Recomendações sobre o método do estudo de caso para pesquisadores iniciantes

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Resumo: A pesquisa qualitativa está crescendo em importância e difusão, especialmente os estudos de caso. Porém, uma preocupação importante sobre esse tipo de estratégia de pesquisa tem sido discutida na literatura: a falta de rigor. Visando contribuir para pesquisadores iniciantes e baseado em uma extensa revisão da literatura apoiada por periódicos e pesquisadores reconhecidos, este artigo aborda questões-chave na condução de um estudo de caso de qualidade. Os pesquisadores mais experientes precisam aconselhar os iniciantes sobre a importância do rigor na condução de pesquisas científicas. Espera-se que as questões abordadas neste estudo possam contribuir para a compreensão do leitor (principalmente o pesquisador iniciante) e fomentem nele a preocupação em colocá-las em prática, bem como profundar o conhecimento sobre este assunto.
Palavras-chave: Método de estudo de caso, Rigor da pesquisa, Pesquisa qualitativa

Recommendations on the case study method for beginner researchers

Abstract: Qualitative research is growing in importance and diffusion, especially case studies. However, an important concern on this type of research strategy has been discussed in literature: the lack of rigor. Aiming to contribute to beginner researchers and based on a comprehensive literature review supported by recognized journals and researchers, this article addresses key issues in conducting a quality case study. The more experienced researchers need to advise the beginners on the importance of rigor in conducting scientific research. It is hoped that the issues addressed in this study can contribute to the understanding of the reader (especially the beginner researcher) and foster in him/her the concern to put them into practice, as well as deepen the knowledge on this subject.
Key-words: Case study method, Research rigor, Qualitative research

1. Introduction

As the case study method has “no particular disciplinary orientation”, its scope of application is broad: social science, applied science, business, fine arts and humanities, among others (VANWYNSBERGHE & KHAN, 2007, p. 81). Its importance is recognized in different areas (EISENHARDT & GRAEBNER, 2007; BARRATT *et al.*, 2011; THOMAS, 2011; TSANG, 2014).

Csillag *et al.* (2012) highlight the growth of this method in some of the leading international journals linked to Industrial Engineering, such as the Journal of Operations Management (JOM) and the International Journal of Operations and Production Management. Paiva and Brito (2013, p. 62) seem to share the same opinion: “recently, a movement has been identified by leading American academic journals to publish research using qualitative methodologies including case studies”.

The growing number of case studies published in high impact journals should be celebrated by qualitative researchers and is a source of motivation for beginner researchers. However, an important concern has been discussed in literature: the case study rigor. For Csillag *et al.* (2012), it is undeniable the importance of qualitative research, especially the case studies; but researchers who adopt this method need to invest in more rigorous methodological

procedures. The editor of the renowned JOM, Professor Tom Choi, notes that "there is still little rigor in applying the case study method" (see CSILLAG *et al.*, 2012, p. 381). Barratt *et al.* (2011) have observed in many papers adopting this method that insufficient information is provided on research design, data collection and analysis.

Several other researchers discuss the concern about the quality of case-based study (see, for example: MEREDITH & SAMSON, 2002; DUBOIS & ARAUJO, 2007; SEURING, 2008; PIEKKARI *et al.*, 2010). It is important to recognize, however, that this concern is not restricted to the external context or the most influential journals. For example, the results of the study by Cesar *et al.* (2010, p. 42) revealed that "the case study method has been used without methodological rigor, especially in Brazil". Lima *et al.* (2012, p. 127) state that the quality of the case study method "has been discussed because of the lack of methodological rigor and research design, which reduces the advantages of this strategy and the validity of the study".

Care with research rigor must follow the researcher from the beginning of his/her career. Aiming to contribute to beginner researchers, this article addresses key issues in conducting a quality case study. A literature review on qualitative research and the case study method is presented in the next section. Section 3 addresses the method. The key issues related to conduct a case study are discussed in Section 4. Next, some final considerations are presented, followed by references.

2. Qualitative research and the case study method

Ketokivi and Choi (2014, p. 233) affirm that it is common for qualitative research to be defined by negation, that is, as what quantitative research is not: "whatever is not quantitative is qualitative". Another undue way to differentiate these researches is to assert that the quantitative deals with numbers, whereas the qualitative deals with speeches and texts. Given that it is possible for a qualitative study to use quantification, it is not the nature of the data that determines whether a study is qualitative or quantitative, but its "theoretical orientation" (KETOKIVI & CHOI, 2014, p. 233): while quantitative research "examines concepts in terms of amount, intensity or frequency", the qualitative "examines concepts in terms of their meaning and interpretation in specific contexts of inquiry".

Qualitative research is particularly suitable for understanding the "open systems" existing in the social sciences: systems that are influenced by their context and are not easily reproduced in a controlled environment, such as a laboratory (DUBOIS & ARAUJO, 2007).

The case study is one of the qualitative approaches available. This method has its roots in the field of social sciences (VOSS *et al.*, 2002) and over the last decades has received many definitions (VanWYNSBERGHE & KHAN, 2007), among which the following: "a case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (YIN, 2009, p. 18).

The case can be a person, a classroom, an institution, a program, a policy, a system, a process (SIMONS, 2009). In studying a case it is necessary to consider the "temporal and contextual aspects" because they are necessary "to understand the how and why elements of the phenomenon" under investigation (MEREDITH, 1998, p. 443). A striking feature of the method is its flexibility to combine different sources (McCUTCHEON & MEREDITH, 1993; VanWYNSBERGHE & KHAN, 2007) and types of data (EISENHARDT, 1989; DUBOIS & GIBBERT, 2010) and even use other methods within the same study (SIMONS, 2009; THOMAS, 2011).

Case studies can be classified in different ways (see THOMAS, 2011), depending on their characteristics: if the study considers one (single case) or more cases (multiple cases), if the case is analyzed in a specific period (cross-sectional) or over time (longitudinal) (for more details, see: YIN, 2009; HERMANOWICZ, 2013; TSANG, 2014). An additional classification takes into account the research objective: although the most common is to generate or test theory, there may be other objectives (SEURING, 2008; YIN, 2009; KETOKIVI & CHOI, 2014).

An important difference between quantitative and qualitative methods involves the concept of generalization, that is, "(...) the extent to which findings drawn from studying one group are applicable to other groups or settings (...)" (McCUTCHEON & MEREDITH, 1993, p. 246). There are two types of generalization. "For empirical generalization, a large, random sample often justifies generalizing from the sample to the population from which the sample was drawn" (TSANG, 2014, p. 372).

> A common type of empirical generalization is statistical generalization, which occurs when a researcher observes a characteristic of a sample of a population (say, that 25% from a sample of foreign firms in Tokyo hire local Japanese as their CEOs) and then infers that the population itself has that characteristic (say, that 25% of all foreign firms in Tokyo hire local Japanese as their CEOs, within a margin of error). (TSANG, 2014, p. 371)

This type of generalization is widely used in quantitative research. In qualitative studies, the "analytical generalization" (or "theoretical generalization", see TSANG, 2014) is used: "(...) a process separate from statistical generalization in that it refers to the generalization from empirical observations to theory, rather than a population (...)" (DUBOIS & GIBBERT, 2010, p. 132). In the example about foreign firms in Tokyo hiring local Japanese as their CEOs, the researcher could develop a theory to explain this phenomenon based on a set of variables; the theory would try to explain what happens in Tokyo or even in Japan (TSANG, 2014).

3. Method

Based primarily on Scopus and Web of Science scientific databases, a comprehensive literature review was performed. Although more recent articles were considered, the main focus was (due to the objective of this study) the most recognized and cited articles on the case study method, obtained from relevant academic journals. After selecting articles based on this criterion, a content analysis was then carried out aiming to identify, understand and organize the information. Some key issues related to the case study method were identified. After that, the information was coded (CORBIN & STRAUSS, 2015) according to these issues. The comparison of the information of a same code allowed to capture its meaning, generating interpretations. Other interpretations were obtained by comparing the codes. The Section 4 was divided into parts and each contained a set of these interpretations.

4. Important issues to conduct a case study research

This section brings some very important questions that a qualitative researcher should consider when conducting a case study.

4.1 About the researcher (or team)

"(...) Case-based research is not for everyone" (STUART *et al.*, 2002, pp. 427-428). This method requires researchers to have some skills that include knowing how to interview people, analyzing qualitative data *etc.* (MASON, 2002; STUART *et al.*, 2002). Before starting

the study, the researchers should carry out a self-criticism and evaluate if they already have the necessary competences or if they should ask for help from other researchers.

The budget issue often imposes restrictions on the allocation of resources for the development of a study, but the literature recognizes the advantages of using more than one researcher at different research steps, such as collection (McCUTCHEON & MEREDITH, 1993), coding (WESTON *et al.*, 2001; CRESWELL, 2007) and data analysis (GIOIA *et al.*, 2012; BOEIJE & WILLIS, 2013; WILLIS & BOEIJE, 2013). This strategy is a form of data triangulation, a concept discussed later. Eisenhardt (1989) defends that multiple investigators enhance the creative potential of the study (because they represent different analysis perspectives and often have complementary insights) and the convergence of observations enhances confidence in the findings (while conflicting perceptions prevents premature closure). Of course, they must have a common understanding of various aspects of the study (the research problem, objectives and steps) and adopt standardized procedures.

4.2 The research database

A case study usually encompasses a large volume of data (EISENHARDT, 1989; McCUTCHEON & MEREDITH, 1993). Therefore, as soon as possible, it is recommended (STUART *et al.*, 2002; YIN, 2009; GIBBERT & RUIGROK, 2010) to use a database to store and organize all data. This will facilitate the access of the persons involved and, at the same time, preserve secrecy and confidentiality when necessary or required. A portable external hard drive is a good option. Risks should be avoided through the routine of backing up data with a regular frequency.

4.3 The theory and the research question

One of the study starting points is the selection (and understanding) of the theory that will underpin the research. "(...) All research is based on theory" (FLYNN *et al.*, 1990, p. 250); "there is always some relevant literature to refer to" (VOSS *et al.*, 2002, p. 216). In a study aimed at theory testing, the researcher selects the theory that will be tested or from which the hypotheses to be tested will be derived (JOHNSTON *et al.*, 1999; BITEKTINE, 2008; KETOKIVI & CHOI, 2014; TSANG, 2014). In a research aimed at theory generation, existing theories will provide, for example, the initial constructs and frameworks (WESTON *et al.*, 2001; DUBOIS & GIBBERT, 2010). When conducting a study, the researcher must expand their boundaries: other fields can provide relevant theories (STUART *et al.*, 2002).

Even at the beginning of the study, it is important to define the research question, although it may be revised later (as new information or insights arise); this flexibility is an advantage of the case study method. An initial question helps to establish a well-defined focus for research; without this focus, the researcher runs the risk of being overwhelmed by the volume of data (EISENHARDT, 1989). The research question can be derived from existing theories (JOHNSTON *et al.*, 1999; WESTON *et al.*, 2001), from literature (EISENHARDT & GRAEBNER, 2007) or from a conceptual framework (VOSS *et al.*, 2002), for example. In the beginning, it is also important to determine whether the problem under investigation will involve theory testing or generation (FLYNN *et al.*, 1990). If the intention is to publish the study, it is essential to assess the originality and potential contribution of the question and the research objective. For example: to be convincing and worthy of interest, a study that simply seeks "little more than the description of a particular phenomenon" should involve "*a talking pig*" (that is, an essential and remarkable phenomenon) (SIGGELKOW, 2007, p. 20).

4.4 Selection of cases

One of the most important methodological decisions is the selection of cases that will be part of the study (DUBOIS & ARAUJO, 2007). Imagine a researcher who wanted to analyze the problems surrounding the relationship between telecommunication companies (mobile telephony) operating in Brazil and their suppliers. The researcher would almost instantly know which companies could be studied if the objective was to look at this question from the point of view of telecommunication companies (there are few such companies in the country). But the same question examined from the suppliers' point of view would expand the possibilities for a universe of tens of thousands of organizations very different from each other and geographically dispersed; to avoid this obstacle, the researcher would have to adopt some criteria to select one or more suppliers.

The researcher should opt for a single case study or multiple cases. If the researcher decided to develop the study from the point of view of the telecommunication companies, the research would probably still be of great interest if a single case were studied, considering the importance and singularities of this type of company. Yin (2009, pp. 47-49) calls these special cases, which alone justify a research, as "critical", "unique", "representative" or "revelatory" cases. However, while it is possible to generate theory or test a hypothesis through a single case (FLYNN *et al.*, 1990; STUART *et al.*, 2002), in general the use of more than one case will strengthen the results and conclusions of the study (EISENHARDT, 1991; EISENHARDT & GRAEBNER, 2007; MILES *et al.*, 2014; TSANG, 2014). Furthermore, multiple cases favor the generalization of findings. In research that tests hypotheses (TSANG, 2014): "cases that contradict the hypotheses derived from the theory constitute a result of falsification, which helps to establish the boundary conditions of the theory" (p. 379); "(...) a multiple-case design is in a better position than a single-case design to show how far a disconfirming finding is a widespread phenomenon" (p. 376).

In research that generates theory, multiple cases allow the findings obtained in a case can be compared with other cases. This process involves replication and extension: "replication simply means that individual cases can be used for independent corroboration of specific propositions. (...) Extension refers to the use of multiple cases to develop more elaborate theory" (EISENHARDT, 1991, p. 620). Therefore, it is possible to identify more clearly what represents a pattern among cases, separating from what is simply an idiosyncrasy of any of the cases (EISENHARDT, 1991; EISENHARDT & GRAEBNER, 2007; TSANG, 2014). Of course, this separation becomes more difficult when analyzing a single case. "(...) Theory building from multiple cases typically yields more robust, generalizable, and testable theory than single-case research" (EISENHARDT & GRAEBNER, 2007, p. 27).

Considering that multiple case studies are generally more advantageous than single case studies, the question is how to choose cases in situations in which it is possible and desirable to study more than one case. It is imperative not to adopt a biased position, selecting cases because they support a particular theory or choosing a theory because it is supported by certain cases (BITEKTINE, 2008), for example. At the same time, cases cannot be randomly selected (as they would in statistical generalization); in analytical generalization (see Section 2) cases are chosen taking into account their theoretical relevance (DUBOIS & ARAUJO, 2007) and potential to contribute to the research objectives (STUART *et al.*, 2002). Therefore, some cases are selected because they predict similar results (favoring the generalization of findings) while others are selected because they predict contrasting results based on anticipatable (known) reasons (establishing the boundary conditions of findings) (YIN, 2009; TSANG, 2014).

The researcher concerned about the research quality should consider some types of cases. The "negative (deviant) cases" are those that do not fit the pattern (CORBIN & STRAUSS, 2015), in which some outcome predicted by theory does not occur (EMIGH, 1997). The "polar types" represent extreme examples, such as cases of success and failure (EISENHARDT & GRAEBNER, 2007). These cases allow contrasting the patterns in the data (EISENHARDT & GRAEBNER, 2007), enriching the findings and leading to alternative explanations (CORBIN & STRAUSS, 2015). Identifying these cases at the beginning favors the research efficiency, but it is possible that they are not identified in the initial steps. One recommendation: as the association with a negative image (failure, for example) is undesirable for many companies, an alternative is to present anonymous data (SEURING, 2008).

Although resource availability and time constraints force researchers to plan the number of cases in advance (EISENHARDT, 1989), an accurate estimate can be difficult to obtain before data collection (but the following researchers provide some general information or guidance: EISENHARDT, 1989; MEREDITH, 1998; STUART *et al.*, 2002; BARRATT *et al.*, 2011). Therefore, an initial estimate should not be considered a goal: in the field, the researcher may find that more or fewer cases will be required, compared to what was originally planned. When to stop adding cases to research is a relevant question in this discussion. For Voss *et al.* (2002, p. 210), "(...) the time to stop is when you have enough cases and data to satisfactorily address the research questions". The concept of "theoretical saturation" is a useful indicator: it is achieved when no new information or themes is gathered once additional cases or interviewees are included in the study (BOEIJE & WILLIS, 2013).

4.5 Data triangulation

Triangulation is a key concept that favors the quality of research (GIBBERT & RUIGROK, 2010). The term has its origin in navigation, military strategy and surveying (see BLAIKIE, 1991) and its use in the scientific field is linked to the *modus operandi* of detectives, doctors and other professionals. For example: to strengthen an accusation, the detective must gather different evidence pointing to the same suspect (MILES *et al.*, 2014). In qualitative research, triangulation means that the researcher should seek to diversify the sources of evidence and compare them with each other. The more convergence (corroboration) among them, the more robust the findings will be (EISENHARDT, 1989).

In a research, triangulation can be put into practice through the adoption of different researchers, theories, methods and data sources. The advantages of using more than one researcher in the same study were discussed earlier in 4.1. Consideration of different theories can result in different interpretations of the same phenomenon, allowing the researcher to select those that are closest to the collected evidence (DENZIN, 1989). By combining methods the researcher can achieve the advantages of each and avoid their specific deficiencies (DENZIN, 1989).

4.6 Selection of data sources

The choice of cases that will be part of the study influences the selection of data sources. This selection is also influenced by the research focus: the sources should be able to provide evidence for the questions included in the questionnaire (JOHNSTON *et al.*, 1999) and ultimately answer the research question. One of the case study advantages is to accommodate a wide variety of data sources: interviews, academic literature, observations, documents, historical records, production statistics, survey data *etc.* (EISENHARDT & GRAEBNER, 2007; BITEKTINE, 2008; BARRATT *et al.*, 2011). Additionally, it allows

adjustments (the addition of data sources, for example) when appropriate (EISENHARDT, 1989; BARRATT *et al.*, 2011). Data can be quantitative or qualitative, obtained from primary or secondary sources (McCUTCHEON & MEREDITH, 1993). When following a line of inquiry, the researcher must be supported by reliable data sources.

4.7 Selection of interviewees

It is not uncommon for a researcher to assume instinctively that the study will involve certain types of data, such as interviews (MASON, 2002). Therefore, in selecting data sources, it is critical that researchers be aware of their choices and gather arguments to support them. But, it is a fact that the interview is one of the main methods of data collection in qualitative research (MASON, 2002; GIOIA *et al.*, 2012). “Interviews are a highly efficient way to gather rich, empirical data, especially when the phenomenon of interest is highly episodic and infrequent” or “intermittent and strategic” (EISENHARDT & GRAEBNER, 2007, p. 28).

The commitment to triangulation also influences the choice of interviewees: whenever possible, people from different areas and hierarchical levels should be selected from different organizations (McCUTCHEON & MEREDITH, 1993; WESTON *et al.*, 2001; EISENHARDT & GRAEBNER, 2007; PIEKKARI *et al.*, 2010). Voss *et al.* (2002, p. 206) recommend that “(...) the researcher should be seeking multiple viewpoints particularly where there is likely to be subjectivity and bias, but be wary of committing too much time and resources” (so, there is a trade-off between richness of data and efficiency). A relevant question: if there is any kind of relationship between the researcher and the interviewee, this should be explained in the case study report.

A case study researcher should maintain contacts in the sectors of interest. For example: former students and meetings can be vital in finding experts (FLYNN *et al.*, 1990). However, it is important to be aware that identifying a potential informant and convincing him or her to participate in an interview is not always a straightforward, simple or quick process. Some companies do not allow employees to participate in research and employees themselves may decline the invitation because of heavy workload (GATTIKER & PARENTE, 2007). While in some areas the informant may receive financial compensation to participate in the interview (see ANTIN *et al.*, 2015), this is not likely a common situation in Industrial Engineering. One strategy that can be used to convince a person to contribute is to point out the benefits the research will bring to the academy or organization that will be studied (GATTIKER & PARENTE, 2007). Another strategy is to request the support of an industry group or technical association (FLYNN *et al.*, 1990; VOSS *et al.*, 2002). The researcher can also adopt the “snowball method” in which every interviewee provides the names of other people that could contribute to the study (BITEKTINE, 2008; BRAYDA & BOYCE, 2014). The idea is: the researcher takes advantage of the influence of the interviewee who made the indications, using he/she as a bridge to convince others to participate in the research. “An ideal prime contact should be someone senior enough to be able to open doors where necessary, to know who best to interview to gather the data required and to provide senior support for the research being conducted” (VOSS *et al.*, 2002, p. 206).

Prior to data collection, an accurate estimate of the number of interviews may be more difficult than estimating the number of cases. Therefore, the same recommendations apply: any initial estimate should not be considered as a goal; the theoretical saturation is a good reference to evaluate the need for new interviews.

In longitudinal studies, besides the selection of interviewees, there is an additional decision: the frequency of interviews (see HERMANOWICZ, 2013).

4.8 Selection of interview type

In addition to selecting the interviewees, the researcher will have to decide on the type of interview. The first decision is whether the interview will be face-to-face or not (in the second case, it will be mediated by a technology). The face-to-face interview, favored by "the more social nature" of the encounter (IRVINE *et al.*, 2013, p. 101), offers many possibilities to create a good interview ambience (OPDENAKKER, 2006). Furthermore, the "social cues" (voice, intonation and body language) of the interviewee can give the interviewer extra information (OPDENAKKER, 2006); on the other hand, the social cues supplied by the interviewer can play the role of showing attention and interest to an interviewee (IRVINE *et al.*, 2013). Disadvantages of face-to-face interviews are related to "time and financial constraints as well as other logistical considerations" (DEAKIN & WAKEFIELD, 2014, p. 604). Therefore, as the data collection process may undergo refinement (or corrections), the researcher must initiate the interviews with geographically close people, and only after expand the horizon to the sites that may be expensive and time-consuming to get into (STUART *et al.*, 2002). Remember that face-to-face interviews may be with a single interviewee or a group; the latter allows debate, although may be dominated by an influential person (VOSS *et al.*, 2002).

Currently available technologies represent viable options as a complement or replacement to the face-to-face interview (DEAKIN & WAKEFIELD, 2014). Synchronous technology (such as telephone) keeps interviewer and interviewee separated in space; asynchronous (such as email) keeps them also separated in time. Interviews using these technologies eliminate or reduce the disadvantages of the face-to-face interview: time (to access the interview site) and cost (for travel, for example). If the interview is mediated by technology, an informant may be more likely to accept the invitation to participate in the research (see DEAKIN & WAKEFIELD, 2014). Asynchronous technologies can facilitate communication between two people located in different time zones (JAMES & BUSHER, 2006). But James and Busher (2006), Irvine *et al.* (2013) and Deakin and Wakefield (2014) have identified (in the literature or as a result of their research) some difficulties that should be considered: the absence of a visual encounter means that the non-verbal cues are lost; it may be harder to achieve rapport (without a handshake or coffee before the interview, for example); requests for clarification of questions can be more frequent; the interviewees can make more explicit checks on whether what they are saying is adequate (sufficient or relevant); the researcher may need to use more verbalized pointers to show interest and attention; interviews may be shorter; technology may fail; researcher and interviewee need to have technological expertise and access to technology; the identify verification can be more difficult; the interviewee may be concerned that responses (via e-mail, for example) are inadvertently passed on to others; interviewees may be slow to respond (in asynchronous technologies).

Another important decision concerns the rigidity of the interview structure and the freedom that will be given to the interviewee's speech. In a structured interview it is common to use a fixed questionnaire, with closed questions (preestablished questions with a limited set of response categories: the interviewee chooses an alternative or a value in a scale) (MEREDITH *et al.*, 1989). This format facilitates comparison among interviewees, groups or cases (MEREDITH *et al.*, 1989; FLYNN *et al.*, 1990; GIVEN, 2008), but restricts responses (so it may

be poor in understanding more complex phenomenon). At the other extreme is the unstructured interview, which utilizes general open-ended questions for the purpose of introducing themes that will be freely addressed by the interviewee (MEREDITH *et al.*, 1989; GIVEN, 2008). The interviewee's speech may reveal new themes, which in turn can generate new questions. This format is suitable for studying new domains or to interview articulate individuals (GIVEN, 2008). It can also be used in the early steps of a research (for example, when the researcher does not yet have much understanding of the research problem and its context); however, it can be difficult to compare the answers (or there may be nothing to compare) (MEREDITH *et al.*, 1989). The semi-structured interview is an intermediate solution: the researcher adopts preestablished open-ended questions and "has more control over the topics of the interview than in unstructured interviews, but in contrast to structured interviews (...) that use closed questions, there is no fixed range of responses (...)" (GIVEN, 2008, p. 810). This interview follows "a relatively informal style" (MASON, 2002, p. 62) and the researcher may decide to change the order of the questions or add a new question depending on the circumstance.

4.9 Recommendations for the case study report

After making the most important decisions about the research project and gathering minimal information about the phenomenon, the researcher can establish a provisional structure for the report. As the study progresses, this initial structure will gradually be perfected and refined. The evolution of the structure reflects the researcher's understanding of the phenomenon and, at the same time, influences the decisions made during the research steps.

It is essential to present to the reader the options identified during the research and justify the decisions made (including the choice of method). In scientific articles, the sections that present the data collection and data analysis steps require particular care because they often lack rigor (see: PIEKKARI *et al.*, 2010; BARRATT *et al.*, 2011). Therefore, the researcher should: present the arguments adopted in the selection of information sources and interviewees; describe the data collection process and the difficulties faced; detail the data analysis so that the findings and conclusions do not appear to have emerged "like magic".

There are other recommendations in the literature. Meaningfully coherent studies "achieve their stated purpose" and "accomplish what they espouse to be about" (TRACY, 2010, p. 848). Thus, the researcher must present the research outcomes (concepts, frameworks, models, propositions, descriptive insights, confirmation or falsification of hypotheses, revised hypotheses or frameworks) (EISENHARDT, 1989; BARRATT *et al.*, 2011) and the theoretical, heuristic, practical or methodological contributions (TRACY, 2010; DeHORATIUS & RABINOVICH, 2011; MILES *et al.*, 2014), compare the findings with the existing literature (BARRATT *et al.*, 2011; DeHORATIUS & RABINOVICH, 2011; MILES *et al.*, 2014) and discuss whether the findings are transferable to other contexts (MILES *et al.*, 2014). Limitations (PIEKKARI *et al.*, 2010) and areas of uncertainty (MILES *et al.*, 2014) should be highlighted.

In summary, the case study report should be transparent, providing enough information for the reader to assess the rigor of the research and the confidence in the findings.

5. Final considerations

The widespread diffusion of the case study method in different areas (including Industrial Engineering) has recently been confronted with criticism related to the poor quality of the

studies that adopt this research strategy. Thus, the more experienced researchers need to advise the beginners on the importance of rigor in conducting scientific research. This concern must exist and be fostered from the most basic studies developed by researchers at the beginning of their careers. Without rigor, the research results have no application.

Flexibility has been indicated (STUART *et al.*, 2002; DUBOIS & ARAUJO, 2007; SEURING, 2008; PIEKKARI *et al.*, 2010) as a striking feature of the case study method. However, this flexibility cannot be confused as an excuse or permission for the researcher not to be rigorous. Methodological procedures are available and must be followed.

This article aimed to contribute to this subject by discussing key issues to conduct a quality case study. Clearly, the space constraints associated with an article from a scientific event make it difficult to address these issues broader and deeper. Besides that, recommendations on data analysis were not included because the author believes that they justify a specific study (see, for example: MILES *et al.*, 2014; NEUMAN, 2014; CORBIN & STRAUSS, 2015), considering the great variety of data types used in qualitative research (NEUMAN, 2014) and the different ways of analyzing them (TESSIER, 2012). Despite these limitations, the author hopes that the issues discussed here contribute to the understanding of the beginner researcher and foster in him/her the concern to deepen the knowledge on this subject.

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