analysis made. The variables *Percentage Articles written with Assistants from the top 40 Business Schools*, *Percentage Articles written with Associates from the top 40 Business Schools* and *Percentage Articles written with Professors from the top 40 Business Schools* represent the overall number of refereed publications one object has conducted together with respectively assistants, associates or professors over time. The cooperation partners in this case could have been both - a colleague or an outsider. Furthermore, the study once again offers the variable of similar nature where only high-quality publications are being measured.

The table below gives a short overview of the derived variables.

<b>Category</b>	<b>Variable</b>
<b>Quantitative Results (all publications in refereed journals)</b>	- Articles published <b>within</b> the Business School (BS), Cooperation in <b>Top 40 BS</b> , Cooperation <b>within BS</b> , % <b>Cooperative</b> Publications, % Cooperative Publications <b>within BS</b> , % Articles written <b>alone</b> , % Articles written in <b>Cooperation</b> - % Articles written <b>within</b> the current BS, % Articles written <b>outside</b> the current BS
<b>High-quality Results (only referred publication in top 50 business journals)</b>	- Articles published <b>within</b> the Business School (BS), Cooperation in <b>Top 40 BS</b> , Cooperation <b>within BS</b> , % <b>Cooperative</b> Publications, % Cooperative Publications <b>within BS</b> , % Articles written <b>alone</b> , % Articles written in <b>Cooperation</b> - <b>Non-qualitative</b> Articles, % Non-qualitative <b>Cooperative</b> Publications, % Non-qualitative Cooperative Publications <b>in BS</b>
<b>Overall Cooperation</b>	- Overall <b>Cooperation</b> , Overall Cooperation <b>with Colleagues</b> , Overall Cooperation <b>with Outsiders</b>
<b>Cooperating on different Hierarchy Levels</b>	- % Articles written in Cooperation with <b>Assistants</b> from top 40 BS, % Articles written in Cooperation with <b>Associates</b> from top 40 BS, % Articles written in Cooperation with <b>Professors</b> from top 40 BS

*Table 2: Overview of the derived variables.*

## 5 Results

The statistical analysis has been conducted with the help of Microsoft Excel and STATA, which is a statistical program for data analysis, data management and statistical graphics. The data was collected in Excel and after some adapting, it was made available for import into STATA.

### 5.1 Productivity

There are overall 903 research objects in the database. Around 70% of the observed individuals are male regardless of their hierarchical position (Appendix III). The professors represent the majority in the database with 48%, whereas 28% of the employees are assistants and 24% work as associates (Appendix IV). An overall of 16 research objects did not have information on their current position. They were automatically excluded from the calculation of all variables, which required this information (e.g. number of publications written in

cooperation with professors). The reason is the incapability of assigning those objects values with regards to quality adjusted productivity, productivity or cooperation level of any position.

### **5.1.1 Hierarchical Positions**

One of the first observations made in this thesis is connected with analyzing the different types of hierarchical positions in each university separately. The university with highest total amount of professors is Harvard followed by the University of Pennsylvania. The institution with the least number of professors is University of Florida, which finds itself at the bottom of the table with top 40 Business Schools in the U.S. A pattern is recognizable – universities which are highly ranked have a higher total amount of professors as employees. The first observation shows that there is a slightly positive correlation between business school rank and professor as a current position. The results for associates and assistants are diverse distributed among the top 40 universities. The explanation for these results lays in the overall distribution of employees among universities. The business schools with the highest number of employees are part of the top 5 in the ranking made by US News – University of Pennsylvania (US News rank 2), Northwestern University (US News rank 5) and Harvard University (US News rank 1). However, there are outliers such as University of Chicago (US News rank 3), which has an overall of 10 employees and MIT (US News rank 4) with 13 employees. However, it is important to notice that the database includes only departments of business and organizational studies. Thus, it is not clear whether the business schools themselves count on a smaller number of employees or they are overall fewer individuals in the mentioned disciplines.

In order to get a better understanding of the distribution of position within the business schools a table with the shares of each position is needed. Appendix V represents the shares of assistants, associates and professors in each observed business school. It is visible that institutions with higher rank rather rely on more experienced employees such as professors. Business schools with a lower rank have a higher number of employed assistants. Having in mind that the shares of associates is on overall lower than the share of assistants, results show that Harvard (US News rank 1) and University of Chicago (US News rank 2) have one approximately 10% associates. Furthermore, MIT does not have any associates. This observation represents the different types of strategies business schools follow – some of them prefer employing tenured individuals, whereas others aim at attracting assistants and associates. The effects of different hierarchy constellation in business schools are discussed at the end of the current chapter.

## 5.1.2 Productivity

The database has information on overall 20600 refereed articles. As expected the minimum amount of publications written by individuals during the course of their career is 0 (13 assistants did not have any accepted refereed publications yet). A total of 243 articles is the maximal number of articles written by a professor. There are 15 professors who have published more than 100 articles during their academic career. The overall average of articles written during one's career is 26,8. However, most of the publications are written by professors, which is not surprising as professors spend more time at the university than lower hierarchical positions. The data with regards to publications is divided as follows: 8% of the publications are written by assistants, 15% by associates and 77% by professors. These numbers represent refereed publication written by an individual alone or in which the object has taken part. However, the higher experience and longer time spent at the university is the logical explanation for the much higher productivity of professors.

Breaking down the number of articles into publications in the different business schools contributes to a better understanding of the results described later in this chapter. Having a look at the shares of articles written by each position in each business school gives a more representative overview of the results. A Pearson correlation test shows a rather negative correlation (p-value obtained: -0,54) between the overall share of articles written in a business school and the rank of the institution. The first half of the list with best business schools is responsible for 63% of the overall publications. Harvard (US News rank 1) contributes with a 6% share of articles, whereas Pennsylvania (US News rank 2), Stanford (US News rank 6) and Columbia (US News rank 10) have each published around 5%. At the bottom of the table the business schools of Brigham Young University (US News rank 34), Emory (US News rank 20), University of Florida (US News rank 40) can be found with the minimum of 1% contribution. Contrary to common belief, the employees of the business school at University of Chicago, which was ranked as the third best business school for 2017, have written less than 300 publications. This leaves them at the bottom of the table when it comes to overall productivity (as an example Harvard have published overall 833 refereed articles). There are various reasons for the statistical outlier – the overall low number of employees in the business school and the observation of alone strategy and organizational behavior departments. Furthermore, the business school at University of Chicago has a stronger presence in other departments (e.g. econometrics, financial management, etc.).

Further analysis shows that there is no linear correlation and coherence between the rank of the business school and the share of articles written by assistants. A slightly negative correlation between business school rank and the share of professor's publications suggests that the relationship between these variables is also not strong. More intriguing, the results representing the share of articles written by associates show that the most productive associates are employees in lower-ranked universities. A possible explanation would be the will and motivation to move up the career ladder in a university with higher rank.

It could be concluded that the overall expectancy is for productivity of higher-ranked institutions to be higher than the productivity of lower-ranked business schools. Furthermore, there is a recognizable pattern in the productivity distributed among positions, which suggests that:

- assistants' productivity is constant
- associates from lower-ranked institutions are more productive
- professors from higher-ranked are slightly more productive

### **5.1.3 Quality adjusted Productivity**

Initial analysis of each business school's performance contributes to a better understanding of how important quality for each institution is. It furthermore builds the foundations for the qualitative aspect of the observations with regards to cooperation and takes into account only articles published within the current business school. Previous publications of the employees conducted in a different university are not relevant for this observation and were excluded from the data. Results shown in this chapter are also weighted for the size of the business school. They represent the average of publications per person in an institution.

The observation on productivity shows that an individual (regardless of the position) conducts approximately 14 articles on average. However, the quality adjusted productivity indicator (refereed journal articles published in the top 50 business journals) shows that on average assistants, associates and professors have 6 refereed publications, while being in the current business school. The distribution among ranking of the business schools does not show any linear relationship between the rank of the university and the average quality adjusted productivity of the employees. As already discussed in the previous chapters, there are outliers in the database (e.g. Yale University ranked 9) Results are described in the graph below.

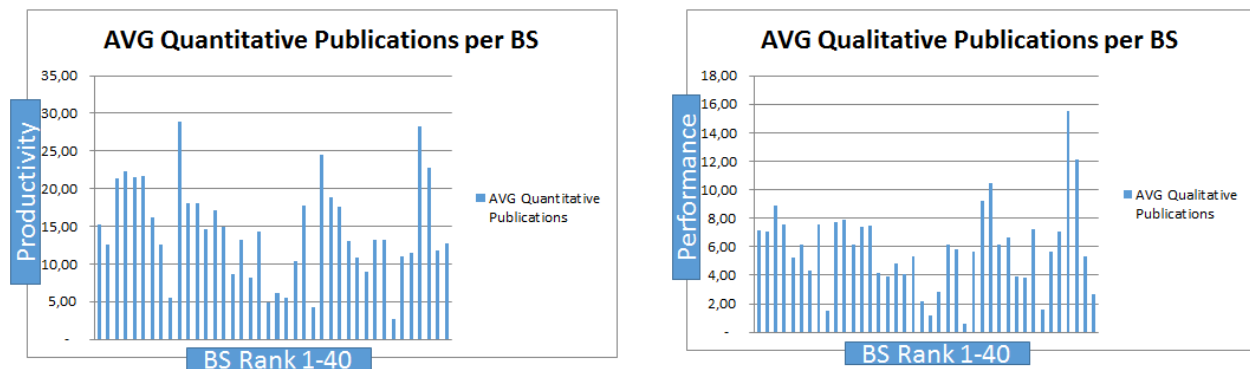


Figure 1: Weighted productivity and quality adjusted productivity.

## 5.2 Cooperation

After presenting some explanatory results with the help of descriptive data in the previous part of the thesis, the current chapter has the aim to acquaint the reader with data about the controversial topic of cooperation. It also has the goal to outline the importance of co-working in an organizational environment similar to the one where business schools are functioning and to show the influence of cooperation on productivity and quality adjusted productivity.

### 5.2.1 Overview

In order to understand how often research objects cooperate between each other, the current analysis includes each object's career timeline. Most importantly, it has to distinguish between articles written while working in the current business school and articles written at previous universities. Very often, at some point of time individuals were employed at a business school, which is not part of the top 40 or it does not even find itself in the U.S. This means that the number of articles published during that period cannot "be attached" to the productivity of a business school that is being observed in the current thesis. However, the productivity and quality adjusted productivity of an employee is measured with the help of both – publications written inside the business school and one's written outside the business school. The first variable is used to determine how cooperative employees are with colleagues, whereas the sum of both shows the overall cooperativeness of a single object.

Figure 2 represents the mentioned variables. 59 % of the overall number of published refereed articles are written within the current business school. This finding suggests that it is common to have a higher productivity at your current working place than at your previous position. An explanation for this result would be the fact that the current paperwork observers the best business schools. Therefore, it might be the case, that employees are more motivated to remain in this working environment, as something else could be considered a career “downgrade”. A significant part of the research objects pursued and received a promotion at the university they are currently employed at. Thus they spent most of their career inside this particular business school. Another support for the conclusion that on average research objects have published more articles within the current Business School than at other universities is the higher number of present professors in the database (approximately 48%). It is a rare case for professors to switch universities, leading to a longer period spent at the current university and the higher amount of publications there.

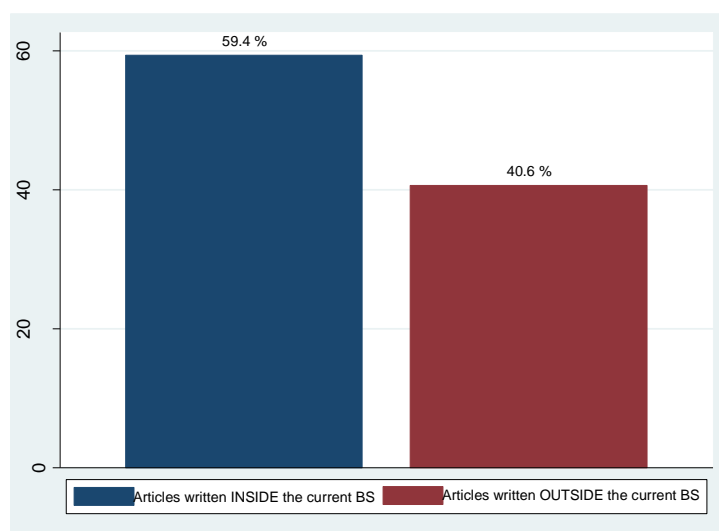


Figure 2: Overall share of publication INSIDE and OUTSIDE the BS.

As more than half of the articles are written inside the business school, the current article argues that the results, which address cooperation with colleagues, are comprehensive and representative. It also suggests that it would make sense to observe the cooperation with the current co-workers, because clearly the productivity (qualitative or simply quantitative) among individuals since the beginning of their current employment is high. In order to do this, the next necessary step would be to analyze the “cooperation flavor” of each object or in other words their readiness to cooperate. Figure 3 shows that most of the observed objects are cooperative. The 80% illustrated at the graph show that more than  $\frac{3}{4}$  of the overall number of publications are articles written in cooperation with someone regardless of their position, gender or working place. Publications, which

had at least one co-author listed, are counted as “articles written alone”. Only 19,6% of the refereed paperwork are written by a single author.

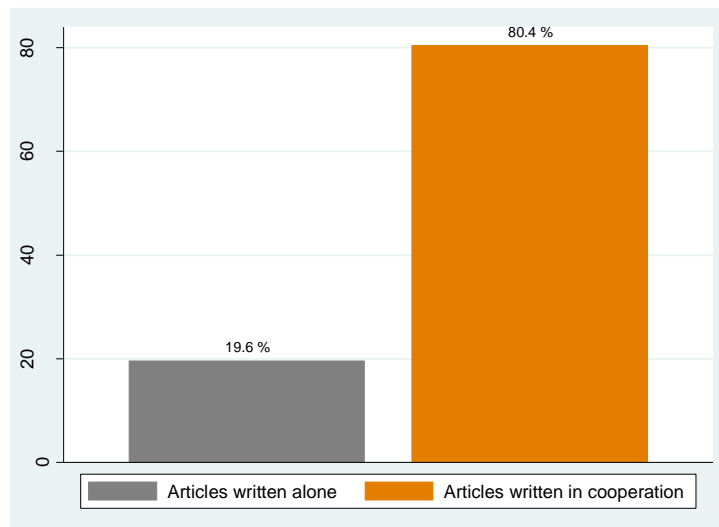
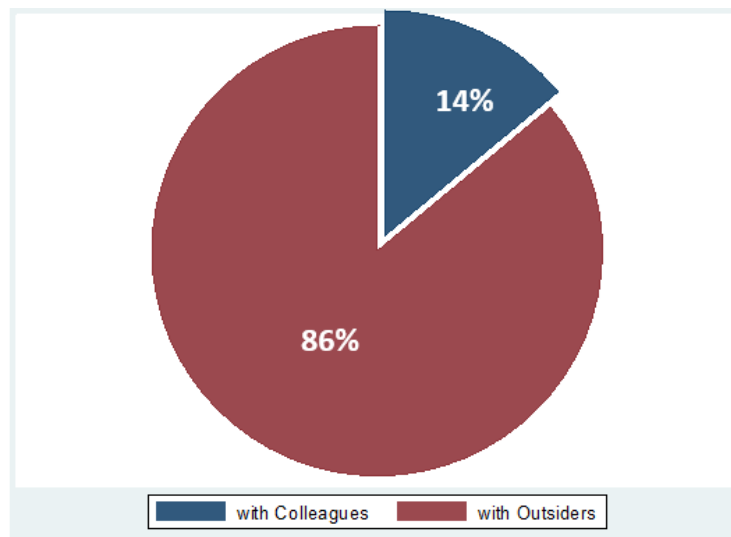


Figure 3: Cooperation flavor.

Having in mind that most of the 903 observed objects prefer to cooperate is further evidence that cooperation between scholars is a relevant topic, which needs further examination.

As already mentioned, the database distinguishes between two types of individuals – colleagues and outsiders. The first type refers to all co-workers currently employed at the same business school. Outsiders are all residual objects that are part of any other business school. Naturally, the data includes individuals who work at universities, which are outside of the scope of this study (outside of the top 40 ranking). Professors Emeriti are excluded from the data. It is important to mention individuals, who were colleagues at some point of time in their careers, but nowadays are considered outsiders, are also present in the data. However, the current study concentrates only on the current relationship between these research objects, because of the difficulty and high level of comprehensiveness of observing and calculating the exact number of previous collaborations in such situations.

Figure 4 represents the cooperation preference of individuals. 86% of the articles written in cooperation with someone are a product of a relationship between employees from different universities. In 14% of the articles there is at least one co-author who is currently working at the same business school as the author of the paperwork. Once again, the results refer only to collaboration between employees from the top 40 business schools.



*Figure 4: Cooperation with colleagues vs. with outsiders.*

Contrary to common belief, research objects seem to prefer working with outsiders although this means additional communication costs. At its core the knowledge transfer and knowledge creation between universities imposes transaction costs in form of longer communication time between partners and less flexibility in the relationship (McFadyen & Canella, 2005). This statement applies for the case where a longer geographical distance between universities is present. Although most of the observed partnerships between business schools according to McFadyen and Canella's work are middle- to long-distance ones, a possible explanation for the presented results in Figure 4 is the fact that all residual barriers such as language, governmental, cultural and legal barriers between institutions are very low. At the end of the day all observed business schools are part of the same educational system and have the same country of residence. This lowers the transaction costs between these entities and provides employees with the possibility to easily interact with each other. In most cases, individuals use this collaboration opportunity in order to obtain. It also seems that the co-working between outsiders is an essential activity, in which they exchange specialized information needed for the completion of the journal article. This type of cooperation can also be explained by the fact that some of the research objects working in lower-ranked business schools might be looking for a partner from a higher-ranked university. This is a common strategy among group members that has the goal to increase one's reputation (Masuda, 2012).

All in all, most of the refereed journal articles are written while being employed at the current business school, which supports the decision to analyze this segment of the current database in details. Furthermore, the majority of publications are written in collaboration with at least one scholar. This shows support for the high

willingness of research objects to cooperate. In addition to the high “cooperation flavor” in the data, most of the individuals prefer working with someone from another business school due to their specific knowledge and reputation reasons, as well.

### 5.2.2 Quantitative vs. Qualitative Cooperation

After taking a look at the basic components of cooperative relationships, the current chapter aims to shed light on the meaningfulness of these partnerships in terms of qualitative productivity (quality adjusted productivity). It also gives insights whether cooperation induces higher quality adjusted productivity or vice versa. The current study examines a couple of possible outcomes:

- cooperation causes **lower/higher** productivity or quality adjusted productivity
- individualism causes **lower/higher** productivity or quality adjusted productivity

The results of the observations are further narrowed down to cooperative relationships with outsiders and colleagues. Thus, following information is also provided in the current chapter:

- cooperation with **colleagues** causes lower/higher productivity or quality adjusted productivity
- cooperation with **outsiders** causes lower/higher productivity or quality adjusted productivity

In terms of quality, 57% of the overall refereed articles written, were published in one of the top 50 business journals (according to the Financial Times ranking). This qualifies them as a high-quality work that contributes to one’s performance. Contrary to common belief, the employees of the top 40 business schools still produce a lot of publications which do not end up published in the best journals. It is also an interesting observation that if the data is filtered and only more experienced positions (in this case associates and professors) are observed, the quality adjusted productivity does not really rise. Around 40% of the articles written by associates and professors are high-quality ones. A possible explanation would be the decreasing motivation of research objects with higher tenure. However, these results show only the average percentage of the overall number of publications and do not take into account other influential factors such as university rank and change in positions. A more precise division of the data is needed in order to receive a better understanding for the influence of cooperation on normal and quality adjusted productivity.

Table 3 represents the average percentage of respectively the overall amount of articles written in cooperation (QNCoop), the amount of articles written in cooperation within the business school (QNCoopBS), high quality

publications with cooperation (QLCoop) and high-quality publications with cooperation within the current business school (QLCoopBS). Firstly, it provides further proof that most of the research objects are cooperative as a whole. Secondly, the 8% that represent the cooperation within a business school are also evidence for the fact that individuals prefer working with outsiders than with colleagues.

The qualitative results show support for high quality when the publication was written in collaboration with someone regardless of the position. 82% of the articles written in cooperation with someone (80% share of the overall number of publications) ended up as a publication in one of the top 50 business journals. This is a sign that cooperation induces not only productivity, but also performance. Further evidence for this observation is the fact that 76% of the articles written alone have low quality. However, the last variable in the table shows that there are only 8% of the high-quality cooperation, which occur within one business school. Based on this fact, the current thesis argues that individuals are better off cooperating with outsiders than with co-workers from the same institution.

Variable	Obs	Mean	Std. Dev.
QNCoop	816	.8043948	.2291283
QNCoopBS	697	.0824264	.1631303
QLCoop	717	.8243718	.2490888
QLCoopBS	599	.0886984	.2066254

*Table 3: Average of quantitative and qualitative cooperation.*

Appendix VII represents the results of a two-sample t-test, which provides further information on the main variables analyzed in this thesis – quantitative and qualitative cooperation between individuals within a business school. The test rejected the H0, which in this case would be the observation that there is not a significant difference between the overall number of cooperative articles within a business school and the cooperation articles with high quality within the business school. It supports the argument that there is a significant difference between those two variables, which suggests that the articles with multiple authors from the same business school do not necessarily have high quality. Although a partnership between colleagues has its benefits (such as low communication cost, same organizational culture, etc.) (Gao et. al., 2018), this is evidence that such cooperation does not mean that the end product will be a publication in one of the best business journals. This statement is also supported by the low average of high quality articles produced by colleagues.

In order to get a better overview of the results analyzed in this thesis, Figure 5 represents the derived variables with regards to cooperation. The topic of influence of cooperation on performance is also addressed in the tree-formed diagram below. Two types of data are present in the figure – the blue boxes show quantitative related results, whereas the orange boxes show the statistical outcome of variables related to quality adjusted productivity of the individuals.

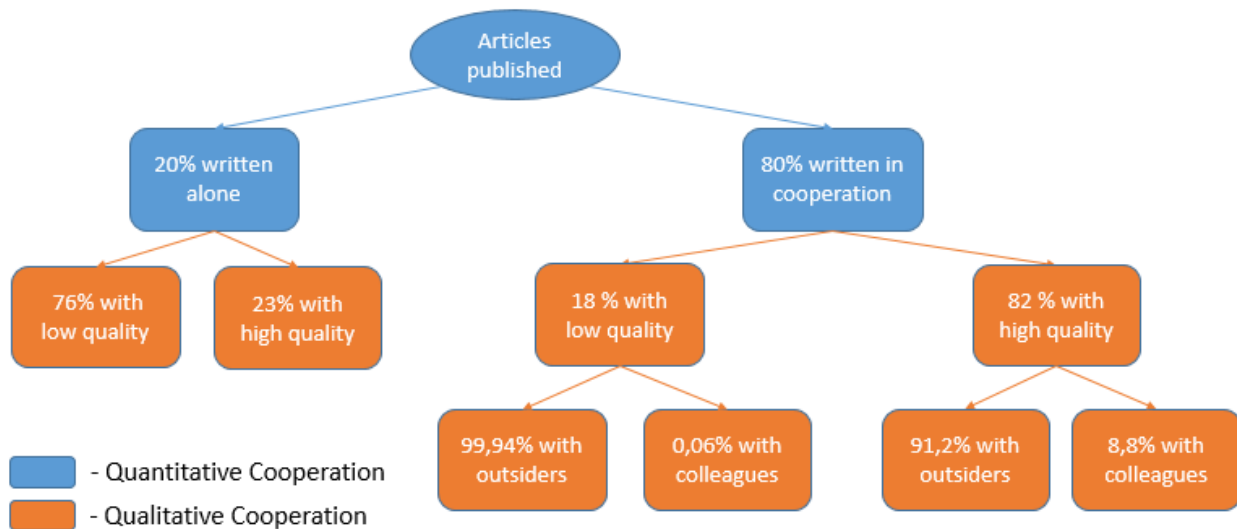


Figure 5: Cooperation, productivity, quality adjusted productivity.

The result tree presents observations in two main categories - “articles written alone” and “articles written in cooperation”.

#### 1. Observations of variable “Articles written alone”

The diagram presents analysis with regards to the publications written alone. As already mentioned, 20% of the overall number of articles is being written alone. Taking a closer look at the quality of this 1/5 of paperwork suggests that most of the publication have low quality, as they did not manage to get published in a business journal that is highly ranked in the academic world. The low performance of individualistic behavior only shows further support for the argument that cooperation has an overall positive influence in the observed academic environment. A logical explanation for the low score of single-author articles would be the fact that each individual has limited knowledge. Furthermore, in most cases the knowledge of a single research object is sometimes not comprehensive enough. It could not cover in detail a lot of disciplines or topics, meaning that people tend to specialize in only a couple of directions. It is also important to mention that when all collaboration partners are specialists in the same area, they still might have distinct opinions and each one of them will contribute with additional ideas (not necessarily qualitative ones). The current thesis argues that the

lack of co-workers and therefore lack of specialists in different areas increases the probability that the outcome will have low quality.

## 2. Observations of variable “Articles written in cooperation”

The second branch in Figure 5 represents the residual 80% of articles written in cooperation with someone. A further observation on the quality of those articles suggests that most of them are published in the top academic business journals. Only 18% of the overall number of cooperative publications had a negative influence on the quality adjusted productivity of the research objects. This aligns with the statement made in the previous paragraph – cooperation seems to help achieving higher quality. Once again, the results are evidence that when it comes to working on a task with long durability and high complexity, cooperation looks like the “right way” to approach it and achieve success.

However, there is still a possibility that the collaboration results into paperwork with low-quality. Possible reasons for that lack of synergy, misunderstanding between participants, language or cultural barriers (Beerkens & Derwende, 2007). A very interesting observation is the fact that almost every partnership in those 18% low quality articles is basically cooperation with an outsider. Only in 0,06% of the time the partner(s) is a colleague working at the same business school. Although most of the research objects prefer cooperating with outsiders, it is still controversial if this helps them achieve a higher rate of high quality work. On the other side of the results tree, where 82% of the cooperation articles have high quality, still individuals seem to prefer working together with outsiders for achieving success (~91%). However, the share of cooperation activities with colleagues is higher than in the low-quality section. This leads to the conclusion that the decision on co-working with a colleague still might be advantageous, because statistically most of the publication written in cooperation with a colleague end up as a high-quality product. Nevertheless, this is a controversial topic, as most of the cooperative articles published together with outsiders are in both cases (high quality vs. low quality) significantly higher than the opposite case. The main takeaway from this part of the result tree is that although most of the qualitative data is a product of a partnership with an outsider, it seems that working with a colleague means a lower probability of conducting a low-quality study.

To recap the main points from the current chapter, results show firstly that cooperation causes both higher productivity and the higher quality adjusted productivity among individuals, when it comes to a task with high complexity and long durability such as publishing a refereed article. Furthermore, the observations made on individualistic actions show support for this statement. However, when the variables “working with

colleagues” and “working with outsiders” are included, results show that overall most of the publications with high quality are written together with outsiders. Nevertheless, there is a controversial part of the analysis, which shows that statistically speaking there is a higher chance of producing a high-quality article with a colleague, as almost every publication made in such constellation ends up in the top 50 business journals.

### **5.2.3 Hierarchical Cooperation**

The current thesis recognizes the need for further assessment of cooperation patterns within an organization. Including a hierarchical variable in the analysis contributes to a better understanding of how exactly individuals choose their cooperation partner. It is worth mentioning that each company’s hierarchical structure in organizations in a single industry is in most cases distinct. The entity’s legal form also plays a role in the way firms choose their internal hierarchical system. However, there are some exceptions and universities as institutions are one of those exceptions. In the U.S. academic area there is a defined hierarchical structure, which is used by the majority of universities. Most institutions follow a model which includes having the hierarchical ladder of assistants, associates and professors. The fact that this thesis concentrates on the academic area, makes it possible to establish a connection between different layers of one single hierarchy type.

#### **Quantitative results**

Figure 6 shows the distribution of overall cooperation (regardless of the quality of the end product) between different positions in all business schools. The graph represents the shares of assistants, associates and professors from top 40 business schools. The data used for this assessment refers to all research objects, which had a defined current position in their CVs defined. However, some of the research objects lacked the information on what their current occupation is (less than 2% of the observed objects). These individuals are not included in this analysis. Furthermore, there are publications, where the main author has cooperated with more than one hierarchical layer (for example with one assistant and one professor). In such cases the article has been counted for every position separately. That way each participation of an employee working in the top 40 business schools has been accounted for.

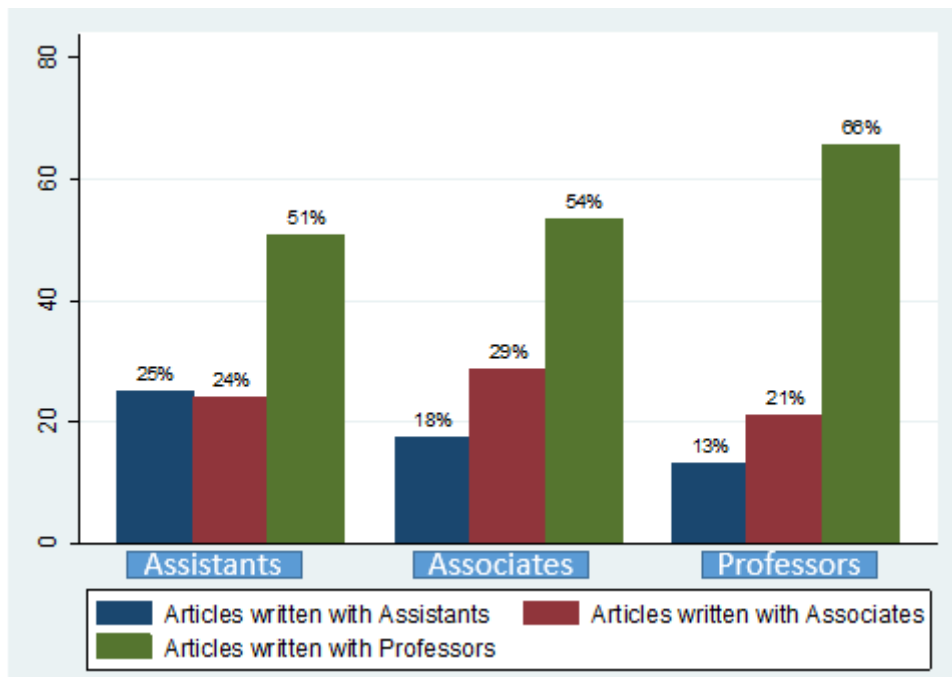


Figure 6: Cooperation with Assistants (1), Associates (2) and Professors (3) in top 40 Business Schools.

The graph describes how many percent of the articles written by assistants, associates and professors are written in cooperation with each position separately. Thus, the numbers show how much of the articles assistants publish together with someone who is on the same or on different hierarchical level regardless if he is a colleague or an outsider. For example, 51% of assistants' publications are written in cooperation with professors. This part of the paperwork concentrates on finding out if there is a cooperation pattern between different positions on overall basis. Results show that professors are by far the most preferable cooperation partner by all hierarchical levels when it comes to productivity. This is not surprising as the largest share of articles written belongs to professors. It is also logical that people with less experience (assistants and associates) would prefer co-working with high tenured individuals, because of their knowledge and the longer period spent on publicizing paperwork. Another observation suggests that professors themselves obviously favor working with individuals on the same hierarchical position. 2/3rds of the articles written by professors are in cooperation with other professors. It is noticeable that although the reasons for that are clear (knowledge, experience and higher reputation), this might be considered as a barrier for lower ranked employees who at the end of the day have a lower probability to end up with a professor as a partner than professors themselves. However, more intriguingly this theory doesn't apply to the individuals with least tenure in the industry. Contrary to common belief, assistants prefer someone on the same hierarchical position as a partner than associates, although they are more tenured and therefore might be more useful to them. One possible

explanation for these results is the fact that assistant position is planned to last (in most cases) shorter than the residual positions. It might be the case that assistants often create a cooperation relationship between each other, because of the willingness to start producing articles. It is difficult for “new-comers” in every industry to attract someone as their partner without having much experience. This naturally leads to the creation of a partnership between two individuals having problems with finding a partner. Furthermore, the anticipation factor in an assistant-assistant relationship is much smaller. Junior positions (in every industry) might simply prefer collaborating with someone with whom they have more in common. They also might have a “social fear” of higher ranked employees (Masuda, 2012).

A paired t-test was conducted in order to get more support for the observation made in the previous graph. Table 4 shows the results of the test, which tested whether or not there is a significant difference between the articles assistants write together with the same hierarchical level and with associates. With 246 degrees of freedom and a p-value of 0.5, the outcome of the test failed to reject the H0 and suggests that there is not a significant difference between those two variables. The results state that assistants equally prefer partners on the same hierarchical level and associates. Still significantly higher is the preference of each position on cooperating with professors, who are the most experienced among all research objects.

```

-> CurrentPosition_Position = 1

Paired t test

```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
ArtidesWith1	247	.4574899	.0643107	1.010722	.33082	.5841598
ArtidesWith2	247	.51417	.0745504	1.171651	.3673316	.6610085
diff	247	-.0566802	.0913643	1.435902	-.2366362	.1232758

```

      mean(diff) = mean( ArtidesWith1 - ArtidesWith2 )      t = -0.6204
Ho: mean(diff) = 0                                     degrees of freedom = 246

Ha: mean(diff) < 0      Ha: mean(diff) != 0      Ha: mean(diff) > 0
Pr(T < t) = 0.2678      Pr(|T| > |t|) = 0.5356      Pr(T > t) = 0.7322

```

Table 4: T-test - articles published together with assistants (1) and associates (2). Grouped by assistants.

It is worth mentioning that in the U.S. professors are responsible for giving recommendations to lower-ranked employees. They also grant them with a tenured position. This goes especially for associates. They already have some experience and it might be the case that cooperation with a professor has a much higher value to them than with an assistant. The two reasons for that are the pursue of a professor career level (or tenure

recommendation) and reputation reasons (Masuda, 2012). This might explain why associates prefer to cooperate with professors.

### Qualitative results

However, Figure 6 represents firmly the quantitative share of published articles alone. In order to get a better understanding of the influence of cooperation between different hierarchical layers on the quality adjusted productivity, the current analysis excluded the articles published outside the best business journals. Figure 7 represents the share of cooperative articles written together with assistants, associates and professors respectively. Not surprisingly, professors are by far the most preferred cooperative partners when it comes to quality work. The overall cooperation shares with assistants and associates drop significantly by at least 5% each. This leads to the conclusion that most of the qualitative work is written in cooperation with highly ranked individuals. Once again, the simple explanation for the results would be the importance of experience and knowledge possession of seniors in this industry.

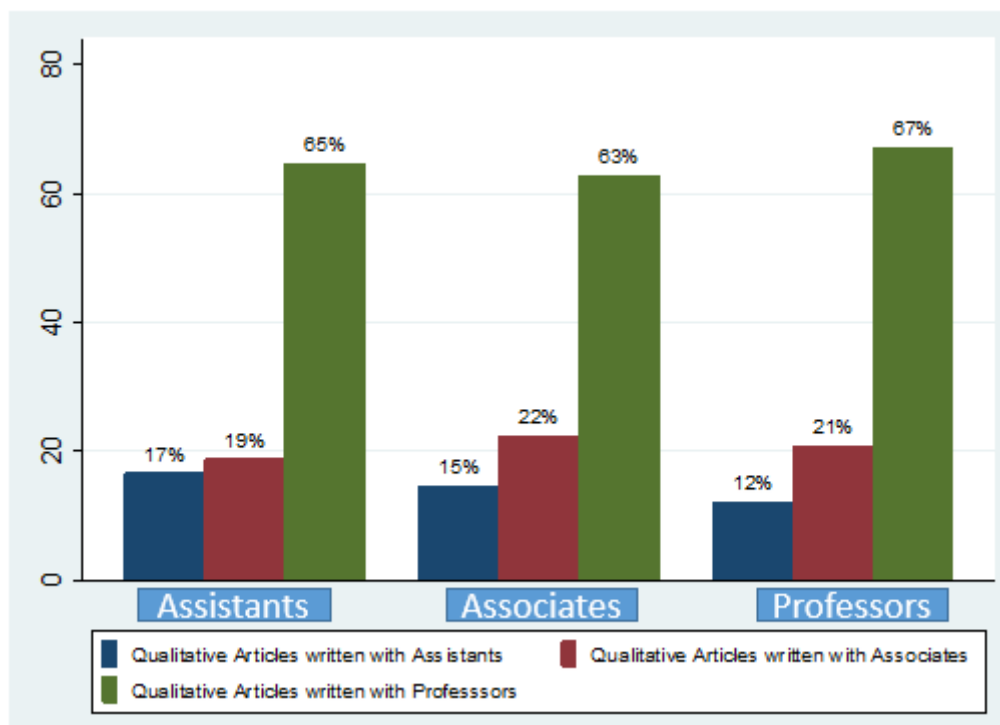


Figure 7: Qualitative Cooperation with Assistants (1), Associates (2) and Professors (3) in top 40 Business Schools.

Another interesting observation in the qualitative analysis suggests that this time assistants “stick” to the recognizable pattern that lower-ranked employees seek cooperation with higher-ranked ones. In this case, assistants prefer a partnership with an associate (19%) rather than with someone on the same hierarchical level (17%). Thus, it would make sense for both assistants and associates to aim at cooperating with a higher ranked

partner and for professors to have a partner from the same hierarchical group. These types of collaboration lead to a higher probability of succeeding in publishing a qualitative work.

```

-> CurrentPosition_Position = 1

Paired t test

```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
ArticlesWith1	247	.2348178	.0437647	.6878166	.1486164	.3210192
ArticlesWith2	247	.2672065	.0477195	.7499712	.1732155	.3611974
diff	247	-.0323887	.0595868	.9364804	-.1497541	.0849768

```

      mean(diff) = mean(   ArticlesWith1   - |   ArticlesWith2   )      t = -0.5436
Ho: mean(diff) = 0                                           degrees of freedom =      246

Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha: mean(diff) > 0
Pr(T < t) = 0.2936           Pr(|T| > |t|) = 0.5872           Pr(T > t) = 0.7064

```

Table 5: T-test - qualitative articles published together with assistants (1) and associates (2). Grouped by assistants.

Similar to the previous part of this chapter, a t-test was conducted in order to analyze in more details the observation that when it comes to publishing high-quality articles, low-ranked employees seek cooperation with associates. Their behavior changes when “quality” is introduced. The p-value of ~0.6 once again suggests that there is not a significant difference between both variables. The means do not show further evidence for the observation that assistants prefer associates as partners. This leaves the observation that every position prefers cooperating with professors in terms of quality, as the only accurate statement in this part of the analysis.

Conclusively, it is worth mentioning that there is not really a developed system in place, which obliges different hierarchical levels in the U.S. universities to cooperate between each other (e.g. professors with assistants in order to contribute with their experience). This is probably one of the reasons for assistants being the employees with whom professors cooperate most rarely. Highly ranked individuals might consider a partnership with someone who has less experience as something, which does not “add up enough” to the end product. Therefore their motivation to cooperate with lower-ranked individuals is low.

Finally, it is important to have experience and knowledge in order to publish a high-quality paperwork. The fact that most of the publications written in cooperation with professors end up in the top business journals is clear evidence that exactly those qualifications and skills are of high significance.

#### 5.2.4 Cooperation and Rank of the Business School

The final part of the chapter, which describes the results obtained during the analysis made, concentrates on examining the relationship between the business school's rank and cooperation. It aims on showing if there is a significant difference between the upper and lower part of the ranking created by USNWR. Furthermore, the following information provides insights on the different approach of employees in higher ranked universities towards cooperation. The current thesis suggests that universities (similar to other organizations with comparable structure) try to control the "level of cooperation" between employees by promoting or discouraging collaborations. However, it does not exclude the possibility that some employees are intrinsically motivated to cooperate and do not need any kind of incentive. The current paperwork argues that these results help understand why exactly some of the business schools perform better than others and more intriguingly whether cooperation influences their performance.

Table 6 represents a correlation matrix with a significance level of 0,05. The significant values are marked with a star. As already mentioned above, the current chapter observes the relation of different variables to rank of the business school (BS rank). The first overall observation that could be made is that although there are significant correlations, all relationships between variables seem to be "weak".

63% of the overall publications are published by employees from the first half of the business school ranking. The statement that higher ranked institutions produce more publication is also being backed up by further statistical evidence, as there is a negative correlation between the rank and the number of articles in a business school. The "QL overall cooperation" surprisingly shows that there is a big part of employees working in the bottom part of the list with business schools, which have cooperated with high quality during the course of their career. The explanation for this result would be the better rate of qualitative publishing in the lower-ranked business schools. The employees there publish fewer articles as a whole during their careers than the scholars in top 20 business schools (~around 40% of the overall), but roughly 30% of their articles are published in the best journals, whereas only 25% of the articles written in the higher-ranked institutions end up there. At the end of the day, employees at the lower-ranked schools are better "performers". When it comes to cooperative publications within the current business school (QL Cooperation within BS), there is also a slightly negative correlation between the variables. This is further evidence that although lower-ranked institutions produce less, they produce high quality publications when cooperating with someone. Once again,

this statement could be explained by one’s motivation to get promoted, to achieve higher reputation or to strive for employment at a higher-ranked institution.

Both shares of articles written alone (qualitative and quantitative) have negative relation to the rank of the business school. Thus, individuals from higher ranked universities tend to publish articles alone and “succeed” more often in the qualitative aspect of the activity. This result aligns with the statement made in the previous paragraph. Nevertheless, when it comes to cooperation, scholars from higher-ranked universities tend to search for cooperative partners outside of the top 40 business schools. Following the previous results, this might be the reason for higher productivity. However, it could also be the reason for lower quality adjusted productivity.

	BS rank	# Articles	# QL Articles	Articles within BS	QL Articles within BS	Overall cooperation	QL Overall cooperation	Cooperation within BS	QL Cooperation within BS	# Articles alone	# QL Articles alone	More cooperation with outsiders
BS rank	1.0000											
# Articles	-0.0499	1.0000										
# QL Articles	0.0516	0.6429*	1.0000									
Articles within BS	-0.0748*	0.8370*	0.5680*	1.0000								
QL Articles within BS	0.0016	0.5405*	0.8046*	0.7243*	1.0000							
Overall cooperation	-0.0503	0.9524*	0.6885*	0.8050*	0.5759*	1.0000						
QL Overall cooperation	0.0831*	0.6148*	0.9785*	0.5347*	0.7786*	0.6989*	1.0000					
Cooperation within BS	-0.0490	0.3488*	0.2617*	0.4432*	0.3400*	0.3745*	0.2574*	1.0000				
QL Cooperation within BS	0.0839*	0.0818*	0.2548*	0.1757*	0.3387*	0.1305*	0.2652*	0.3503*	1.0000			
# Articles alone	-0.0960*	0.6360*	0.2991*	0.5561*	0.2758*	0.3953*	0.1858*	0.1863*	-0.0057	1.0000		
# QL Articles alone	-0.1021*	0.4045*	0.5630*	0.4043*	0.4878*	0.2867*	0.3807*	0.1420*	0.0796*	0.5969*	1.0000	
More cooperation with outsiders	-0.1068*	0.1898*	0.3011*	0.2675*	0.2598*	0.3346*	0.2966*	0.0547	0.0740*	0.1444*	0.1617*	1.0000

BS - Business school; # - Number; QL - Qualitative

Table 6: Correlation matrix - business school rank and cooperation.

The values in Table 7 present the relation between rank of the business school and the cooperation between different hierarchical levels. The higher the rank of the Business School (1 is highest, 40 is lowest) the higher is the number of articles written in cooperation with professors. As already described in the previous chapters of the current paperwork, professor is the most represented position in the higher-ranked business schools. Furthermore, professors are the most desired cooperation partner. Not surprisingly there is more cooperation with professors in the upper part of the ranking than in the lower. However, the obtained p-value of 0,047 for qualitative articles written together with professors is not enough evidence for arguing that professors’ cooperation at higher-ranked universities means better quality of the end product. Nevertheless, there is a significant relationship (although weak) between rank of the business school and the high-quality publications written in cooperation with assistants or with associates. This result also aligns with the argument made in this chapter – whose performance is better - individuals with less experience or professors working at lower-ranked business schools. Higher motivation, establishing reputation (Masuda, 2012) and looking for employment at a higher-ranked institution could be the reasons for that.

	BS rank	Articles with 1	Articles with 2	Articles with 3	Qualitative articles with 1	Qualitative articles with 2	Qualitative articles with 3
BS rank	1.0000						
Articles with 1	-0.0077	1.0000					
Articles with 2	0.0188	0.4296*	1.0000				
Articles with 3	-0.1128*	0.4910*	0.4467*	1.0000			
Qualitative articles with 1	0.0656*	0.7073*	0.2206*	0.2883*	1.0000		
Qualitative articles with 2	0.0807*	0.2616*	0.7936*	0.3560*	0.2546*	1.0000	
Qualitative articles with 3	-0.0473	0.2939*	0.3485*	0.8075*	0.3143*	0.4407*	1.0000

BS - Business school; 1 - Assistants; 2- Associates; 3 - Professors

Table 7: Correlation matrix - business school rank and hierarchical cooperation.

## 6 Conclusion

The current thesis analyzed the topic of cooperation between assistants, associates and professors from the top 40 business schools in the U.S. Two types of collaboration have been discussed – inter- and intragroup collaboration. The main aim of the paperwork was to make observations on the cooperation patterns in the top echelon of the academic field in business, strategy and organization. A task with high complexity and long durability, such as publishing a refereed article in an academic journal, is the main measurement used for conducting the analysis.

Although the topic of cooperation was already discussed by scholars (e.g. Deutsch, 1949a, Janis 1982, Hillebrand & Biemans, 2003, Franco & Pinho, 2017), there was no research observing the best performers in an industry with the help of quantitative data up to now. The fact that the measure for cooperation is a complex and time-consuming task also adds up to the uniqueness of this study. Last, but not least the current article contributes to the academic literature by analyzing the quality of cooperation between entities and within entities with regards to the hierarchical constellation of the organization.

The analysis of the existing literature on the topic helped establishing the “direction” of the observations that had to be made. Multiple observations were successfully backed-up by the statistical results.

First of all, one of the noticeable patterns in the data is the fact that there are more tenured employees in the highly-ranked business schools. The number of individuals with less experience (e.g. assistants) rises if the university finds itself on the bottom part of the ranking. Having this in mind the following observation with regards to productivity could be made – professors working at the top business schools are more productive. However, associates’ productivity in lower-rank universities is higher. It might be the case that they are

intrinsically motivated to achieve promotions (Masuda, 2012). Furthermore, the observation on productivity suggests that most of the refereed articles are published while working at the current place of employment. This is an argument in favor of choosing to investigate the cooperation between colleagues in more details. Second, it is also visible that the majority of the research objects are cooperative. However, most of the individuals, regardless of their position, cooperate much more with outsiders than with someone from their own university. This type of cooperation results into additional communication costs and slower processing of the information. Therefore, this observation disagrees with the arguments made by Gao et. al (2018) but shows support for the research published by McFadyen & Cannella (2005), which states that individuals prefer engaging into intergroup collaborations in order to obtain unique know-how regardless of the costs. Another explanation for the result would be probability that employees at lower ranked universities search for a partner from a highly ranked because of reputation reasons. This would align with the statement made by Masuda (2012).

Third, when it comes to a task with long durability and high complexity, cooperation seems to be a better approach in terms of quality. Most of the published articles written in cooperation (82%) end up published in the best business journals. In general, the low quality cooperative articles are a result of misunderstanding between partners, cultural barriers or lack of synergy between some of the parties (Beerkens & Derwende, 2007). The opposite view – the individualistic approach – scores very low on both productivity and quality adjusted productivity. Each individual has limited knowledge and it could be argued that cooperating with someone who is a specialist in the research's topic increases the quality of the publication.

The fourth observation suggests that although most of the partners in cooperative partnerships resulting in a high-quality end product are outsiders, almost every cooperation with a colleague resulted into a top 50 business journals publication. The current paperwork argues that although a collaboration with a colleague occurs much seldom, it is successful in terms of quality. This statement sheds light on the contradictive theory of groupthink (Janis, 1982). When it comes to a complex task which takes time to complete, it seems that intragroup cooperation does not necessary causes groupthink that would hinder the whole process. Lower communication costs and same organizational structure are possible explanation for this result. However, individuals still prefer cooperating with outsiders most probably because of the limited number of colleagues and the unique knowledge they need in order to complete their research.

Fifth, it can be observed that professors are by far the most preferred cooperation partner in terms of productivity and quality adjusted productivity. This statement underlines the importance of experience, knowledge possession and reputation when looking for a cooperation partnership. A pattern where higher-ranked cooperation partners are favored is recognizable. After taking a more detailed look at the analyses, it can be observed that professors from higher-ranked universities are more productive in terms of cooperation, whereas assistants and associates from lower ranked institutions produce more high-quality cooperative publications.

The last observation made, relates to the quality adjusted productivity of employees in the higher ranked business schools. Although individuals in better ranked business schools have produced more articles during their career, the employees in universities in the bottom of the ranking are more successful with publishing a high-quality research. This statement is backed-up by the fact that individuals from higher-ranked business schools tend to publish more articles alone than others. As already discussed this has a negative impact on the quality of their work. It is surprising that the best institutions score worse on quality. However, obviously the quality factor is not the only influencer on the positions of universities in the overall ranking. A conclusion could be made that for business schools in order to move up the ranking, concentrating on the quantity of articles produced might be of higher importance than their quality.

In conclusion, the current thesis argues that it makes sense for universities to take into consideration the cooperation between employees and try to influence its level in order to perform better. One thing is certain – the nature of the task is of high importance for the cooperation strategy that needs to be used. If the task is simple and does not require that individuals invest much time in it, the communication costs might exceed the benefits resulting into overall loss for all parties (Steiner, 1972, Scot & Cherrington, 1974, Puck & Pregernig, 2014). Universities could consider controlling the cooperation with the help of financial incentives (Bozeman & Gaughan, 2007), obligatory involvement of more experienced employees in the research of less experienced ones (Franco & Pinho, 2017), investing into research centers and international relations (e.g. conferences) (Olcay & Bulu, 2017).

Furthermore, there are a lot of organizations that have a similar hierarchical structure to universities. Therefore, the observations made in this thesis could be easily applied to an organization with a hierarchical ladder of junior-senior-expert, where both stand-alone and group projects are present. When it comes to a group project, which requires a lot of time to complete, it would be important for managers to consider promoting cooperation

between employees with less experience and more experienced ones. It is also considered beneficial to build groups when the task is complex. The study suggests that the group should consist rather of colleagues when high quality is pursued. External parties should be involved in case the main goal is increasing the productivity of the entity.

It is of great significance for companies to consider the way their employees cooperate. The research in this area helps managers with choosing a suitable cooperation strategy, which will result in increase in the productivity and (or) performance of the institution.

## **7 Limitations & Further Research**

The analysis in the paperwork has also its limitations. There are a couple of drawbacks in the database – firstly missing information about individuals and secondly the level of co-worker's contribution to the mutual publication written. The current chapter aims to provide explanation on both problems and possible solutions. It also discusses a proposition for further research and adjustment of the database.

The origin of the first limitation is the maintenance absence in business schools' official internet page where all employees are listed. In some cases, there is no information about the individual at all. The current thesis also does not exclude the possibility that some of the current employees are not listed in the "team section". Furthermore, in the same section an inconsistency in CVs' format could be often found. There is not a uniform frame of how exactly scholars have to prepare their CV. It is not always recognizable what the previous positions were or which articles were published in a refereed journal. The inconsistency of how the co-authors' names are listed, is also recognized as an issue. The aforementioned problems have been tackled by conducting a quality check by going through all 903 research objects and adjusting the data manually. Google Scholars, LinkedIn and Xing helped filling in the missing information. Nevertheless, similar to most studies relying on secondary data, there is a small statistical error in the results of the current thesis. It was not possible to find information about the current position of overall 16 individuals. Out of 903 observed objects, 58 were lacking data about their research. This means that 6% of the objects were automatically excluded in the analysis of cooperation, whose cooperation behavior might have had an impact on the final results. In order to overcome these issues, future researchers should concentrate on extending the information sources they use (e.g. going through internet sites devoted on collecting academic information). Contacting the business school or the

individuals directly is also an option. The information disclosed by institutes is public, so it shouldn't be an issue to receive up-to-date data by them.

The second limitation refers to the difficulty of measuring co-authors' contribution to a publication. In the current setting, it is not possible to measure the input of each participant and how much time or effort did he or she invest into the collaboration. It is plausible that some cooperative partners provide less information for the multi-author paperwork than others do, but at the end of the day end up as co-writers with equal contribution. This is particularly the case when there is a need for a cooperative partner, who is a specialist in a certain area that is not essential for the analysis, but perhaps needs to be mentioned in the research. In order to overcome this problem further qualitative analysis of the data would be needed. However, directly contacting all research objects in the database would be very time consuming. Another way to divide the publications of a scholar into *multi-author articles with high contribution* and *multi-author articles with low contribution* would be the usage of "authorship contribution statement". A lot of scientific journals ask for a statement which includes the individual contribution of the authors. Including one's involvement into the analysis will also have its effect on the observations made in this thesis. Adding the "psychological aspect" of cooperation would make the analysis more complete. Future researcher could think about gathering qualitative data about the individual behavior, motivation and interpersonal relations. This information could help understand how significant is the impact of individuals' characteristics on cooperation activities, which have long durability and are complex.

As already discussed in the previous chapters of the current thesis, the academic literature on the topic of university-industry cooperation is scarce (Siegel et. al., 2004). The industry side could be considered as an "outsider" and as already debated, cooperating with such in most cases leads to high quality results. An idea for further research would be to analyze the industry-related publications written by scholars and to identify the industry party. Dividing the cooperative publications into low and high qualitative ones and analyzing their impact could contribute to a better understanding whether this partnership is beneficial or not.

Conclusively, the current paperwork suggests further improvements in the analysis that could be made by researchers using the same data base. For example, the analysis referring to cooperation between hierarchical positions could also include the variables "colleagues" and "outsiders". This could lead to the discovery of further relations between cooperative partners working at the same business school but having different

positions. Another improvement of the data would be to include the “weight” of outsiders in multi author articles. Paperwork where more outsiders were involved, could be considered in a new variable called “publications written rather with outsiders”. That way the articles written in cooperation only with colleagues could also be differentiated and a broader analysis could be made in order to provide further evidence on the observations made in the current thesis.

Besides the mentioned propositions for further development of the topic, “classical extensions” such as including more universities, more departments and making the intercultural research by researching business schools from other countries would also be beneficial. It would be interesting to see whether the observations made are valid on international level.

All points considered, the topic of cooperation needs further attention in the academic area. The research in this area is important for all types of industry. It will enlarge the current knowledge on organizational behavior and will increase the effectiveness of the strategic management in organizations.

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## 9 Appendices

### Appendix I Top 40 Business Schools in the U.S. (2017)

Ranked	Business School	Location	Observed Departments
1	Harvard University (Harvard)	Cambridge, MA	Organizational Behavior, Strategy
2	University of Pennsylvania (The Wharton School)	Philadelphia, PN	Management
3	University of Chicago (Booth School of Business)	Chicago, IL	Strategic Management, Management Science, Entrepreneurship
4	Massachusetts Institute of Technology (Sloan)	Cambridge, MA	Technological Innovation, Entrepreneurship, Strategic Management
5	Northwestern University (Kellogg)	Evanston, IL	Strategy, Management and Organizations
6	Stanford University (Graduate School of Business)	Palo Alto, CA	Organizational Behavior
7	University of California at Berkeley (Haas)	Berkeley, CA	Management of Organizations, Business and Public Policy
8	Dartmouth College (Tuck)	Hanover, NH	Strategy and Management
9	Yale University (Yale School of Management)	New Haven, CO	Management, Organizational Behavior
10	Columbia University (Columbia Business School)	New York, NY	Management
11	University of Michigan (Ross)	Ann Arbor, MI	Strategy, Management and Organizations
12	Duke University (Fuqua)	Durham, NC	Strategy, Management and Organizations
13	New York University (Stern)	New York, NY	Management and Organizations
14	University of Virginia (Darden)	Charlottesville, VG	Strategy, Ethics and Entrepreneurship, Leadership and Organizational Behavior
15	University of California at L.A. (Anderson)	L.A., CA	Strategy, Management and Organizations
16	Cornell University (Johnson)	Ithaca, NY	Management, Management and Organizations
17	University of Texas at Austin (McCombs)	Austin, TX	Management, Business, Government and Society
18	University of North Carolina (Kenan-Flagler)	Chapel Hill, NC	Strategy and Entrepreneurship, Organizational Behavior
19	Carnegie Mellon University (Tepper)	Pittsburgh, PN	Strategy, Entrepreneurship, Organizational Behavior
20	Emory University (Goizueta)	Atlanta, GE	Organization & Management
21	Georgetown University (McDonough)	Washington, DC	Management Faculty; Strategy, Economics, Ethics, and Public Policy Faculty

22	Indiana University (Kelley)	Bloomington, IN	Management and Entrepreneurship faculty
23	Washington University in St. Louis (Olin)	St. Louis, MO	Management Faculty, Strategy Faculty, Organizational Behavior faculty
24	University of Southern California (Marshall)	Los Angeles, CA	Management and Organization
25	Arizona State University (Carey)	Tempe, AZ	Management and Organization, Economics, Business Communications
26	Vanderbilt University (Owen)	Nashville, TN	Organization Studies, Strategy and business economics
27	Ohio State University (Fisher)	Columbus, OH	Department of Management Sciences
28	University of Washington (Foster)	Seattle, WA	Management and Organization
29	Georgia Institute of Technology (Scheller)	Atlanta, GA	Strategy and Innovation, Organizational Behavior
30	Rice University (Jones)	Houston, TX	Strategy and Environment, Organizational Behavior
31	University of Notre Dame (Mendoza)	Notre Dame, IN	Management and Organization
32	Temple University (Fox)	Philadelphia, PA	Department Strategic Management
33	University of Minnesota—Twin Cities (Carlson)	Minneapolis, MN	Strategic Management and Entrepreneurship
34	Brigham Young University (Marriott)	Provo, UT	Management Department
35	University of Wisconsin—Madison	Madison, WI	Management and Human Resources
36	Pennsylvania State University—University Park (Smeal)	University Park, PA	Management and Organization
37	Michigan State University (Broad)	East Lansing, MI	Management Department
38	Texas A&M University—College Station (Mays)	College Station, TX	Management Department
39	University of Texas—Dallas (Naveen Jidal)	Richardson, TX	Organization, Strategy and International Management
40	University of Florida (Hough)	Gainesville, FL	Management

## Appendix II Top 50 Business Journals

Ranked	Business Journal
1	Academy of Management Journal
2	Academy of Management Review

<b>3</b>	Accounting, Organizations and Society
<b>4</b>	Administrative Science Quarterly
<b>5</b>	American Economic Review
<b>6</b>	Contemporary Accounting Research
<b>7</b>	Econometrica
<b>8</b>	Entrepreneurship Theory and Practice
<b>9</b>	Harvard Business Review
<b>10</b>	Human Relations
<b>11</b>	Human Resource Management
<b>12</b>	Information Systems Research
<b>13</b>	Journal of Accounting and Economics
<b>14</b>	Journal of Accounting Research
<b>15</b>	Journal of Applied Psychology
<b>16</b>	Journal of Business Ethics
<b>17</b>	Journal of Business Venturing
<b>18</b>	Journal of Consumer Psychology
<b>19</b>	Journal of Consumer Research
<b>20</b>	Journal of Finance
<b>21</b>	Journal of Financial and Quantitative Analysis
<b>22</b>	Journal of Financial Economics
<b>23</b>	Journal of International Business Studies
<b>24</b>	Journal of Management
<b>25</b>	Journal of Management Information Systems
<b>26</b>	Journal of Management Studies
<b>27</b>	Journal of Marketing
<b>28</b>	Journal of Marketing Research
<b>29</b>	Journal of Operations Management
<b>30</b>	Journal of Political Economy

31	Journal of the Academy of Marketing Science
32	Management Science
33	Manufacturing and Service Operations Management
34	Marketing Science
35	MIS Quarterly
36	Operations Research
37	Organization Science
38	Organization Studies
39	Organizational Behavior and Human Decision Processes
40	Production and Operations Management
41	Quarterly Journal of Economics
42	Research Policy
43	Review of Accounting Studies
44	Review of Economic Studies
45	Review of Finance
46	Review of Financial Studies
47	Sloan Management Review
48	Strategic Entrepreneurship Journal
49	Strategic Management Journal
50	The Accounting Review

### Appendix III Shares of male and female

Gender	Freq.	Percent	Cum.
f	267	29.57	29.57
m	636	70.43	100.00
Total	903	100.00	

**Appendix IV Shares of assistants (1), associates (2) and professors (3)**

Current Position_Position	Freq.	Percent	Cum.
1	247	27.85	27.85
2	212	23.90	51.75
3	428	48.25	100.00
Total	887	100.00	

**Appendix V: Distribution of employees in each university**

	<b>Bottom 3</b>
	<b>Top 3</b>

Ranked	University	Share Assistants	Share Associates	Share Professors
1	Harvard University	22%	11%	68%
2	University of Pennsylvania	36%	19%	45%
3	University of Chicago	10%	10%	80%
4	MIT	40%	0%	60%
5	Northwestern University	24%	27%	49%
6	Stanford University	15%	12%	73%
7	University of California - Berkeley	37%	15%	48%
8	Dartmouth College	4%	26%	70%
9	Yale University	44%	17%	39%
10	Columbia University	24%	12%	64%
11	University of Michigan	24%	18%	58%
12	Duke University	14%	38%	48%
13	New York University	20%	40%	40%
14	University of Virginia	10%	25%	65%
15	University of California - Los Angeles	17%	30%	52%
16	Cornell University	27%	13%	60%
17	University of Texas - Austin	29%	23%	49%
18	University of North Carolina - Chapel Hill	36%	20%	44%
19	Carnegie Mellon University	27%	23%	50%
20	Emory University	28%	28%	44%
21	Georgetown University	17%	17%	65%

22	Indiana University	47%	26%	26%
23	Washington University	32%	18%	50%
24	University of Southern California	37%	22%	41%
25	Arizona State University	59%	16%	25%
26	Vanderbilt University	19%	19%	63%
27	Ohio State University	44%	19%	38%
28	University of Washington	32%	36%	32%
29	Georgia Institute of Technology	44%	31%	25%
30	Rice University	20%	27%	53%
31	University of Notre Dame	15%	60%	25%
32	Temple University	17%	33%	50%
33	University of Minnesota	28%	33%	39%
34	Brigham Young University	48%	28%	24%
35	University of Wisconsin	15%	46%	38%
36	Pennsylvania State University	20%	20%	60%
37	Michigan State University	20%	33%	47%
38	Texas A&M University	24%	24%	52%
39	University of Texas - Dallas	25%	38%	38%
40	University of Florida	20%	40%	40%

#### Appendix VI: Distribution of publications in each university

Ranked	University	Share Articles Assistant	Share Articles Associate	Share Articles Professor	Share Articles Overall
1	Harvard University	2%	5%	93%	4,1%
2	University of Pennsylvania	11%	9%	80%	4,8%
3	University of Chicago	1%	3%	96%	1,4%
4	MIT	13%	0%	87%	2,2%
5	Northwestern University	5%	15%	79%	6,4%
6	Stanford University	7%	5%	88%	4,8%
7	University of California - Berkeley	7%	11%	81%	3,1%
8	Dartmouth College	1%	15%	84%	2,7%
9	Yale University	27%	10%	63%	1,5%
10	Columbia University	5%	6%	89%	5,2%
11	University of Michigan	5%	13%	82%	4,2%
12	Duke University	2%	18%	80%	2,8%
13	New York University	6%	28%	66%	2,7%
14	University of Virginia	3%	12%	85%	2,6%

15	University of California - Los Angeles	9%	28%	63%	2,3%
16	Cornell University	15%	12%	74%	1,4%
17	University of Texas - Austin	6%	16%	78%	3,9%
18	University of North Carolina - Chapel Hill	19%	18%	63%	1,8%
19	Carnegie Mellon University	4%	16%	80%	2,0%
20	Emory University	29%	14%	57%	0,9%
21	Georgetown University	6%	18%	76%	2,4%
22	Indiana University	23%	34%	43%	1,7%
23	Washington University	5%	18%	77%	1,8%
24	University of Southern California	14%	11%	75%	3,9%
25	Arizona State University	23%	28%	49%	2,0%
26	Vanderbilt University	4%	13%	83%	2,5%
27	Ohio State University	8%	15%	77%	2,2%
28	University of Washington	7%	29%	64%	2,6%
29	Georgia Institute of Technology	19%	26%	55%	1,4%
30	Rice University	5%	21%	74%	1,7%
31	University of Notre Dame	5%	28%	67%	1,8%
32	Temple University	0%	2%	98%	1,2%
33	University of Minnesota	3%	23%	73%	1,8%
34	Brigham Young University	34%	18%	48%	0,7%
35	University of Wisconsin	0%	27%	72%	1,2%
36	Pennsylvania State University	1%	18%	81%	1,8%
37	Michigan State University	2%	31%	67%	2,7%
38	Texas A&M University	7%	11%	83%	3,1%
39	University of Texas - Dallas	3%	33%	64%	1,7%
40	University of Florida	3%	21%	76%	1,1%

## Appendix VII: T-test: Quantitative and qualitative cooperation within the Business School

```
. ttest QLCoopWithinBS == CoopWithinBS
```

Paired t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
QLCoop~nBS	903	.4252492	.0411124	1.235427	.344562	.5059363
CoopWi~S	903	1.03433	.0744936	2.23853	.8881291	1.180531
diff	903	-.6090808	.0713715	2.144711	-.7491544	-.4690073

mean(diff) = mean(QLCoopWithinBS - CoopWithinBS)      t = -8.5339  
Ho: mean(diff) = 0      degrees of freedom = 902

Ha: mean(diff) < 0      Ha: mean(diff) != 0      Ha: mean(diff) > 0  
Pr(T < t) = 0.0000      Pr(|T| > |t|) = 0.0000      Pr(T > t) = 1.0000

### Appendix VII: Zusammenfassung

Das Ziel dieser Masterarbeit ist die Analyse von Kooperationsmustern innerhalb und zwischen Organisationen. Dabei sollen die unterschiedlichen Kooperationsmöglichkeiten von Mitarbeitern und ihre Auswirkungen auf Produktivität und qualitätsbezogene Produktivität aufgezeigt werden. Die Arbeit soll ein besseres Verständnis für die Bedeutung von Kooperationsaktivitäten innerhalb und zwischen Organisationen vermitteln. Gleichzeitig schlägt sie vor, dass die Ergebnisse, die auf gesammelten Daten von den Top 40 Business Schools in den USA basieren, nicht nur auf die akademische Welt, sondern auch auf Organisationen im Allgemeinen anwendbar sind. Manager könnten die Ergebnisse beispielsweise für eine Verbesserung der Gesamtleistung ihrer Organisation in qualitativer und quantitativer Hinsicht verwenden.

Das Thema „Kooperation“ ist ein Thema von großer Bedeutung, das seit Jahrzehnten von Wissenschaftlern unter Diskussion gestellt wird (z. B. Coase, 1937, Deutsch, 1949a, Janis 1982, Hillebrand & Biemans, 2003, Franco & Pinho, 2017). Es wurde jedoch noch keine Forschung durchgeführt, die die „Spitzenklasse“ (in vorliegendem Fall die Top 40 Business Schools in der USA) einer bestimmten Industrie analysiert, in der die Hauptaufgabe der Forschungsobjekte eine Aktivität mit langer Dauerhaftigkeit und hoher Komplexität ist. Dies ist eine der Tatsachen, die den aktuellen Artikel vom Rest der Literatur zum Thema Kooperation unterscheidet. Weiters liefert diese Arbeit neue Beobachtungen und zusätzliche Beweise für die Vor- und Nachteile über die Zusammenarbeit mit Kollegen aus derselben Organisation, über die

organisationsübergreifende Zusammenarbeit und über die Zusammenarbeit mit jemandem, der sich auf derselben, niedrigeren oder höheren hierarchischen Ebene befindet.

Die Ergebnisse zeigen, dass die meisten Mitarbeiter kooperativ sind und die meisten von denen häufiger mit sogenannten "Außenseitern" (Mitarbeitern, die in einer anderen Organisation arbeiten) zusammenarbeiten, als mit Kollegen derselben Organisation. Die Zusammenarbeit mit Kollegen erhöht jedoch die Qualität des Endprodukts. Weiters wurde fast keine der Kooperationsaktivitäten, die zu einer schlechten Qualität geführt haben, zusammen mit Kollegen abgeschlossen. Nach der Betrachtung der Erfahrung der Forschungsobjekte (jedes Individuum, dessen Daten in die Analyse einbezogen wurden), legen die Ergebnisse des aktuellen Artikels nahe, dass erfahrenere Mitarbeiter bei weitem die am meisten bevorzugten Kooperationspartner sind, wenn es um eine qualitative Arbeit geht. Einige der gemachten Beobachtungen beziehen sich auch auf den Rang der Organisation (Business School) und betrachten genauer die Abhängigkeit von Kooperation und Position in einem globalen Ranking.

Die Datenbank der aktuellen Mitarbeiter in den Top 40 Business Schools in den USA ist einzigartig und bietet hochqualitative Informationen zu allen Forschungsobjekten. Die wichtigsten Variablen in dieser Forschung sind die Positionen der Forschungsobjekte (Assistenten, Mitarbeiter oder Professoren) und die Anzahl der veröffentlichten Artikel. Sie spielen eine bedeutende Rolle bei jeder Beobachtung.

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