



**DETERMINANTS OF TEAM PERFORMANCE IN BUSINESS  
ORGANIZATION EMPIRICALLY RESEARCHED UNDER  
INFLUENCE OF BEHAVIOR – VALIDATED  
IN AN EUROPEAN ENVIRONMENT**

*Doctoral student **Andreas Michael Giesa**, MBA, MSL  
University of Latvia, University Applied Sciences, Kufstein, Austria  
Ottostrasse 1, 40625 Düsseldorf, Germany  
E-mail: [Andy.Michael.Giesa@googlemail.com](mailto:Andy.Michael.Giesa@googlemail.com)*

*Dr., Professor **Inesa Voroncuka**  
Director of Doctoral Study  
Faculty of Economics and Management  
University of Latvia  
Aspazijas bulv. 5, Riga, LV-1050, Latvia  
E-mail: [voroncuk@lanet.lv](mailto:voroncuk@lanet.lv)*

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**Abstract**

Human resources, the economy, and large organizations face dramatic changes based on the worldwide financial and economic crisis. Thus Behavioral Economics is becoming more and more a part of daily business in large organizations. Since the 1940s, teams have played an important role and today the use of formal, informal developed teams in organizations continues to increase. As the interest in Team Performance rises, empirical and theoretical attention has been focused on varying themes such as conflict, social networking, and decision-making. The new drive of Behavioral Economics into economy has given rise to the idea to measure Team Performance including behavior. This research paper presents an executive summary of how to measure the determinants behavior of an empirical research by methods of secondary analysis, survey, and a result of a validation process through a laboratory test method in an European environment. It presents a result to measure Team Performance, including the determinants of behavior, in a summarized and representative way and gives a perspective of how to set up team so that they are performing on a high level.

This paper is based on the fact that Behavioral Economics is entering the economic business area. It summarizes aspects of Team Performance & Behavioral Economics, outlines a way to measure behavior by Team Performance and presents an executive result of an empirical research study. The authors define teams including behavior and develop a 12 dimension model of measuring Team Performance including the determinants of behavior.

Key findings are: First, Team Performance is measured in companies on a regular basis. Due to new trends in organizations also triggered by crisis, Behavioral Economics is entering



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into the practical environment, linked to the increased importance of measuring Team Performance. Secondly, the research result presents evidence that it is possibility to measure behavior in Team Performance and empirically presents the impact of behavior. Lastly, an important result of a dissertation in a summarized way is presented empirically that delivers a support of the entrance of Behavioral Economics into the economy and environment in measuring Team Performance with the determinants of behavior.

## Introduction

As the interest in Team Performance rises, empirical and theoretical attention has been focused on varying themes such as conflict, social networking, and decision-making. New drive of behavioral economics into the business environment has given rise to the author an idea to measure Team Performance including behavior. The author's research into the field of Team Performance proposes a selection of Team Performance dimensions including behavior. A team should have a mix of competences, i.e., technical skills, problem solving, and interpersonal skills, with the goal to approach and accomplish a high level of team results. However, based on the author, aligned with Hyatt, Ruddy and Moran, teams need to have an appropriate level of empowerment to deliver and manage their tasks, including proper leadership support and a significant environment with a rewards and recognition system. The author defines the team including the behavioral field. Furthermore, a dimension of behavior should be included into the research to evaluate the significance of behavioral economics in the economic environment and Team Performance. In current literature, the author finds many definitions of the term team. The perspective of the term varies with the author. For example Van Dick et al. define team as any group of people, who work together. This work can be cooperative and interdependent in order to produce goods or services. Usually team players give account of their performance to each other. Schneider et al. put emphasize on the responsibility of each TM for reaching the goals. The purpose is to meet the needs of customers of the organization. Weinert adverts to the need for efficiency in a team. The author shows that in this context a team is not only a group of people working together, but a self-organised connection of individuals in order to work hand in hand. Thus, a team can produce long-term troubleshooting.

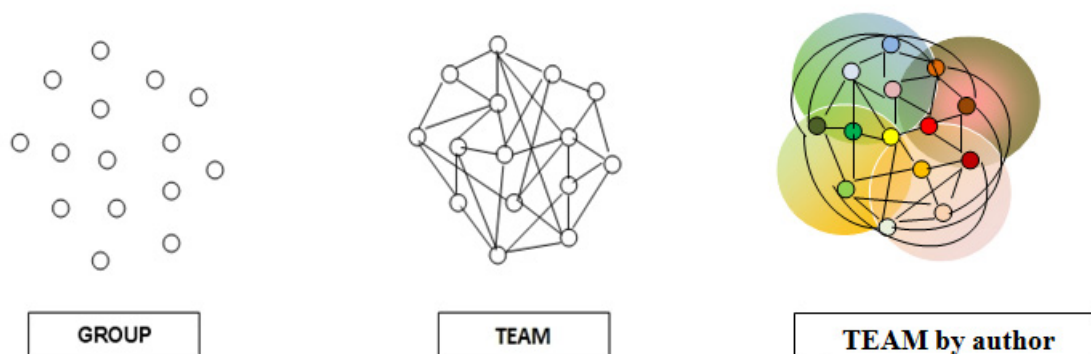


Figure 1. Team Definition by the author



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The author identifies also the problem that often the terms team and group are used as synonyms, but the difference between a team and a group is the reach of synergies. The performance of a group consists only of the input of each individual. In a team there is binding force and responsibility between the team members. This has individual effects as well as collective impact. The following figure visualises the difference between group and team. Teams can be created for various interactions. It is possible to introduce teams both in long term and short term perspective.

The research into the field of Team Performance proposes a selection of Team Performance dimension. Furthermore, it is necessary to outline that a team must work hard and must be committed to achieving results. [1] In addition, a team should have a mix of competences, i.e. technical skills, problem solving and interpersonal skills with the goal to approach and accomplish a high level of team results. However, teams need to have an appropriate altitude of empowerment to deliver and manage their tasks, [2] proper leadership support, [3] as well as a significant environment with a rewards and recognition system. [4] Furthermore, a dimension of behavior should be included into the research so evaluate the significance of Behavior Economic into the economic environment and Team Performance. However, the literature is so far very economically with this idea. Not many Team Performance assessment found in the literature had behavioral statistical information or statistical psychometric soundness of the instruments. A definition of each dimension, used and relevant for this study, is described with the focus to indicate the scale of the dimension name to this research. This research has defined four clusters, in which one cluster focuses on the new innovative behavioral aspect and three other clusters, which are based on literature findings to measure TP. In total, there are on 12 dimensions defined and in this publication, it will be purely focused on the Cluster Behavior.

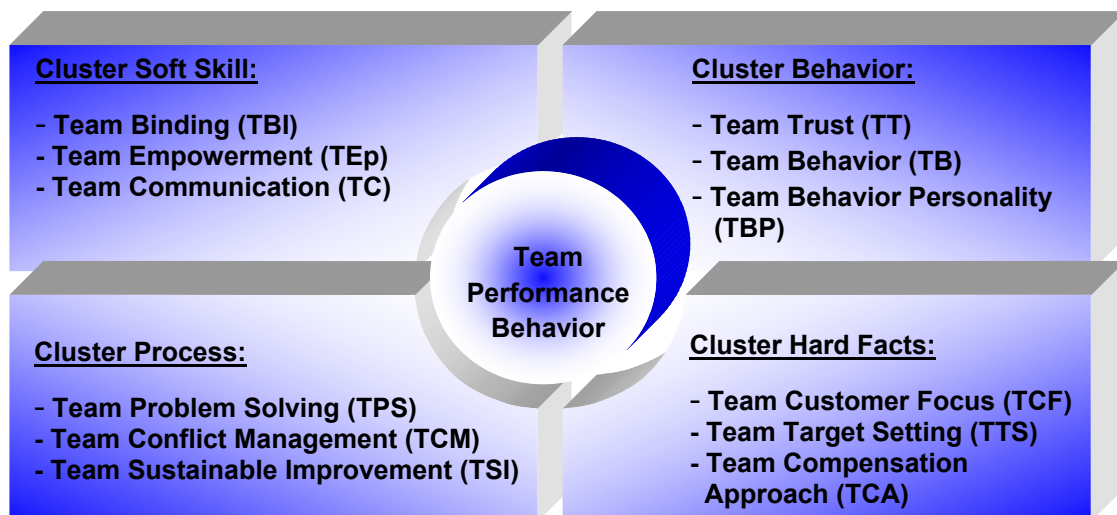


Figure 2. The 12 Dimension for Team Performance Model incl. context of behavior



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Team Trust is a difficult area. On the one hand it is a behavior topic, on the other side; it occurs within a relationship and implies some amount of risk and individual vulnerability. A behavior of trust is initiated in a team when the person believes that the team, "...makes a good-faith effort to behave in accordance with any commitments both explicit or implicit, ... is honest in whatever negotiations preceded such commitments, and ... does not take excessive advantage of another even when the opportunity is available" [5]. In addition, a trust environment can be developed by people who have shared social norms, shared experiences and repeated interactions. [6] During the research on the relationship between trust and performance in teams, there are studies that report a link between trust and performance while others do not. Smith and Barclay found for instance a positive relationship between trusting behaviors and perceived trustworthiness with task performance using different rationales. In addition, Mc Allister found already in 1995 a positive relation between the behavioral trust and the assessment of performance. However, there are researches in which trust takes a moderate role in the relation between team processes and performance. [7] TT will be defined as the degree to which team members believe they can depend on other TM abilities and intentions.

Team Behavior is a complex field and therefore often not considered so far in statistical TE measurements. This dissertation has the main focus in this area and hypothesis a key influence in TE. TBE is referring to actions or reactions of an i.e. an organism (a person), usually in relation to the environment. TBE can be conscious or subconscious, overt or covert, and voluntary or involuntary. Referring to the literature, team role behavior is measured by the known used Belbin Team Role Self-Perception Inventory (BTRSPI). In addition, there are researches done focused on team role aspect on the significant in behavior by gender. [8] Furthermore, the authors Fisher and Macrosson brought the childhood family environment to interpret different management team role in the sense of behavior. [9] The known BTRSPI is a widely used instrument by managers and trainers in management selection, assessment, team building and management training, but it does not measure TE in teams, even though it delivers aspects of behavior. [10] TBE in this dissertation is defined on the origin to psychophysiological factors as extroversion-introversion, high anxiety-low anxiety, which underlie the TBE definition in this dissertation. [11] The aspect of the individual's motivation and values is a part of the particular set of definition in TBE.

Team Behavior Personality can be defined as a dynamic and organized set of characteristics possessed by a person that uniquely influences his or her cognitions, motivations, and behaviors in various situations. [12] The definition of TBP for this dissertation is focused on the personality aspects of Openness to experience: the tendency to be imaginative, independent, and interested in variety vs. practical, conforming, and interested in routine. Conscientiousness: the tendency to be organized, careful, and disciplined vs. disorganized, careless, and impulsive.

Agreeableness: the tendency to be softhearted, trusting, and helpful vs. ruthless, suspicious, and uncooperative.

Neuroticism: the tendency to be calm, secure, and self-satisfied vs. anxious, insecure, and self-pitying. [13]

At this stage, it is important to outline a theoretical based comment to the hypothesis of the Cluster Behavior, Team Trust in the field of heterogeneity. The system-theory deals quite strong with the field of heterogeneity of organizations. In their context, heterogeneity is not only



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used in the context of random or negatively evaluated characteristics of organizations, which focus on standardization, but also build the basis for flexibility and organizational learning development. A central message of the system-theory is the aspect of “law of the necessary diversity” [14] in which the long-term survival of a system is in danger when the complexity is not enough to allow variety to solve environmental influences. As more heterogenic a system appears, as more is the probability for linkage to element of a system. [15] As a result, the internal heterogeneity is therefore the most important pre-condition of self-reflecting development processes of systems and so the successful adaptations of the continuous changing environmental conditions. [16] Reviewing into the management and organizational theory, St. Gallen Management approach [17] and the author Kirsch [18] assume that organizations are too complex to get steered systematically and target oriented by management. Instead of using instruments to reduce complexity to be capable to manage the organization, they propose to understand complexity as an advantage. In conclusion, complexity, heterogeneity and redundancy take a key position into the conditions to have a long-term capability of the survival of the organization. [19] However, empirical studies deliver only partly evidences. There are studies that present a positive impact from cultural heterogeneity to the TP, but there are also studies that present a negative impact. By the author Kilduff/Angelmar/Mehra (2000) and Gibson (1999, 1<sup>st</sup> part), there is shown no impact of cultural heterogeneity in their empirical study. The authors Thomas/Ravlin/Wallace (1996) prove even a negative influence of the heterogeneity linked to TP. However, Cox/Lobel/McLoeod 1991 and Gibson (1999, 2<sup>nd</sup> part) deliver a positive effect of TP and Earley/Mosakowski (2000) find even an linear relation to TP. Based on the discussions, in this dissertation it was decided to take this hypothesis in and try to deliver an additional aspect of the empirical study in the field of heterogeneity.

## The Core Hypothesis with the Six Key Hypotheses

$H_{y0}$  If Team Performance is measured in Business Organizations, then it will be affected when the team has a basic knowledge about behavior action/reaction of team members.

Reflecting these dimensions, the core hypothesis and the behavioral aspect, the following hypotheses are issued:

Cluster Behavior: Dimension Team Trust

$H_{y1TT}$  *The higher the heterogeneity, the higher the Team Performance will be.*

$H_{y2TT}$  *The higher the content of the business together is related, the higher the Team Performance will be.*

Cluster Behavior: Dimension Team Behavior Personality

$H_{y1TBP}$  *The higher the age range in the team, the higher Team Performance will be.*

$H_{y2TBP}$  *The higher the level of education in the team, the higher Team Performance will be.*

Cluster Behavior: Dimension Team Behavior

$H_{y1TB}$  *The higher diversity index in a team, the higher the Team Performance will be.*

$H_{y2TB}$  *The higher the amount of not taken vacation days, the higher the Team Performance will be.*



## Empirical Research Environment and the Measurement Indicators

The empirical research environment is an organization that is used for the secondary analysis, survey and in which the hypothesis are checked against the data is today a worldwide company under the top five software business players in the field of lifecycle management. The global organization has more than 8,000 employees worldwide in more than 24 countries with more than 63,000 customers. It is a dynamic, flexible, lean, function-oriented and team-structured organization that develops, sells, and provides service of software. The research design focuses on the second largest country – Germany – in the sense of revenue and profit. The German organization is represented in the field of research development, pre-sales, sales, services, customer support and support functions (IT, AC, Finance, HR, and Procurement). The following measurements are defined in relation to the hypotheses:

- $H_{y1TT}$  Heterogeneity (H) is measured by one Team Member with foreign nationality = 0.25, one team member living experience abroad = 0.25;
- $H_{y2TT}$  High content business relation (BR) is measured by two Team Members from the same business field = 0.5 three Team Members from the same business field = 0.75 four Team Members from the same business field = 1.0;
- $H_{y1TBP}$  The age range (AR) will be measured by age range from 1-3 years = 1, age range from 3-6 years = 2, age range from 6 – 10 years = 3, age range higher than 10 years = 4;
- $H_{y2TBP}$  Education (Ed) is defined and measured by education (no study background, apprenticeship or learning academy) = 0.5, Bachelor/Diploma University of Applied Sciences = 1.0, Master/Diploma University = 1.5, Doctor = 2.0;
- $H_{y1TB}$  Diversification Index (DI) presented via the measurements of 4 team members with equal gender = 1, 1 Team Member different gender than 3 other Team Members = 2, 2 team Members men and 2 Team Members women = 3;
- $H_{y2TB}$  Left Vacation (LV) days per Team member measured by 1-10 left = 1, 11-20 = 2, 21-30 = 3, More than 30 days = 4.

Team Productivity is presented via the measurements of achieved variable income versus targeted revenue. In the following, it will link this to the variables. By measuring the determinants of TP in the behavior in this empirical study, it is wanted by the author to link at this stage with conjectures summarized by Lewin in the psychological field theory: “In psychology, one can primarily distinguish between a person (P) and its environment (E) in a situational context. The extent of one or the other element, which certain behavior depends on, varies tremendously. In principle, however, this psychological phenomenon depends on the predisposition of the person and its environment. So far, we can utilize the formula  $B (= \text{behavior}) = f(S = \text{situation})$ . Behavior (B) can describe any psychological activity as the function  $B = f(P, E)$ .” Based on this equation, the author concludes, there is a cause-and-effect-relationship between behavior as a dependent variable, and personality and its environmental context as the independent variables. As a result, the author links these to the research of the determinants of TP in business organizations, theoretical background & empirical evidence in the context of behavior and linked to the hypothesis and measurement delivered, the equation could be transformed into to  $TP = f(\text{SoftSkill}) + f(\text{Process}) + f(\text{Hardfacts}) + f(\text{Behavior})$ , whereby the focus of this dissertation is concentrated on  $TP = f(\text{Behavior})$ . Subsequently by the





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author, the equation continuously triggers function  $TP = f(P,E)$  with the additional aspect that TP is measured by team productivity, fluctuation rate and vacation rate, and whereby  $P = TM$ , and  $E = BR$ . TM would be defined by the indicators of age range, education, heterogeneity, diversity index, remaining vacation per year, so that we could get the following summary:  $TP = f(TPr, Fr, Vr); f(AR, Ed, H, DI) + (BR)$ . The author defines therefore the dependent variables as presented by TPr, Fr, and Vr, and the independent variables as AR, Ed, H, DI, BR.

## Empirical Research Methods, Its Validation and Results

The secondary analysis is a method using existing material independently from the original aspect relating to the required topic and analyzing the data in relation to it. The advantages of this method are to provide a retro view of using real data in a long-term perspective, to use it for multiple research of a complex problem, to accumulate more representative data, to compare data to various trend analyses, and to be able to compare it with new research data. The challenges of this method are that there might be a high risk of receiving the data; the theoretical background needs to be defined clearly so that the secondary analysis will be suitable for the research, and there is question about the quality based on the limitation of the delivered data. In this analysis, there will be targeted collection of the definition for diversity index, age range, heterogeneity aspect, business field operations, educational level, and status of open vacation days. In addition, it will be calculate individual productivity and Team Performance by targeted revenue and achieved revenue. The secondary analysis was implemented by empirical researching pro rata the data of 68 teams that comprise 602 team members In addition; we will review if there is a possible to link to the designed hypothesizes. The age range result outlined that the sales population has a wide age range distribution; however around 50% of the employees are at least 40 years of age, which could signify that the company has a lack of behavior in younger mind-sets. It also could link to the behavior, the dimension of team behavior personality, which triggers the age range into the hypothesis that the higher the age range in the team, the higher the Team Performance will be. In conclusion, the salary rate and revenue achieved would need to be approximately high even though there was a financial crisis. As same behavioral personality cluster includes the educational perspective, it is valuable to focus on it. The educational level overall is around 70%. The education level is doctoral degree, 1.4%; university diploma, 50%; master's degree, 3.54%; certificates, 14.95%, and not available, 30.11%.

## Result and Analysis of the Secondary Analysis

Based on the previous overview into the first results of the Secondary Analysis and the first links to the hypotheses, a more detailed link is now established to the indicators and measurements and its hypothesis. The following table provides a detailed overview and linkage, based on hypotheses and defined measurable indicators by points to each team and reflection to the calculated productivity rate. The presented point calculation is based on the designed indicators.



Table 1

**Overview of Hypothesis Measurements & Indicators**

Team	Hypothesis Rate	Productivity Rate	Team	Hypothesis Rate	Productivity Rate	Team	Hypothesis Rate	Productivity Rate
Team1	31.25	24.68	Team24	26.50	14.10	Team47	13.50	27.60
Team2	26.75	33.90	Team25	17.25	15.10	Team48	16.75	20.00
Team3	22.50	53.90	Team26	21.50	21.40	Team49	13.00	21.70
Team4	19.25	24.70	Team27	17.25	14.80	Team50	12.00	21.70
Team5	21.25	81.90	Team28	19.25	21.50	Team51	16.00	12.40
Team6	21.75	37.00	Team29	21.50	-0.44	Team52	18.75	12.60
Team7	15.75	24.40	Team30	21.75	20.00	Team53	25.00	09.80
Team8	17.50	21.70	Team31	19.75	17.30	Team54	18.25	27.50
Team9	18.00	27.80	Team32	18.75	17.30	Team55	15.50	39.40
Team10	19.50	26.00	Team33	22.50	14.90	Team56	12.50	33.20
Team11	15.00	22.20	Team34	23.25	08.40	Team57	13.50	58.00
Team12	13.50	23.10	Team35	16.00	24.40	Team58	21.50	23.00
Team13	27.25	25.90	Team36	28.00	21.40	Team59	18.75	52.00
Team14	18.00	30.40	Team37	14.75	27.90	Team60	18.00	58.30
Team15	26.25	12.00	Team38	16.50	15.00	Team61	18.75	22.60
Team16	21.00	22.80	Team39	20.00	14.30	Team62	25.25	25.20
Team17	16.00	46.70	Team40	20.25	07.10	Team63	27.50	19.40
Team18	23.50	24.20	Team41	20.25	18.60	Team64	24.75	21.00
Team19	21.75	06.70	Team42	18.75	23.90	Team65	16.75	28.40
Team20	15.50	-6.28	Team43	16.75	29.20	Team66	19.25	24.40
Team21	21.75	16.90	Team44	11.00	14.60	Team67	24.50	16.90
Team22	14.25	27.70	Team45	22.25	12.20	Team68	15.25	12.10
Team23	20.00	17.70	Team46	21.00	12.70			

**Conclusion and Implications of the Secondary Analysis**

It seems to be by reviewing and analyzing this secondary analysis, of 68 teams, 602 people in a sales population, and linkage to the implemented Pre-Test, the hypothesizes with the defined indicators generally show an intersection and influence to determine Team Performance in relation to behavior. The empirical secondary research analysis indicates in its reflection measurable overlaps and outlines behavioral impact. Key determinants of Team Performance might be heterogeneity and education; medium determinates Team Performance in relation to behavior might be age range, diversity index, and determinants of business relations do not need to be focused anymore at all, and open vacation days seems to be a minor role in determining Team Performance in relation to behavior. One critical aspect in this secondary analysis could be the different size of teams, even though the average team number is 8.8; however there were larger and smaller teams and in general, a suitable amount of 602 people





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evaluated. In conclusion, the secondary analysis reflects a tendency of the Pre-Test [19] with variations in diversity and age range. The secondary analysis was a valuable empirical research to analyze the trends of the hypotheses and review the variables and their influence on the topic of Team Performance with determination of behavior. In reflecting on the Pre-Test [19], the following function was made:  $TP = f(TPr, Vr); f(AR, Ed, H, DI, FR) + (BR)$ ;  $TP_{sum} = f(2079, 48); f(13, 21, 2, 5, 0)+2) / (TPr = \text{Team Productivity Rater}, Vr = \text{Vacation Rate}, AR = \text{Age Range}, Ed = \text{Education}, H = \text{Heterogeneity}, DI = \text{Diversity Index}, FR = \text{Fluctuation Rater}, BR = \text{Business Relation})$ . In review of the delivered secondary analysis, the following function can be made:  $TP = f(TPr, Vr); f(AR, Ed, H, DI, FR) + (BR)$ ;  $TP_{sum} = f(1599, 199); f(261, 483, 38, 95, -27)+272)$ . Looking at both functions, the question appears to be how they compare way and is it possible to identify parallels. Based on this, the following two illustrations present first a view on the first part of the TP function  $f(TPr, Vr)$  and the second function  $(AR, Ed, H, DI; FR) + (BR)$ .

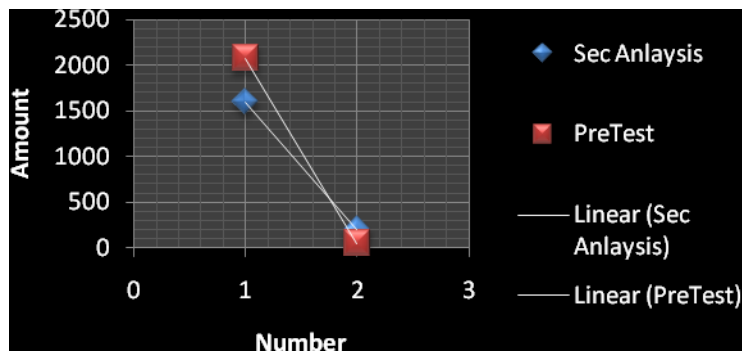


Figure 3. The view of  $f(TPr, Vr)$  by PreTest & Secondary Analysis

By comparing the two TPr or even the Vr, parallels can be identified. Of course, the amounts diverge due to the different amount of the population, but a parallel tendency is found. The thin white line is only shown to outline the parallelism.

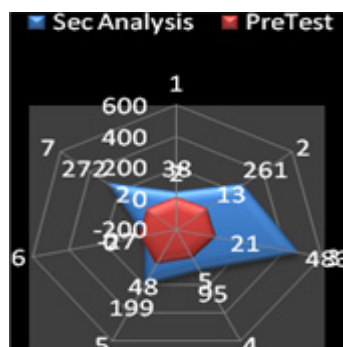


Figure 4. The view of  $f(AR, Ed, H, DI, FR) + (BR)$  by PreTest & Secondary Analysis



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In reviewing this illustration, it can be seen that the Pre-Test [20] covers the aspects of the secondary analysis or vice versa; however, the Pre-Test [20] has not delivered the extreme outcome shape as the secondary analysis. So far, it can be stated that the Pre-Test [20] and the secondary analysis drive this research with the defined hypothesis of determining Team Performance in business organizations with the theoretical background and the so-far evaluated empirical evidence in a specified context of behavior and links via the measurable indicators into a new and interesting perspective of behavior in business. An additional review and comparison should be done of an empirical evaluation of a Team Performance Survey in the sales population to measure the Team Performance, including the relationship of behavior, and to evaluate and link the results to the Pre-Test [20] and secondary analysis [21].

## Survey

A survey is a study by asking people from a population about their opinion on a specific issue with the intention to define relationships outcomes in this issue. There are three types of survey: the descriptive, the explanatory and the explorative one. Based on the research question, it is one solution to issue a survey into the conflict team including the mediator and ask for their feedback. The choice of a survey seems to be a reasonable solution with the possibility to add a research method with the goal to increase validity and reliability. In the industry organization, teams self-assess their performance. Of course, the assessment and its measures is based on this research and rooted in theory [22] because theoretical models greatly influence the way in which measures are constructed and utilized [23]. In conclusion, the teams are asked voluntarily to complete a self-assessment including the aspects of behavioral approach against their performance using the new approach of team assessment. This is accomplished by sending an e-mail to request for participation in the research to all of the team leaders throughout the organization. Moreover, the opportunity to participate in the research is communicated individually to managers and news-tickers internally. Teams are informed that their participation is voluntary, their information is used anonymously, and the data from their pilot assessments is used for the sole purpose of validating the properties of the assessment. Participants receive no feedback of the results as the instrument had not yet been evaluated. Teams have the choice of completing their assessments in electronic or paper format. The electronic version of the assessment is available on a commercial electronic data collection tool and is sent to the team leaders, Team Members via e-mail. All of the electronic assessments contained only information to identify the total feedback. The survey is anonymous. The collection procedure is designed this way to maximize anonymity at individual. The data will be then evaluated. Based on this information data analysis, statistics will be done.

## Results & Analysis incl. the Link to the Hypothesis of the Survey

The idea was to evaluate Team Performance in form of a survey with the determinant of behavior in software sales and service population in Germany of around 840 people. The key aspect of the Team Performance Survey was the cluster of behavior. In this cluster there are embedded the key questions that link to directly to the hypothesis, which can be seen in the below extract of the survey. To pre-check, if the survey is designed correctly was done in a Pre-



Test Survey and the results were published [20]. The paper presents the final survey result. 840 participants were asked to open and answer the 17 questions in order to evaluate Team Performance including the determinant of behavior. Finally, 466 people filled out the survey, which is a rate of 55.47%. Out of this group 355 people answered at least one question, meaning 76%, and 295 people answered the last questions, means meaning 64%. It can be concluded that the survey is representative. The respondent population has is in an Age-Range of 30-49 years, 99% of the participants have an education with 78% of having at least a bachelors degree. 45% of the respondents have lived abroad and 40% have 5-10 days open vacation days, 25% have more than 11 days left for vacation in 2010. The focus of the evaluation will be on the eight key questions in the cluster behavior that are linked indirect/directly to the hypotheses.

## Conclusion & Implications of the Survey

Reviewing the Survey of the Software population of 466 people in total, it can be definitely stated that the survey is representative. Based on the detailed results and analyses, it can be also stated that the survey delivered clear results for the questions and therefore clear key messages to the hypotheses. The received data with the focus on behavior and the linkage to the hypothesis triggers in total a valuable result.

The question in the survey, whether the Team Performance increases by knowing more about the behavior of the others, links to the generic hypothesis and is clearly stated with 79% responding with a “yes” in the empirical test. A similar result was reached at during the Pre-Test Survey [20]. After the first laboratory test [24], the Pre-Test Survey [20] and now the final survey test with the representative number of people, it can be stated that this behavior has an impact on Team Performance. Referring to the dimensions of behavior and the behavioral cluster, the following summary based on the test can be formulated: Cluster Behavior: Dimension Team Trust  $H_{y1TT}$ : The higher the heterogeneity, the higher the Team Performance will be. The questions of team members with different nationalities add value to the Team Performance and team members with different experiences leading to a better trustfulness and Team Performance link to this hypothesis. Based on the results in the Test, it can be concluded that all three questions were answered so clearly that they deliver an explicit support of the statements and therefore to this hypothesis. Heterogeneity seems to have an impact on Team Performance. The final laboratory test should include the Dimension Team Trust and finally test it in the laboratory using methods of validity.

Cluster Behavior: Dimension Behavior Personality  $H_{y1TBP}$  The higher the age range in the team, the higher Team Performance will be; and  $H_{y2TBP}$  the higher the level of education in the team, the higher Team Performance will be. The questions of age range and educational level in the survey of the cluster behavior links these hypotheses. The results in the Test for the age range were clearly positive and delivered a strong representative trend. The assumption can be made, that Age Range has an impact on Team Performance. The support for educational level question and so the link to this hypothesis is not clear and strong. The representative data is not strong for this support and therefore it should be neglected for last test. In conclusion, the Age Range hypothesis is supported by the population and should be tested for validity in the final laboratory test. The result of the educational level is not strong enough based on the population and is therefore not to be considered in the further empirical study.



Cluster Behavior: Dimension Team Behavior;  $H_{y1TB}$  The higher diversity index in a team, the higher Team Performance will be; and  $H_{y2TB}$  the higher the amount of not taken vacation days, the higher Team Performance will be. The questions regarding the mixed-gender and the open vacation days are directly linked to these hypotheses. The evaluation of the mix-gender in the Test delivers a clear statement as well as the statement of the hypothesis with the open vacation status can be considered representative and hence stated as a trend. The diversity index and the amount of open vacation days are representative and empirically tested and deliver a supporting result.

In summary, the hypotheses are represented in the survey and clear empirical trends were provided. One hypothesis has not received the support, however all three dimension can be still considered and four hypotheses can be considered for validity in the final laboratory test. In addition, the overall hypothesis is clearly proved by the empirical test of Pre-Test [24], Pre-Test Survey [20], and this final survey result [25].

## Validation Results & Analysis

In total, the author had involved 256 international university students in the European validation process, which were split up into 56 teams during a period of one year. In summary, the author had by average taken a team with 4.57 people in which the author followed the theoretical advice to have a team with more than three people.

### Validation Heterogeneity 22 teams, 111 people

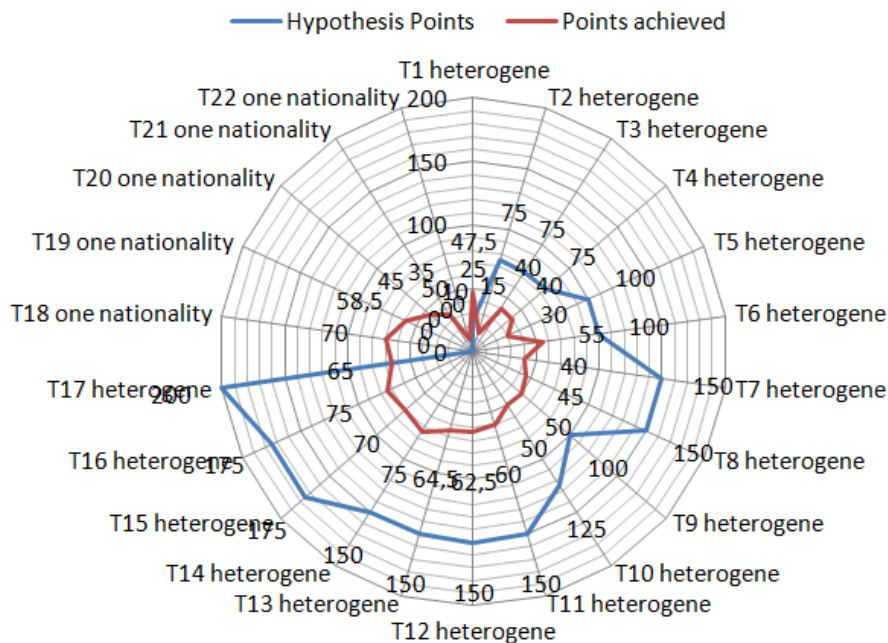


Figure 5. Validation result of heterogeneity



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The first hypothesis that was validated is sourced in the field of the team trust personality, defined as higher the heterogeneity, the higher the TP will be. Heterogeneity is defined in the area of team members who have the same nationality but have lived at least six months abroad or who have foreign nationality. As more as you have of these people in your team, as higher the heterogeneity, as higher the TP will be. The results present a validated tendency that heterogeneity teams perform higher than non heterogeneity teams. The point results for the heterogeneity teams are the same, it means foreign nationality and German with six months abroad, but one of the non heterogeneity team has only five points less. The productivity seems to be the lowest one by having only one nationality in the team, even though there is one overlap. There is a clear highest performance for a strong foreign, means high heterogeneity team.

The second hypothesis tested was in the field of behavioral personality, the age range hypothesis. The higher the age range, the higher the Team Performance will be. In the validation population there were no possible test populations for an age range of ten or above ten years, so that the test was limited to the three groups to 1-3 years, 3-6 years and 6-10 years. The result states a rough tendency that teams with a higher age range perform better, however on team performed worse with a higher age range than the other, but the two teams with the same high age range performed almost equal and better than compared to the smaller age range team. If we link this result to the theory of Katzenbach, Watson and Smith who mainly outlined that demographic diversity teams communicate better, increase cooperation and better collaborate so that the performance outcome will increase, the validation delivers a rough tendency to support the increase of performance. Of course the survey result as well as the secondary analysis supports this tendency [21], however the validation result show also a tendency.

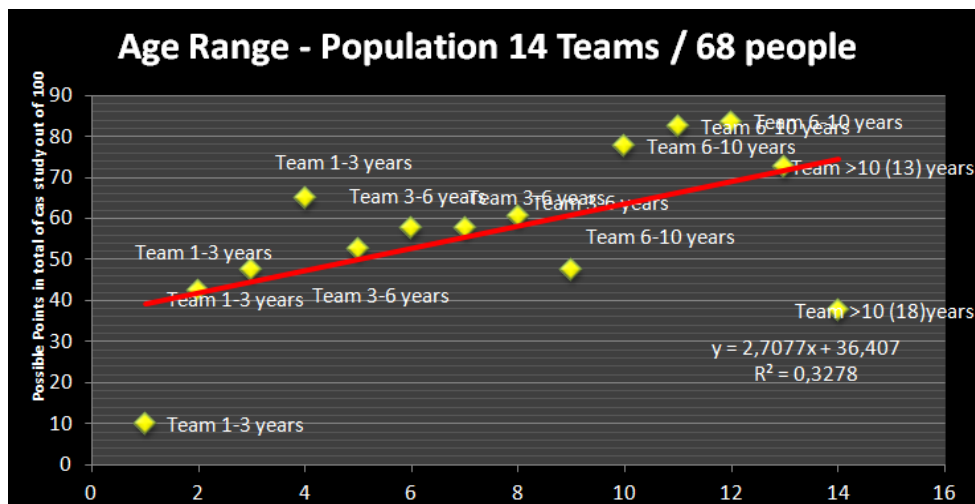


Figure 6. Overview of age range validation result

The third hypothesis tested was the diversity index, which is limited in the validation on the gender – mix. The graphic below shows a first tendency that the hypothesis seems to deliver a positive trend aligned with the results of the survey [25] and the secondary analysis [21]. The



result delivers a clear trend that as more equal of the gender mix in a team it becomes, as higher the increase of Team Performance. The gender team with two women and two men receives the highest outcome compared to the other teams. In addition, an interesting outcome is that the development of only women up to the gender mix is directly linked to the Team Performance. At this stage, it is necessary to mention that this result could be linked to the theoretical researches, in which it is outlined that the author Wood states that gender-balanced teams have more positive interaction, better communication and a conflict reduction, which would lead to a higher performance.

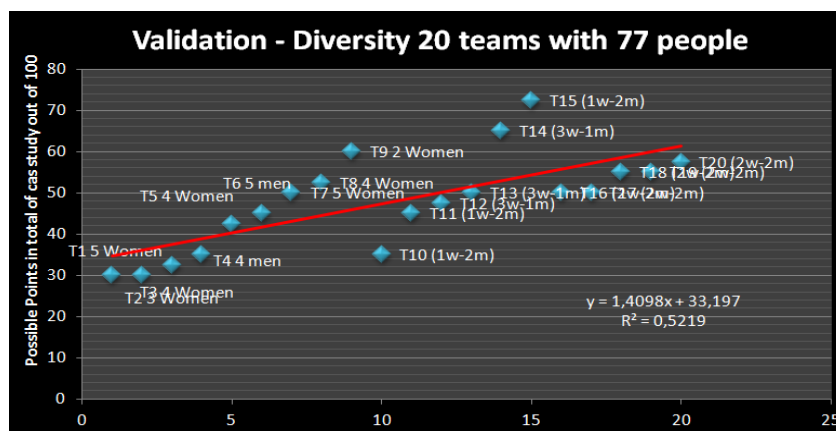


Figure 7. Overview of diversity validation result

## Conclusion & Implications of the Empirical Research

The result of validation links by  $H_{yITB}$  to the critical discussion in the literature, in which one research group states the negative relationship and the other the positive relationship to cultural teams versus homogeneous teams. In this research based on the validation, there is a clear positive trend in  $H_{yITT}$  heterogeneity,  $H_{yITBP}$  age range, and  $H_{yITB}$  diversity that can be recognized in relation to the Team Performance and its determinants of behavior. In summary, all validations deliver a tendency of the hypotheses; however, the proposal is to continue with the validation and to link it to the results of previous research results in the field of Team Performance under the determinant of behavior empirically.

Based on the implemented research methods of laboratory pre-test [24], secondary data analysis [21] of around 68 teams and 602 people, a survey [25] with around 320 replies and a laboratory validation process [26] of around 256 international students with around 56 teams in a scientific University European wide environment, there were three hypotheses delivered with a strong trend analysis and one hypothesis with a given results but without validation. As a results, the authors conclude that the main  $H_{y0}$  were positively research and analyzed tested by  $H_{y0} (TP) = f(H_{y1TT}, H_{y1TB}, H_{y1TBP}) + (H_{y2TB} * z)$ ; in which z stands for unknown impact of the validation that were not implemented by this hypothesis. In conclusion, the authors continue to state that the original  $TP = f(TPr, Fr, Vr)$ ;  $f(AR, Ed, H, DI) + (BR)$  can be concluded to  $TP = f(TPr, Vr)$ ;  $f(AR, H, DI)$ . The authors are able to state based on the empirical research





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result that  $H_{y0}$  If Team Performance is measured in business organizations then it will be affected when the team has a basic knowledge about behaviour action/reaction of team members. Finally, the authors showed that behaviour is able to be measured based on defined key indicators and evaluate the impact of TP.

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