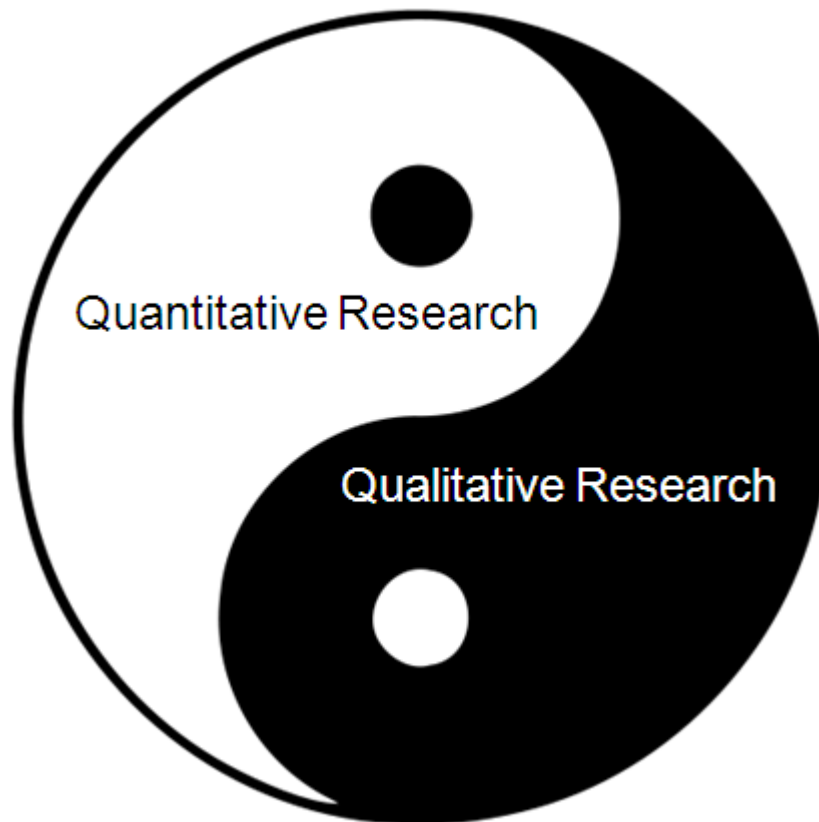


SCHOOLS OF METHODS.
THE QUALITATIVE AND QUANTITATIVE APPROACH



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Publication Info:

Draft: Introduction text of seminar “Methods of field research” (METH 15272) WS 2011/12 at Otto-Suhr-Institute

Contents

<i>Abstract</i>	4
Introduction	4
Qualitative	8
Quantitative	10
Conclusion	14
References	17

Abstract

Aim of the piece is to give an introduction to basic differences between qualitative and quantitative approaches, named here as two schools of methods. Decision to take either quantitative or qualitative approaches, or a mix of both, is required for all researchers at all instances in the methodological decision making process. The article outlines, on which line methods can be distinguished. A structure of three types of methods is assumed, to which all given arguments are applied: Method of theory building, method of data generation, and method of data analysis. It will be revealed, to which extent qualitative or quantitative approach can contribute with reference to these types. At the end four general rules are presented as recommendation to be applied for method finding and method application of all method schools and types.

Introduction

Classification of method into schools for methodological debates is a controversial issue as method's discussion is ruled by representatives of different approaches. Very often, the discussion about one method or another is inaccurate in relation to researcher's leading question. Basically, thoughts based on general simplification such as schools cannot replace regular critics on particular methods. On the other hand, general classification helps to see, whether one's research rather fits into one or the other field, and to decide which frame fits best to a chosen question. Using a mix of method tools, differentiation and premises must be clear. This means consideration of both limits. Decision to favor one or the other refers to the logical chain of evidence in the social sciences. When using the concept of 'social sciences', no limitation or artificial border is assumed. Basically all scientists deal to a certain degree with society of social facts. Without opening a broad debate here, I believe that scientific borders are artificial and mostly used to cover other interests. In particular when speaking about schools of methods, this work assumes to be interesting and considerable to scientists of all kind. On the other side must be recognized that methodological struggles with reference to superiority of one over the other school or one over the other particular method, tool or technique is much more pronounced in social science than in nature science. Nevertheless, researchers, which deeply deal with statistics (like mathematicians or physicists) are often more aware of the carried bias when analysing social facts or factors than social scientists of all kind (like quantitative sociologists or social psychologists), which try to backup certain interpretations of social reality by 'hard facts'. Even qualitative researchers are not free of the belief

that the use of mathematical formula would make their argumentation more convincing. Good example for this is the standard book on qualitative research by King et al (1994), to which is also referred at other points. “We use some mathematical notation because it is especially helpful in clarifying concepts in qualitative methods; however, we assume no prior knowledge of mathematics and statistics, and most of the notations can be skipped without loss of continuity.” (1994: ix) If it can be skipped, why is it used though, in particular as Bartels answers directly to the King publication, that it “seems unlikely to have significant practical consequences.” (2004: 70) Math is without any doubt a fascinating science, since numbers can clarify and image complex situations by simplification. Nevertheless, the contradiction emerges between certainty of propositions and degree of saying something about reality. “[A]s far as our propositions are certain” Einstein states “they do not say anything about reality, and as far as they say anything about reality, they are not certain” (quoted by Schumpeter 1991: 298-99). Conclusions from certain propositions are often provided with base on evidence which is consistent with those conclusions, but the frame in which evidence was gathered didn’t allow other interpretations. As Lieberson states, many controversies such as deductive vs. inductive processing, frictions between macro- and micro-approaches, or qualitative vs. quantitative distinction “are essentially conflicts between interest groups, each pushing to advance its own distinctive concerns and seeking symbolic recognition.” (1991: 2) Obviously, this is not of any help for the evidence problem. Distinction between results with and without evidence with regards to quantitative and qualitative framing is anyway arbitrary in some ways. When different methods are applied to the same research topic, most likely contrary results will be revealed. This doesn’t say in itself anything about the quality of the results and even less about the quality of qualitative versus quantitative research in general. These contrarities reflect different views on reality, create different bases for scientific interpretation, and consequentially stand for different evidence. This is starting point for this outline. Instead of “method bashing” (Ibid: 3), the present paper aims to give a guideline for general method decision making of which kind of method to apply for which kind of research question. The question is how much evidence do we have when looking at the results in consideration of chosen method and research question? Which bias was taken by the chosen method? Hereby is assumed, that there is no perfect method and no absolute values, no absolute truth, only different ways to discover secrets. “Weiß man etwa mehr über den 'Wucher'“ asks Marx „wenn man sagt, er widerspreche der 'justice éternelle' und der 'équité éternelle' und der 'mutualité éternelle' und andren 'vérités éternelles', als die Kirchenväter wußten, wenn sie sagten, er widerspreche der 'grâce éternelle', der 'foi éternelle', der 'volonté éternelle de dieu'?“ [Do you know something new about price gouging when saying it contradicts

with the 'eternal justice' and the 'eternal inexpensiveness' and the 'eternal mutuality' and other 'eternal verities' when the Church Fathers knew when they said, it would contradict the 'eternal grace', the 'eternal creed', the 'eternal will of God?'] (Marx/Engels 1968: 99, note 38) Indeed, we would not know anything new about price gouging either, when saying there is just one method to reveal it. Gouging – to stay with the example – might appear in very different shapes when looking at it from statistical measurement or analyzing unstructured interviews. With reference to a certain question, decision then is to look at the limits of the frames and try to sort different methods into these frames in order to traceably decide which particular method fits best with smallest bias to answer your question. Logic reasoning should lead the selection process to a point where method decision can be argued and biases can be admitted as options have been pondered.

As King points out, brilliant insight is not a method in itself, but can come from hypotheses that are evaluated empirically (et al. 1994: 16). Basic advantages and disadvantages of qualitative and quantitative approaches and assumptions in general are outlined in the following to give hints, which 'brilliance' can be discovered by either one or the other approach. In the following, structuring requirements for good research will be discussed in terms of data generation with respect to scientific rigor and qualitative flexibility on the one hand and polysemy, nomothetic image of humanity and traceability/reproducibility of qualitative researches on the other hand. When bespeaking scientific rigor, logic and logic reasoning is meant. Polysemy refers to the interpretation of gathered data, finally to certainty of propositions and their evidence. The nomothetic image of humanity is the belief in the possibility to image hyper complex social reality by numbers. Consequentially, application of statistical proceeding in social sciences bases on this assumption, which is why nature science methods and theories are easily adopted by social scientific methods, but not vice versa. Under these conditions will be looked at both the qualitative method school and the quantitative method school. The 'school' concept must not be understood as monolithic block porousness, but (here) as ideal typed directions with many particular methods in between. This must not be understood as if so called 'mixed methods' be the best methods, but in terms of clearness in strengths and weaknesses by looking at these ideal types. Mixed methods should critically be analyzed and scored in regards to their parts. Using some mathematical procedures (such as Kendall W coefficient for Delphi technique or factor rotation in Q Methodology for instance) does not provide more evidence or better understanding of reality as such, but a certain mixture may enrich significance of particular research questions.

The debate here is about the methodological location of social sciences in the field of all sciences (nature and social). Starting point is given by German sociologist Max Weber, "who distinguished

between *Verstehen* (understanding) and *Erklärung* (explaining). Building upon Max Weber's work, Martin Hollis and Steve Smith (...) have sought to clarify the difference between these two terms as follows: *Erklärung* (...) involves constructing formal theories in order to generate and test hypotheses designed to identify casual factors. It aspires to a 'scientific' methodology comparable to that of natural sciences (...). (...) *Verstehen* (...) on the other hand is based on the belief that a scientific methodology modeled on that of the natural science is inappropriate for study of human society." (Crotty 2003: 16/17) Simple decision between "nomothetischer versus ideographischer Methode, Kausal- versus Sinnanalyse oder Gesetzes- versus hermeneutischer Orientierung"[nomothetic versus ideographic method, causal versus meaning analysis or law versus hermeneutic orientation] is not possible as "Soziologie ist eine historisch-empirische Wirklichkeitswissenschaft, die systematisch zwischen Geistes- und Naturwissenschaften angesiedelt ist(...)" [sociology is a historic-empirical science of reality which belongs systematically to the interface between the humanities and science] (Müller 2007: 108). Sociology is consequentially tantamount to *erklärendem Verstehen* [explaining Understanding] or *verstehendem Erklären* [understanding Explaining].

With reference to Kruse can be said, that the distinction between the two 'schools of methods' is the distinction between 'explain' (quantitative) and '*verstehen*' (qualitative):

Qualitative Research	Quantitative Research
Reconstruction of subjective interpretative patterns	Targets 'objective' definitions
Retaining own pre-understanding as long as possible	Testing of pre-formulated hypotheses
Interpretative <i>Verstehen</i> and subjective viewpoints	Measuring rate and connection
Principle of openness	Principle of standardization
Open questions, answers are texts	Standardized closed questions, answers are surveys
Small sample	Big sample

Kruse 2011: 17

Kruse's distinction is useful even if it is rather a consideration process than a clear line. Basically, in accordance to quoted Albert Einstein (cf. p. 5), the set of problems is classified in the following as accessibility (to the field), traceability, reproducibility (of the collected data) and flexibility (by collecting data and interpreting during the field research). In accordance to these three notions, critiques and advantages of quantitative and qualitative methods will be compared.

Qualitative

As can be seen from the above table, qualitative approaches differ in considerable aspect from quantitative. In contrast to approaches of licit accounting (quantitative), ‘ideographic’¹ approaches have been raised in history science. Ideography bases on the old-Greek words ἰδέα [idea], which is ‘idea’, and γράφωετη [graphein], which is ‘to write’, and means more understanding. Seeking to ‘writing’ down an ‘idea’ as key concept led early to methodological notions of ‘participant observation’ and ‘field research’ in order to operationalize the claim. Researching a social field by participant observation can be called the origin of modern qualitative methods. As the inventor of qualitative Grounded Theory method describe it: “the ‘Chicago tradition’ (from the 1920s to the 1950s) I associated with down-to-earth qualitative research” (Glaser/Strauss 1967: vii). Such methods refer back to the beginnings of ancient ‘human ecology’² as developed by ‘Chicago School’ in the 1920s. It was further developed in the early 20th century by Lindemann (1924) and Malinowski (1961). At this time participant observation was defined as a method of social science to acquire social interactions of groups. Malinowski’s approach to bring social science >off the verandah< was to experiencing the everyday life of the subjects along with them. It was his objective ”to grasp the native's point of view, his relation to life, to realize his vision of his world.” (Malinowski 1961: 25) And further, he argued that the observed subjects “know their own motives, know the purpose of individual actions and the rules which apply to them, but how, out of these, the whole collective institution shapes, this is beyond their mental range. Not even the most intelligent native has any clear idea of (...) organized social construction, still less of its sociological function and implications. (...) The Ethnographer has to construct the picture of the big institution, very much as the physicist constructs his theory from the experimental data, which always have been within reach of everybody, but needed a consistent interpretation.” (Ibid, 83-84) Second important representative for the upcoming has been Robert Ezra Park. His mentioned human ecology based methodologically on the geography of men, the research on spatial division of social phenomena, on the interplay and tension between human beings and object, between spirit and nature and finally on the theory of economic competition (Groß 2001: 139). Being a participant (researcher) is defined as being a passive attendee. Aim is to perceive scenes with regard to the problem systematically. So, with regard to this, problem hypothesizing can be avoided. Flexibility is both strength and weakness of qualitative approaches. It offers openness and mental smoothness concerning the chosen object.

¹ Idiographic is based on what Kant described as a tendency to specify, and is expressed in the humanities. It describes the effort to understand the meaning of contingent, accidental, and often subjective phenomena.

² Not to be mixed with the re-defined today’s usage of this term (Abercrombie et al. 1994: 440) such as by Catton and Dunlap(cf. Groß 2001: 93).

Declared objective is to find a concluding structure as well as an exact thematic scope during the research and – in contrast to quantitative methods – not in advance as premise (Hoffmann-Riem 1980: 343). As Berg-Schlosser adds, majority of researchers don't boast "intensive Kenntnis einer größeren Zahl von Fällen einschließlich der jeweiligen oft nur in den Landessprachen zugänglichen historischen, statistischen usw. Quellen (...). Am ehesten ist dies noch auf dem Gebiet der Regional- und ‚area‘-Studien gewährleistet, wobei die meisten dieser Art allerdings eher breit deskriptiv und additiv geblieben sind und relativ wenig im Hinblick auf eine systematischere politikwissenschaftliche Theoriebildung beigetragen haben" [intensive knowledge of a bigger number of cases inclusively referring historical and statistical sources, accessible only in the particular language. This is rather insured in the field of regional and area studies. These however are rather descriptive and additive and could not contribute relatively low to with reference to a more systematic political scientific theory construction] (1997: 68). Following, pre-phase, hypothesis and questionnaires respectively are set up (Girtler 2001: 55). The setup of an initial hypothesis is not just falsified but rather modified and expanded (Glaser et al. 1973: 10). Consequentially, hypotheses is not tested but adapted. As principle approach, qualitative research does not declare an end to modifying the 'object'. The lack of a concrete and clear question leads to the impossibility to collect related data although this would be appropriate to answer the given questions. Instead of given questions, a straightforward field to endless questions opens up in researches. Thus, categorical selections or limitations of gathering data is required to not getting lost in arbitrarily collected data.

Another aspect is polysemy and ambiguity in qualitative research as part of its inherent structure. So, the problem of polysemy is a wanted one, since social acting is not seen as a unique phenomenon but as ambiguous. The 'explorative' and open access to human reality refuses a nomothetic image of humanity. This understanding excuses qualitative methodology from necessity to particularly deal with the polysemy bias. Qualitative approaches rather struggle to sketch traceable observations. Reaching qualitative traceability requires critical verification of observed acts by qualitative scientific rigor. (Grümer 1974: 26) Position of the observer when observing has to be reflected and reported. Recorded data have to be analyzed under certain condition. Qualitative researchers must guarantee a maximum of traceability through high level envisioning of observer's own position. This problem is already recognized but can never be totally avoided. The debate even between qualitative researchers leads to skepticism with regards to scientific rigor in selecting when intensively penetrating the researched field (Grümer 1974: 64, 115), which is called as 'going native', 'over-identification' or 'overrapport' (Miller 1952: 97 et seq.). These terms mean, that the

researcher is about to lose concentration on his original research focus. Too much identification bears danger of reporting unduly with the field with result of reporting from the viewpoint of the researched persons, not from a more distant viewpoint. Gerdes adds to this point, that the methodological rule to keep distance “in meinem Kategorienystem zu bleiben, to go weiterhin civilized, dient also dazu, die Wahrnehmung der Welt des anderen – so wie sie in sich selbst ist – zu verhindern.” [and to remain within your own category system, consequentially to go furthermore civilized, comes in useful for preventing perception of the other’s world as it is in itself.] (Gerdes 1979: 138) Even though some, mainly ethnographic researcher, refuse the importance of this weakness in their conclusion (Girtler 2001: 80 et seq.), the flexibility bias in clear qualitative approaches is problematic. Even structuring approaches such as Grounded Theory (Glaser/Strauss 1973) cannot deny the danger for appliance of qualitative logic at particular research questions. With reference to the initial Einstein quotation can be said, that the difficulty for qualitative approaches appears in the shape of the uncertainty of propositions. Qualitative results can say a lot about reality, the question is, what? Validity of the results therefore must result from traceability and self-evidence of the researcher’s arguments [chain of logic] (cf. Miles/Huberman 1994).

In addition to the problem of traceability, the non-reproducibility is a strong bias of qualitative approaches in general. When saying non-reproducibility, it is rather spoken of impossibility to reproduce a research in a comparable manner. Therefore, any bias cannot be clarified and isolated, but is inherently inclusive in all qualitative research. Even though qualitative methods attempt further structuring to produce traceability, the problem of too many subjective decisions cannot be properly considered methodologically. It is possible and eligible to re-research the field but the results won’t reveal significant evidence about the character of the data. Again, the polysemy of ambiguous data appear from the beginning to its end: The selection of the case, the character of the researcher (personality, preparation, ability to adopt unknown situations and to socialize, observation capacity, approachability and being approachable) and the situation in the field (mood, external events, acceptance, self-interest), selection of chosen method and ‘relevant’ persons, conduct of data collection, analysis and finally interpretation of data. By nature, qualitative methodology is not able to resolve this bias problem.

Quantitative

Generally, quantitative approaches observe a field³ or research a problem in its stagnation, not in its

³ Both ‚field‘ and ‚observation‘ must be seen and understood in terms of ‚problem‘ or ‚area‘ and ‚analysis‘. Hereby, the process of direct data collection such as mass interviewing to a certain topic is meant.

movement. Critiques on or rather ‘some unfulfilled promises of quantitative imperialism’ (Bartels 2004: 69-74) appear in different ways. Named distinction from introduction is considered in the following thoughts.

In time of global access to data, the challenge of a researcher is not access to information in general, but selection of the ‘relevant’ or ‘important’ variables. The best mathematical procedure (factor correlation, regression or else) cannot replace proper selection of data in advance. The data aspect here applies in two different ways. On the one hand, the question what kind of data (GDP, GNP, size, age, structured interviews etc.) is collected with reference to the research question. On the other hand must be answered, how to analyze the survey. Math cannot reveal what hasn’t been framed in advance. Best statistical procedures will not produce more evidence due to the fact that data are measured and analyzed quantitatively.

Furthermore, all, what has been said about possible interpretation bias and polysemy applies to a certain degree also to quantitative data, which will be discussed in more detail later on. Here, the structure of analysis and data generation is more formalized, but nevertheless bases on assumptions of logic reasoning. The easier the collection of data, the more data you gather, but the more difficult is the interpretation. The less data you have, the easier is interpretation, but the more difficult is, what quantitative approach seeks the most: generalizability. ‘World System Analyses’ (WSA) calls for implementation of all possible variables in a total system in order to offer solutions. As Berg-Schlosser, representative of the quantitative school, states, WSA bases on hypothetically endless numbers of variables. Impossibility to include all possibly relevant variables leads not only to necessity of selection, but also to a limiting frame, in which sense of the data can be made and interpretations been drawn. The polysemy of WSA exemplifies consequentially the same basic problem for validity in comparative methodology (Berg-Schlosser 1997: 56), which is – like in qualitative studies – both essential part and weakness of the quantitative concept. The created limiting frame by variable selection processing is often underestimated. Major bias appears at this point. All significant and statistical evidence bases to a different extent on data which have been gathered after the selection processing. Representativeness of results therefore can just be assumed within this limited frame. Herein, considering logic reasoning as principle of scientific rigor, a stronger need of explanation is engaged, since there is no naturally given limit of data you can collect. A comprehensible and logically reasonable selection of existing variables – instead of ‘senseless collecting of numbers’ (Girtler 2001: 28/29) – would be required: Evaluation of the variables must be traceable or objectively preclusive. The more selection of variables, if not based on a deductive explanation, the less the informational value of quantitative results in general. In

opposite to qualitative results, in regards to quantitative research must be spoken of two distinguishable results: One result are the data as result from correlations, regressions or other ways of measurement. If mathematical procedures are complied, the mathematical results are generally always good. The same cannot be said about the results in terms of scientific evidence. This means proper interpretation of the mathematical results. The quality of mathematical results does not lead by default to good quality of sociological evidence. Herein, the limiting process to determine the relevant variables is as much important as logic reasoning by interpretation of data. The quality of the limiting process in terms of traceability determines – finally – the reach of interpretable results. At least, even the interpretation of data varies, depending on the interpreter's viewpoint. Finally, one can conclude that three biases can appear by conducting quantitative research: Variable's selection, significance, and data interpretation. The former is similar to the possible bias in qualitative data measurement; the latter – by nature – is of different type as will be outlined in the following.

Variable's selection bias plays a different role for quantitative evidence, since from these data the conclusion must derive. Often underestimated, the necessary argumentation to choose one variable as dependent and another as independent, to ask one question and not another (interview technique), focus on one topic and neglecting another is of highest importance for the whole research. This aspect is denoted as nomothetic approach or understanding. Nomothetic⁴ means countability of social facts by scientific research. Inasmuch a nomothetic approach can help to understand social reality beyond reproducible and retraceable data is controversial⁵. Max Weber advances a view, assuming objective treatment of cultural procedures is senseless as the reduction of empiricism to 'laws' is both non-practicable and non-achievable. Non-practicability of objectivity comes from the 'ideas of value', which don't base on however natured 'laws', but on sense and relation of individual reality. Non-achievability of the named objective treatment arises from impossibility to sort out initially denominated problems. (Weber 1973: 222)

Even though some qualitative social scientists refer to ideographic understanding of science (see

⁴ *Nomothetic* is based on what Kant described as a tendency to generalize, and is expressed in nature sciences. It describes the effort to derive laws that explain objective phenomena.

⁵ Girtler made his objection to the fact that such procedure bases on metaphysics in the understanding of human being (2001: 36). Historical roots originated in the period of Enlightenment, when Modern Science emerged. Nature scientists developed in the post-Descartes era approaches for social-science to explain human doing and being a better way (cf. La Mettrie 1748). The approach has been called 'social physic' as a discipline analyzing social acting. The 'social' isn't reduced to an adjective by accident, but as expression of principle assumption: Human acting is seen as a physical model in which human procedures are predictably. The beginnings of 'New Science' in the 16th century refer back to Francis Bacon (1561 – 1626), the preparer, precursor and propagator of 'New Science' (Groh 1991: 40). Bacon stressed, that "das mathematisch formulierte Naturgesetz (...) objektive Geltung für Vorgänge in der äußeren Natur [habe]" [the mathematically formulated laws of nature have objective validity for processes in the outer nature] (Ibid: 27). In his 'Instauratio Magna' (1620), which contained two parts, the completed 'Novum Organum' on the one hand and the uncompleted 'Nova Atlantis' on the other, he claimed the major renewal of science. In the center of his efforts laid a co-working of natural science and technology. The reach of Enlightenment's modernization and technological optimism resulted in mechanic ideas of human beings construction, which has been adopted by social science to be more 'scientific'. This debate is profoundly illustrated by the sociologism - naturalism debate at the beginning of the 20th century (Grundmann 1997).

above) and see nomothetic approaches as ‘forcing human action into regularities’ (Girtler 2001: 37), quantitative social science undeniably has produced meaningful results (i.e. Todd 2003). Staying with the given example of Todd’s examination of US superpower by looking at growing women’s education and GNP in border and developing countries with reference to military conflict, the author concludes (in short), that USA has already crossed the zenith where it could be called superpower, as it opposes some weak third world countries such as Iraq to show military superiority to the world. To be a superpower they must oppose China and Russia which it isn’t capable to perform. Theoretically and from interpretation side convincing, methodologically looking at the nomothetic approach, the question remains, why to choose women’s education and GNP as something in particular meaningful for the conclusion. The reason cannot be – from methodological viewpoint – that the result is convincing, but must derive from the theoretical frame. The example is not a critique on Todd’s outstanding work, but only as illustration of the nomothetic bias in general. Significance can statistically (mathematically) be measured to reveal weakly executed data analysis. Here, appliance of the P-value⁶ gives strong evidence about the result’s quality. At this stage, quantitative research shows its undeniable strength with which qualitative studies aren’t capable to compete. If variable’s selection bias is avoided and the P-value demonstrates significant results, the data for conclusion are highly reliable for the last step of interpretation. As can be seen in the paragraphs, the possible biases regarding significance appears clearly in the shape of the P-value which all statistical programs reveal as part of their results or by indirect effects of the many ‘ifs’. The ‘ifs’ bias assumed to be non-existent by the P-value, but must be considered in the interpretation.

Data interpretation bias in the school of quantitative methods is highly connected with this issue: The claim of quantitative objectivity bases exactly on the assumption of nonbiased ‘ifs’, which is methodologically insufficient. This claim is then often enlarged also to the interpretation of data, which is even more methodologically insufficient. Interpretation bases on logical coherence from data’s extraction, analysis to interpretation. Behind often made statements of ‘clear’ results, a certain discourse (in Foucault’s understanding) is concealed. Even obvious numerous data with highest statistical significance (P-value) do not provide by itself a stronger standing of the resulting arguments as such. Even more, resulting data can just provide evidence within the given framework

⁶ P stands for the chance to obtain a statistical result at least as extreme as the one that was actually observed, assuming that the null hypothesis is true. The null hypothesis then is often rejected when the p-value is less than the significance level α . This often being the case when $p \leq 0.05$ (also written as $p \leq .05$). When a null hypothesis can be rejected, the result is assumed to be statistically significant. Rosner lists the common classification for statistical significance as follows: “If $.01 \leq p < .05$, then the results are significant. If $.001 \leq p < .01$, then the results are highly significant. If $p < .001$, then the results are very highly significant. If $p > .05$, then the results are considered not statistically significant (sometimes denoted by NS). However, if $.05 \leq p < .10$, then a trend toward statistical significance is sometimes noted.” (2010: 212)

of selected variables and accepted biases by the chosen selection.

Conclusion

Main strengths and weaknesses of both generalized schools of methodology require continuous research and work. In this paper could just have been given short conclusions.

Generally can be said, that all methods are capable to give meaning (understanding and/or explaining) to social reality, but limited by the extent of particular method's explaining capacity. Consequentially, decision in favor of quantitative, qualitative or a mix of both depends on the answers to the question(s) of the research. As could be outlined, even if decided, there may be parts missing in the picture which should be considered when collecting, analyzing, and interpreting data or giving forecasts.

Qualitative school of methods deals with three biases: polysemy/ambiguity, categorical selections, and traceability/non-reproducibility. The former can make a strong point with regards to the problem of the quantitative school of methods, but often, researchers fail to answer main and important questions: What defines their work as being 'relevant'? This is different to the general requirement of practical and scientific relevance in all kinds of research. For qualitative research, group selection should be determined by relevance, not by structural circumstances (Glaser/Strauss 1967: 58). Assuming the random qualitative research project is both scientifically and practically relevant, what is the reason to do a field study in a certain area, to talk to the selected population and people? Secondly, what method is applied? Why using a qualitative method such as narrative interviews, participant observation or ero-epic conversations (Girtler 2001: 147)? Why not applying a quantitative method frame? Finally, why not using any other qualitative method than the chosen to research the chosen topic? What qualifies the research to be more than a journalistic investigation or something, the researcher believes, is worth to be told?

For first decision between qualitative and quantitative framework, the argument must come from the logical chain of arguments, not from the skills, the researcher has. This means, that if a random research question requires a certain approach, failure of training cannot be the methodological argument to not applying it. Let's say, a random social scientific researcher wants to research climate change impacts of fishermen in a particular village on the Maldives. Assuming, she has decided to use internationally available climate data, she should give methodological reasons, why she didn't want to do a field study and doing interviews (or any other qualitative method). On the contrary, if another random researcher wants to forecast climate change impacts in South America, he must argue, on which reasons he based his decision to apply – let's say – participant observation,

when regression analysis would also be and the more obvious solution.

In the realm of social science one can point out that qualitative approaches are closer to a specific social reality, but have a greater distance to more generalized evidence. Necessary inductive approaches are more difficult to be realized considering the aspect of scientific rigor and validity. As Filstead argues, objects can be recognized and analyzed from an outside look “während geistige und soziale Prozesse nur von innen erkannt werden können” [whilst mental and social processes can be recognized just from inside] (Filstead 1979: 33). Herein, the strength of qualitative school of methods must be seen in recognition of the initial Einstein quotation (see above).

Quantitative methods or quantitative contribution to mixed methods afford validity problems in terms of Variable’s selection, significance (data analysis), and data interpretation. As could be shown, the bias character appears both more concrete and more specific in the quantitative school of methods than in the qualitative one. Formalized bias tracking is reduced to the second step of data analysis, whilst variable’s selection and data interpretation can suffer from the same weakness as qualitative research results can do. Also, what can be said about the random social fact in question is less detailed and less close to reality as qualitative field studies do. Strengths spring from traceability, reproducibility and – first of all – comparability of data due to simplification of social facts to numbers.

Finally one can state that despite of their limits, quantitative or qualitative methods are able to explain (Erklären) and understand (*Verstehen*) specific areas of social reality. The central set of problems lies in a coherent derivation of an inductive generalization on a superior level (in case of a qualitative approach), or, in a deductive concretion (from the general to the particular in case of a quantitative approach). All specific mixed methods, meaning methods that are a combination of both quantitative and qualitative approaches, should be reckoned under the conditions (strengths and weaknesses) of the ‘two’ schools of method.

As conclusion to all qualitative and quantitative methods, all mix methods inclusively, can be stated, that the frame of logical coherence (good reasoning and a logical chain of arguments) are proposed for both decision and particular application of one or the other method, and how. In opposite to Lieberson (1992), who claimed a more of quantitative evidence in sociology, King (et al. 1994), who tried to develop an identical logic for qualitative and quantitative research, Brady (et al. 2004), whose critique on King retreated to the Durkheim ‘sociologism’ paradigm, and Girtler (2001) who claimed ignoring of quantitative approaches to understand social reality, I generally ask for good reasoning and recognition of good sense in methodological application of social sciences. Many works still suffer methodologically from this gap.

My proposition refers to application Descartes four methodological rules, which he developed with base on insufficiency of the three sciences of geometry, algebra, and logic. „By these considerations” he states “I was induced to seek some other method which would comprise the advantages of the three and be exempt from their defects.“ (1946: 15) His examination in ‘Discourse on methods’ of 1637 (later on just used as ‘discourse’) still reveals the crucial points for contemporary method examination. Adopted by King (without noting) and transformed into five rules (et al 1994: 99-112) for some reasons that will be mentioned at the end, Descartes’ thoughts in the ‘discourse’ remain as relevant today as they have been in the past. Good sense and reasoning is defined by him as „the power of judging aright and of distinguishing truth from error, which is properly what is called good sense or reason, is by nature qual in all men; and that the diversity of our opinions, consequentially, does not arise from some being endowed with a larger share of reason than others, but solely from this, that we conduct our thoughts along different ways, and do not fix our attention on the same objects.“ (1946: 3) As Descartes himself stresses, the following ‘rules’ shall be accepted stimulus and guideline, not as rule that is to be uncritically adopted. The four ‘rules’ are to be applied not once, but again and again during the research at all stages. They are consequentially not a hierarchical list, but a flexible and considerable frame, which can help to better the methodological argumentation and lead to better argued research results and better research in general. Simplified characteristics of the four ‘rules’ are: (1) doubt, (2) division into parts, (3) simplicity, and (4) non-omission.

The first rule was to never accept anything for true, which I did not clearly know to be such, in order to exclude all ground of doubt. (1946: 15) At the beginning of all research usually stands a doubt in the shape of question, a contradiction or an unresolved problem which is non-sufficiently discussed (scientific relevance) and of social importance (practical relevance). For methodological reasoning, Descartes’ first rule leads with reference to his preface⁷ to the well-known adoption of Plato's Apology of Socrates as *scio me nihil scire*⁸. The second rule is “to divide each of the difficulties under examination into as many parts as possible, and as might be necessary for its adequate solution.“ (Ibid) The third rule was to structure the items related to the research interest and to commence with the simplest and easiest objects to the more complex (Ibid: 15-16). The fourth rule was to make in every case enumerations so complete, and reviews so general, to assure

7 „But as soon as I had finished the entire course of study, at the close of which it is customary to be admitted into the order of the learned, I completely changed my opinion. (...) I found myself involved in so many doubts and errors, that I was convinced I had advanced no farther in all my attempts at learning, than the discovery at every turn of my own ignorance.“ (1946: 5)

8 „For neither of us is likely to know anything noble and good, but he does not know, while I, just as I do not know, do not suppose I do. I am likely to be wiser than he in just this little something: that is what I do not know, I do not suppose I know.“ (Plato: Apology of Socrates 21d; in: West 1979)

(or to make it most likely) nothing was omitted.“ (Ibid: 16)

The first rule is what King calls ‘Construct Falsifiable Theories’ (et al 1994: 100-104). Clearness about the ‘doubt’ considering both good reasoning and sense means falsifiability of the research theory in terms of good theory. Good theory must not ignore evidence (Liebersson 1992: 4), but theory which does not require evidence to true is a paradox and consequentially an oxymoron. ‘Division into parts’ in the ‘discourse’ is called ‘Build Theories That Are Internally Consistent’ by King (et al 1994: 105-106). Internal consistency means dividing into solvable parts. This, at the end, is nothing more than checking different distinguished parts with regards to their linkages. Therefore, one can see the second rule of King as more specifically applied good reasoning and sense to Descartes’ second rule. ‘Select Dependent Variables Carefully’ of King – rule three – (Ibid: 107-108) is thinking in order from the simple to the more complex to understand the linkages, which is similar to Descartes’ rule of simplicity. ‘Non-omission’ as last rule of Descartes is another view on the same aspect as ‘Maximize Concreteness’ as rule four of King (Ibid: 109-112). King’s fifth rule as addition to Descartes’ four rules is only expression of already said in new language. What he calls ‘State Theories in as Encompassing Ways as Feasible’ (Ibid: 113-114) is the self-evident request. Descartes’ first rule already demands to doubt and never accept anything, which is not absolutely clear that nothing is left in doubt, to which King’s fifth rule cannot really contribute any further. As the authors confess, “there is some tension between this fifth rule and our earlier injunction to be concrete.” (Ibid: 113) In consequence, the fifth rule seems to be already an interpretation and operationalization of the four rules of good reasoning and sense which I want to recommend for putting into consideration last but not least.

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