Investigating collaboration in project management research: Using action research as a metamethodology

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Introduction

The rise of scientific collaboration to conduct research has been reported in the literature. This increase in collaboration has been described as driven by a need to contain costs by sharing resources and advance knowledge, to innovate and work across disciplines to deal with complex problems. Advances in information and communication technologies coupled with reduced travel costs also make it easier for scientists to collaborate across geographical boundaries rather than just working co-located in laboratories. An increase in collaborative research has also been noticed among social scientists (Endersby 1996; Hunter & Leahy 2008; Lassi & Sonnenwald 2010; Wooley et al. 2015).

Studies also report an increase in co-authorship in articles published in management journals. Acedo, Borosso, Casanueva and Galán (2006), who reviewed co-authorship in highly ranked management journals, report a 'progressive growth in the number of co-authored papers' (p. 979). Choudhury and Uddin (2018) compared the co-authorship of articles in project management journals in 2006–2010 and 2011–2016 (and found the number of co-authored articles had doubled from 40 in 2010 to 80 in 2016). Choudhury and Uddin (2018) also found that co-authorship in scholarly articles, which is 'the best-known measure of such collaborations' (p.9), resulted in 'more citations and wider acceptability' (p.35) in project management research. It was also found that multi-authored articles receive more citations and increased research productivity. According to Sonnenwald (2007), co-authored articles from collaborations also get published in higher-impact journals. However, very little is known about how such collaboration takes place in practice in project management research. This motivated the authors of this article to ask the following research question:

How and why is collaborative research conducted in project management research?

While answering the main research question, a supplementary research question, stated below, was also addressed.

What are the barriers and enablers to collaborative research in project management?

To answer the main research question, this article uses a multimethod approach combining action research as a metamethodology and two qualitative surveys to reflect on a successful two-year collaborative research project studying leadership in projects. The research was sponsored by the Project Management Institute (PMI) (Müller, Drouin and Sankaran 2018) and has resulted in several refereed publications. It also won an award for excellence in research from the International Project Management Association in 2019. The research was carried out in nine countries around the world in which a total of 26 researchers participated. Therefore, it

serves as a suitable example to investigate collaboration across geographical boundaries mediated by information and communication technologies.

In this article, we use a subjective, inductive, interpretive approach, adopting action research as a metamethodology to reflect on our research followed by two qualitative surveys to validate our findings. The collaborative research was carried out over three years (two years for completion of the funded research and a third year to disseminate knowledge from it) involving mostly academic researchers and some practitioners. As part of our analysis we have also validated our results by comparing our findings with a sample of ten project management researchers who have conducted collaborative research around the world. We expect that our findings will help academics and practitioners to engage in effective collaboration to advance research that will be useful to link theory and practice in project management.

The article is structured as follows. First, a literature review explaining why collaboration has increased over the years in scientific research and the impact it has had on social science research is carried out. This is followed by a presentation of a single case study of collaborative research in project management using three action research cycles. Next, the results from a survey conducted with the participants of the PMI research project and results from a survey of ten project management researchers about their collaborative practices in project management research are summarised. The findings from the case study and the surveys are then discussed to also present enablers and barriers to collaboration in research to answer our second research question. We conclude the article with some lessons learned from project management research collaborations that would be useful to researchers who want to engage in collaborative research.

Literature review

This literature review is positioned as per Klein & Müller (2020) 'to identify the need for further research' (p.3) and to identify a 'gap we are addressing' (p.3). In this review, we are not attempting to carry out a systematic literature review but a semi-systematic review (Snyder 2019) as a 'research within a selected field' (p.335) to identify a gap to report on our research.

Scientific collaboration

Scientific collaboration is defined by Sonnenwald (2007, p.645) as 'human behaviour among two or more scientists that facilitates the sharing of meaning and completion of tasks with respect to a mutually-shared superordinate goal and which takes place in social context'. The nature of scientific collaboration can vary across a spectrum, from simple ways such as communication about related work (for example, a scientist may have read an article written by another scientist whose work she or he has been impressed with and might want to clarify a question) to more integrated collaborative activities as described in this article. Thus, true collaboration occurs when a group of scientists starts working towards a common goal, prioritizing it over their individual goals (Neale et al., 2004). An example could be when applying for a research grant in which the composition and capability of the team is critical compared with individual expertise.

Beaver (2013) found that scientific collaboration started growing after 1945 when big scientific questions in physics, molecular biology and biomedical research had to be addressed, which required the investigative power of many. He reports that since the mid 1990s collaboration among researchers published in prestigious journals has moved from 10% when it originally started to 95%, clearly indicating that collaboration is on the rise.

Although collaboration among researchers in the natural sciences grew, it also had an impact on the social sciences for reasons other than sharing expensive and rare laboratory equipment and resources. Sonnenwald (2007 p.646) explains this by stating that social scientists may collaborate to 'jointly develop data collection instruments from similar populations in different geographic regions, and then analyse and interpret the results together'.

Franceschet and Constantini (2010), who investigated collaboration in Italy, found that collaborations in the social sciences happen at a smaller scale than in the natural sciences, in smaller groups or teams. A study of collaboration among Canadian scholars, carried out by Lariviere et al. (2006) using bibliometric analysis, showed that while collaborative research increased in both the natural and social sciences, the rise in collaboration in social sciences showed an increase only from the 1980s.

The recent trend of collaboration between scientists via email and the internet has been called 'collaboratory', a portmanteau term derived from 'collaboration' and 'laboratory'. Finholt (2002) defines a collaboratory as 'a laboratory without walls, in which scientists are connected to each other, to instruments, and to data, independent of time and location' (p.77). The emergence of collaboratories is driven by reduction in cost, co-opetition (i.e. cooperating while also competing, Bouncken et al. 2015) to address critical issues, more efficient use of capacity and resources through sharing, and access to wider knowledge. However, some scholars argue that deliberate choice of partners may not act in the interest of diversification but result in Balkanization into intellectual factions. Despite some reservations, successful collaboratories have been established in areas such as biology, oceanography, atmospheric research, molecular science, education, energy, engineering, health, space research and library science. A prominent example of a large international collaboration is the human genome project that operated between 1990 and 2003 involving hundreds of scientists from 20 institutions and six countries. Another research achievement through collaboration has been the reduction in time required to develop a clinical protocol in AIDS research showing promise to more efficiently address global problems.

Enablers for scientific collaboration
Beaver (2013) provides a list of factors that encourage scientists to collaborate. These are summarised as:
1. Access to expertise, equipment, resources and funds
2. Professional advancement
3. Increased efficiency and faster progress through enhancement of productivity
4. Ability to share bigger problems that cannot be solved by an individual

5. Creating a network to get to know others who are interested in the same area of research, reducing the feeling of isolation
6. Learning new tools and skills and breaking into new territory
7. Better and wider dissemination of knowledge
8. Advancing knowledge and learning
9. Reducing costs by sharing materials, equipment and resources
10. Satisfying curiosity and catering to intellectual interest.

Lassi and Sonnenwald (2010) categorise these factors at individual, group and economic levels that could positively and negatively affect the reasons for collaboration in terms of career and social factors. Although career factors are related to advancement in own career due to the outputs from research, social factors motivate individuals to collaborate as they find enjoyment in working with others and as a group when a sense of community develops.

Advances in technology have also helped to make collaboration easier. Beaver (2001, p.376) states that collaboration among scientists and physical location is not an obstacle as internet technologies have helped bridge geographical barriers. The evolution of e-science (Jirotka et al. 2013) has also resulted in massive cyberinfrastructure in Europe to support 'large-scale multidisciplinary research' using 'powerful computer-based research infrastructure' (p.667).

Barriers to collaboration
Collaboration may not always be a positive experience (Lassi and Sonnenwald, 2010). In terms of career, the academic reward systems have not caught up with trends in collaboration and give more credit to individual effort or lead authors. There is also a fear that others may take your work and publish it as theirs. This may become more difficult to manage if they happen to be from outside one's organization.

Birnholtz and Bietz (2003) point out that barriers of data sharing increase if the work involved in converting data to be reusable takes too much effort. Lowe and Phillison (2009), who studied research collaboration in smart cities where multiple disciplines worked together, note that the various disciplines 'intrude into their constitution and operations' (p.1176) creating obstacles during governance and assessment due to multiple research councils being involved. Chung et al. (2016), who observed bio and nano-scientists in collaboration, observed that the motivators and barriers also varied across the life cycle of the collaboration. Non-technical factors can also become a barrier to collaboration. In a Research Council UK review of e-science (RCUK 2009) it was found that both technological and 'social (behavioural, economic, legal, ethical) dimensions (p.51)' need to be considered in enabling collaborations.

The way researchers agree to work with each other could limit the potential for collaboration. In business and management research, 'homophily' was found to limit collaboration (Evans et al. 2011). Homophily refers to similarity-attraction hypothesis (Byrne 1971), which 'predicts that people are more likely to interact with those with whom they share similar traits' (Yuan & Gay 2006, p.1062). 'Homophily places two types of constraints. The first are

institutional constraints that force 'scientists to select collaborators within rather than across institutional boundaries' (Evans et al. 2011, p.381) and the second are geographical constraints that work across institutions 'to involve scientists that are geographically co-located than dispersed' (p.381).

In sum, both technological and social factors could act as barriers or enablers in scientific collaboration.

Factors that impact on collaboration
Based on case studies carried out at research centres in the US, Hara et al. (2003, pp.959-963) found four factors that were critical to collaboration: compatibility of work and writing styles that resulted in the right chemistry; matching of work interests, skills and expertise; prestige resulting from being able to publish in outlets regarded as important to the field; facilities available for ease of communication. Hunter and Leahy (2008, pp.305-306) add that prestige of the institutions where the researchers are located, methodology(ies) used in the study, and availability of data (in large projects) could also have an impact.

Although having a common goal or shared vision is recommended by Lippe and Brocke (2016), Laudel (2002, p.5) feels that the nature of activities is more important than trying to establish a 'shared vision'.

Indicators to measure research outputs from collaboration
The recognised measure for success due to collaboration found in the literature is the number and quality of publications achieved together. This seems to have become the key indicator as it is easier to measure (Hunter & Leahy 2008). Birnholtz (2006) clarifies that authorship of an article serves several other purposes (p.1759):
1. Attributing credit for discoveries to a person or a group of people
2. Assigning ownership to this person or group
3. Enabling the accrual of reputation (which relates to measuring the outcomes of collaboration as these count towards career advancement in academic environments).

Sonnenwald (2007) adds that the number of citations also counts as an indicator. She makes an interesting observation that co-authored articles tend to be published in higher-impact journals as they could 'foster a more rigorous review' (p.668). This is confirmed by Beaver (2004), who carried out a citation study of collaborative research and concluded that 'philosophically and scientiometrically, there are many good strong persuasive arguments that collaborative research possesses greater epistemic authority than research produced by single authors' (p.407).

Sonnenwald (2007) adds that collaborative research facilitates 'career, educational, instrumental, business and socio-political' developments (p.668), which also need to be considered. In addition, collaborative efforts could contribute to new products or services, innovative tools and patents providing an opportunity for commercial benefits that can also be measured.

Management of collaborative research

The opinions expressed on in the literature range from loose to tight control for managing collaborative research projects. Some authors feel project management practices are necessary although others disagree, citing Turner and Cochrane's (1993) goal-and-methods matrix, arguing that research projects may have uncertain working methods and it may be difficult to predict their outcomes (Brocke & Lippe 2015). Brocke and Lippe (2015) also point out that managing research projects closely may inhibit creativity and innovation. Therefore, having a bigger picture (such as a shared vision) that provides guiding principles for the research can aid in solving problems when they occur. There is also the difficulty that experts often dislike being managed and prefer unlimited authority over their work. One way of overcoming this reluctance is to train one of the scientists or researchers in the team to assume an administrative role along with the scientific role (Adler, Elmquist & Norrgren 2009).

Collaborative research in project management

Although Brocke and Lippe (2015) found an increase in collaboration in project management research, they point to some challenges that have to be overcome:

1. 'Tight management' (p.1031) needs to be combined with a flexible approach. They recommend setting up a shared vision mentioned earlier in this review.
2. Diversity of partners may give rise to 'inter-cultural, inter-organizational and inter-disciplinary' issues. They suggest running partnership workshops to clarify expectations at the start.
3. Varying commitment and involvement by researchers involved. They suggest assigning a project manager with a technical background, who can act as a 'knowledge broker' (p.1032) and demonstrate a 'participative leadership style' (p.1032).

Measuring Research Collaboration

Wagner et al. (2011) explain how qualitative and quantitative methods for measuring interdisciplinary research have been used to investigate antecedents, processes and outcomes:

- Antecedents included: values, expectations, goals and experiences
- Processes included: interpersonal, intrapersonal, positive, negative, intentional and unintentional activities
- Outcomes included: concepts, interventions, training programs and organizations.

Generally, a combination of qualitative and quantitative methods was used, which included surveys, interviews, observations and archival data. Self-assessments have also been used. Bibliometrics based on citations were found to be commonly used. Spatial evaluation using visual representations were also found. However, there was a lack of agreement on evaluating interdisciplinary scientific research posing several questions to be addressed. A bibliometric analysis of Australia's international research collaboration (Mathews et al. 2009) showed collaboration with international researchers increased from 21% in 1991 to 44% in 2006.

Hara et al. (2003) used a mixed-methods approach of a combination of sociometric surveys, interviews supplemented by observations and participation in video conferences at 'multi-disciplinary, geographically distributed research centre' to study collaboration (p.954). An early attempt at measuring international collaboration was carried out by Luukkonen et al. (1993) by examining articles published by co-authors across countries.

Our review showed no similar analysis carried out recently as a general comparison. However, recent bibliometric analyses were found to be much more sector or discipline focused.

Thus, although various qualitative and quantitative methods have been used to evaluate research collaboration, most of these studies used snapshots of collaboration in their investigation. Collaboration, however, has not been studied as a phenomenon across the life cycle of a project. Using action research as a meta-methodology has helped the authors of this article to observe and reflect on collaboration over the life cycle of a research project.

Based on the lack of investigation into how collaborative research takes place among project management researchers, we addressed the following research question:

How and why is collaborative research conducted in project management research?

As we carried out this research using an action research approach, we added a supplementary research question to our main concern:

What are the barriers and enablers to collaborative research in project management?

Method
We use action research as a meta-methodology to explain how the research emerged in cycles of planning, acting, observing and reflecting and taking new action to plan again for the next cycle. A brief review of action research follows.

Action Research
The social psychologist Kurt Lewin is often referred to as the father of action research. Lewin (1948) described action research as a spiral of steps 'each of which is composed of a circle of planning, action and fact-finding about the result of the action' (p.206). Action research has been portrayed by management researchers as a global family of related approaches that integrates theory and practice (Shani & Coghlan 2019) and combines 'action and reflection in ongoing cycles of co-generative knowledge' (p.3).

Action research is also 'becoming increasingly recognized as a meta-methodology' as described in the SAGE Encyclopedia of action research (Attwater 2014, p. 532). The application of action research as a governance mechanism for a research project has been published in the *Project Management Journal* (Dick et al. 2015). We have used action research as a meta-methodology in this article to study collaborative research in project management.

How action research is used in this article

Based on a pragmatic philosophy, our inquiry for this article is presented as a social construction of reality through the eyes of the authors. We also captured how the other researchers who participated in this project expressed their feelings about being part of this study. We use three action research cycles to describe our journey.

We have used the process shown in Figure 1, which is modified from the action research process recommended by Perry and Zuber-Skerrit (1992, p.204), to divide the observed phenomenon into three cycles based on goals to be achieved.

Insert Figure 1 about here

The overarching action research project is the process we used to write this article. We started with a *plan* to write this article by reflecting on the collaborative research we had completed over three years. This is the main cycle shown in the top of Figure 1. To do this, we *acted* to review our research retrospectively to identify three plan-act-observe-reflect cycles (shown in the middle of Figure 1) to describe our journey as action research cycles 1, 2 and 3.

We used the cycle shown in the bottom of Figure 1 to *plan* to report the results of our reflection in this article. To validate our findings, we *acted* by sending out a survey to a sample of our co-researchers from our main research projects. We presented a paper at a European Academy of Management (EURAM) conference to report on our findings in June 2019. We were then invited to contribute an article to this special issue on action research. In order to further investigate how project management researchers collaborated, we identified a purposeful sample of ten researchers who had been working on collaborative research projects in the past five years to test our findings. We then *reflected* on the results we found from our surveys to that helped us to write this article.

To indicate our reflections during the action research cycles we have used vignettes as a way of indicating that these are narratives from the authors. The use of vignettes is recommended by Humphreys (2005) to 'enhance the reflexivity' (p. 840).

Starting out on our journey

Kemmis, McTaggart and Nixon (2013, p.18) explain that 'In practice, action research begins with an imperfectly understood felt concern and a desire to take action … The group decides to work together on a thematic concern'. The thematic concern for the authors was identified in the proposal submitted for a PMI in 2014 for a sponsored research grant.

The authors had observed a growing diversity of perspectives on leadership in projects. It was found that the traditional person-centred or vertical leadership approaches (e.g. Turner & Müller 2006) were being increasingly supplemented by team-centred, horizontal, or shared leadership approaches (e.g. Lindgren & Packendorff 2009). Within this duality of perspectives, related studies in the context of project management tended to polarize towards one view of

leadership rather than integrate the two perspectives into a holistic understanding of leadership in projects. The authors, who are also practitioners, have observed that both forms of leadership coexist in projects, and a one-sided view did not contribute to a comprehensive understanding of leadership in projects. It was also found that recent developments in general management emphasize the importance of understanding the relationship between people-centred and team-centred leadership and a balance of both approaches in corporate reality (Burke, Fiore, & Salas 2003; Edmondson 2012). This motivated the authors to ask the following questions in the realm of project management that became the thematic concern for their research:

1. What is the relationship between person-centred and team-centred leadership in projects of different types, sizes and geography?
2. What is the individual and combined effect of people-centred and team-centred leadership on projects of different types, sizes and geography?
3. What are the contextual factors that moderate or mediate the individual or combined impact of people-centred and team-centred leadership on project success?

At this stage of the research, the authors had recruited researchers from six countries to conduct the research together: Australia, Canada, China, India, Norway and Sweden.

Action Research Cycle 1

While we were waiting for the award of a research grant, we decided to carry out a pilot study to test the research protocol we had developed from the literature. For the pilot study, we identified three case studies in China and three in Australia, where we could interview managers, and completed these case studies in late 2015. This pilot study helped us to review the protocol and questions with prospective informants. We presented a paper from our findings during this cycle to the APROS EGOS conference (Müller et al. 2015) in Australia in December 2015.

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Vignette 1 shows our reflections from this cycle. The reflective questions asked are based on (Dick 2002 http://www.aral.com.au/resources/reflques.html)

Vignette 1 – Reflections from action research cycle 1

Goal

To test the research protocol and pilot test the questions prepared for interview. Gauge how a translated protocol and questionnaire work in practice.

Process of engagement

We planned to start this with two groups of researchers (one from China and the other from Australia). This pilot testing was led by one of the authors in China and the other in Australia.

Reflections

What did we plan?

To pilot test our research protocol and questions in two different cultures.

What happened as we planned? Or did not happen?

We were able to conduct three case studies in Australia and three in China successfully. Translation on questions into Chinese did not hinder our data collection and analysis.

What did we discover new?

We discovered the concept of socio-cognitive space, based on Bandura (1989), which impacted on the balance of leadership in projects.

We realised that senior managers at a higher level than project managers in the organization also influenced the occurrence of balanced leadership in projects.

How did this help to set up the next cycle?

This led us to further investigate the elements of socio-cognitive space and added new questions to our research questions to investigate its impact on balanced leadership.

We added questions to the semi-structured interview we had planned with senior managers.

Achievement due to collaboration

During this pilot, there were 8 researchers collaborating (1 from Sweden, 4 from China and 3 from Australia). The Chinese researchers worked with the lead researcher from Sweden to help ask questions in Chinese, when required, and translate the interviews into English so that comparative analysis of findings from China and Australia could be made. The results also showed that national culture influenced sharing of leadership due to the differences in power-distance characteristics. Leadership was distributed more easily in Australian organizations where the power-distance relationship between project managers and team members was lower. The findings were disseminated at a conference in Sydney in December 2015. Through this pilot testing, we were able to start quickly when the main research project was awarded to us in January 2016.

Action Research Cycle 2

The main target for this cycle was to conduct a midpoint review of the project to gauge whether the research could be completed on time.

The research grant awarded to us had to be completed in two years. We had recruited researchers from six countries, with geographical time differences, to work on the grant. We planned to have regular teleconferences using Skype to progress the study. In addition, we also planned to meet at international conferences where we would present papers. In our original plan we had allowed for a budget for the three authors to have a dedicated workshop in one location, about midway through the research, to take stock of what we had found so far and forecast whether the research would meet its promised milestones. This meeting was also expected to inform us what the data was telling us so far.

The check at the midpoint was the main goal for this cycle to review and adjust the research process if needed.

PMI awarded the research grant to us to start in January 2016 and finish by December 2018. Although we started the research with co-researchers from six countries, researchers from three more countries – South Africa, the Netherlands and Lithuania – joined the research.

In each country where the research was carried out, we aimed for five case studies in different sectors of the industry. The research in each country was led by a nominated investigator and the research protocol was distributed to the interviewers so that they would use the same questions. We had also planned to meet in 2017 in Oslo to carry out a preliminary data analysis.

We met in October when two-thirds of the case studies had been completed, with 33 case studies and 166 interviews available for analysis. We invited three more researchers from different countries to join us at this meeting to widen our perspective on the data analysis. Six members from the research teams met in Oslo and we divided ourselves into three groups of two to use an abductive process, based on the initial review of the interviews, and try to propose a theory that could explain what we had found from our case studies. We used the 'mystery construction process' to develop theory suggested by Alvesson and Kärreman (2007). We discussed our ideas and came up with a theory of how the activities that lead to balanced leadership in projects evolved from our case studies, based on sociologist Margaret Arthur's realist social theory and the morphogenetic process of how structure and agency interact to move from structuration, to conditioning, to elaboration (Archer 1995). We identified five events that were components of the morphogenic cycle of balanced leadership that matched the three processes proposed by Archer. We called these five events nomination, identification, selection, horizontal leadership and governance, and transition.

Vignette 2 shows our reflections from this cycle.

Vignette 2 – Reflections from action research cycle 2

Goal

To review what we found when we had completed about two-thirds of the planned interviews and to check if we could complete the project on time.

Process of engagement

We organised a data analysis workshop in Oslo and invited one researcher each from Norway, Sweden, Australia, India and South Africa to get a diverse perspective on what we had found. We gathered all the transcribed interviews into a shareable location and requested the six researchers to review these for an initial impression on what they found from the data as preparation for the workshop.

Reflections

What did we plan?

To arrive at a common overview of the findings to set up the next phase of the research and to check progress.

What happened as we planned? Or did not happen?

We were able to get a feel for what the data was telling us. We expected all the researchers to have had an opportunity to analyse the data they had collected in their countries, but this did not happen. Our meeting was expected to be midway, but it was delayed. This was not an issue as we had met face to face twice before the meeting at conferences,

What did we discover new?

We formulated a theory to explain how balanced leadership occurred in projects using Archer's social realist theory and her concept of the morphogenic cycle.

How did this help to set up the next cycle?

Having a theory based on abduction helped us to structure the work of publishing articles from the study based on the five events we constructed from our theory.

Achievement due to collaboration

During this phase, there were 26 researchers collaborating from nine countries. However, only six of us met in Oslo to make sense of the findings arrived at so far. But the views of all nine countries were represented at this meeting as the six researchers were also involved with other country teams. We presented our findings at an international conference. From the six researchers who were in Oslo we were able to designate at least one article to be published focusing on each of the five events arrived at from our theory. We also explained our theory to the rest of the research teams and invited them to join with the lead researchers or find partners from any of the research teams to develop and publish articles. This suggestion was taken up enthusiastically. In the end, this resulted in the publication of more articles than what we had promised PMI. We also felt that we needed to provide more evidence about the link between balanced leadership and project success, which was followed up by us.

Action Research Cycle 3

The main target for this cycle was to complete the research and ensure that articles were published /presented as agreed with the funder.

Along with the various research teams, we focused on getting at least one paper per event established by the balanced leadership theory – nomination, identification, selection, horizontal leadership and governance, and transition. We also had to investigate the relationship between balanced leadership and project success. We had to complete the final report that was due by end 2018.

The article on balanced leadership theory drafted at the meeting in Oslo became our flagship article from the study. We were invited to submit this article, which we presented at an international conference, to a special issue in the International Journal of Project Management. This was submitted and published in early 2018 online. The lead and co-researchers then worked on additional papers on the five events of the balanced leadership theory and most of these were submitted or were in advanced stages of preparation by the time the final report of the research project was submitted to PMI in December 2018. The other articles were progressively published until mid 2018 and some new articles are still being published in 2020, showing that the collaboration has extended into a long-term relationship beyond the original project.

Vignette 3 records our reflections from this cycle.

Vignette 3 – Reflections from action research cycle 3

Goal

To complete the deliverables we had committed to PMI. Have at least one paper submitted on each event of the balanced leadership theory. Investigate and report on the relationship between balanced leadership and project success.

Process of engagement

The authors of the article had to work closely and had several teleconferences to complete the final report for PMI. While we also worked on articles from the study, other researchers in the various teams started working on some additional papers based on the balanced leadership events.

Reflections

What did we plan?

To complete the PMI report and publish planned papers from the Oslo meeting.

What happened as we planned? Or did not happen?

The PMI report was submitted on time. The investigation on linking balanced leadership to project success was completed and submitted as a conference paper. Although some of the papers we planned to submit about the five events were being submitted the review process took longer than we had anticipated. Therefore, these were not published by the time the final report was submitted to PMI.

What did we discover new?

We found that several researchers in the collaboration started to form small teams to publish more papers than we had planned on the events.

How did this help to set up the next cycle?

This was the last cycle but several other things we had not planned started emerging. We felt that this research turned out to be much more global and bigger than we had anticipated. We also felt that the theory we developed and the articles we published had to be translated into practice and this could be done through publishing a book, so we submitted a proposal to publish a book on balanced leadership. That proposal has been accepted and the book is on its way.

Achievement due to collaboration

Having started as a small research project sponsored by a PMI grant with a small leadership team this research ended up being carried out in nine different countries (Australia, Canada, China, India, Lithuania, South Africa, Norway, Sweden, and the Netherlands), with a total of 54 case studies and 249 interviews. It was carried out in multiple sectors and in organizations of varied sizes, from small (<50 employees) to large (>250 employees). It resulted in more outputs than what we had promised as part of the research grant. We also found new collaborators to publish articles from the research.

This concludes our retrospective reflections on the balanced leadership research project using three action research cycles based on key events that moved the research forward. Next, we examine the data we collected from co-researchers in the project as well as from a sample of

project management researchers who have been conducting collaborative research over the past five years to extend our findings.

Data collection and analysis
The first evaluation of our collaboration was carried out using a survey designed by the authors to collect reflections from the research teams.

We sent out a questionnaire (Survey 1) to 18 of the 26 researchers, who participated in the PMI research project and were still working on the project when the survey was conducted. Twelve responses were received.

The highlights from the responses to the survey 1 as reported in our international conference paper are summarised in Table 1 (Sankaran, Müller & Drouin 2019). The names of the respondents (R1–R12) have been anonymised.

Table 1: Summary of feedback from participants of Survey 1

Themes	Quotes
Participation	'Really happy to be part of the team' (R1); Satisfied with the participation' (R2); 'Enjoyed the participation and learnt a lot from the cooperation' (R3)
Management	'Organized with clear deliverables and clear deadlines' (R2); 'The whole project was an inspiring process' (R5); 'The case study protocol which guided the whole process' (R3)
Leadership	'Clear leadership was felt from principal investigator 1' (R2)' 'The project itself was an example of balancing leadership' (R5); Experienced principal investigators who provided clear direction' (R7)
Communication	'Communication was very good [within teams] but could have been further enhanced across teams' (R8); '[Good] collaboration between core team members (principal investigators), between core teams and satellite teams' (R9); 'Inspiring collaboration across cultures and languages' (R4)
Improvements	'Some online conferences would have been wonderful [between teams]' (R8); 'More opportunities [in the future] to contribute to papers based on all of the dataset' (R1); 'Transfer the process into publications to inspire and benefit more researchers' (R5); '[How to deal with] silent disappearance of [some] team members' (R9); '[Could have been improved] by insisting on equal quality standards across satellite teams' (R9); 'More clarity in terms of project schedule and deliverables' (R6)
Engagement	'Valuable to have the possibility to discuss ideas with principal investigator 1' (R10); [Enjoyed opportunities to] engaging to collaborate with different researchers and data from different countries' (R1)

A second survey (survey 2) was sent out to 15 project management researchers who had collaborated on different project management research over the past five years. We identified

these researchers through published reports on PMI's website, contacting the PMI as well as through our own knowledge of collaborative projects that we found through publications in prominent project management journals. We received 10 responses (RR1–RR10) within the deadline we specified, and we felt that this was sufficient for our discussions in this article.

The highlights from the responses to the survey 2 are summarised in Table 2. The names of the respondents (RR1–RR10) have been anonymised.

Table 2: Summary of feedback from participants of Survey 2

Themes	Quotes
Enablers	
Shared interest and respect	Respect and scholarly reputation of the research partner were found to be an enabler as confirmed by RR2, RR3 and RR8, while 'a desire to publish with people I know' motivated RR9. Common interest also resulted in expanding the collaboration possibilities with 'access to informants in different areas' (RR7), enhanced 'value of the research and its outcomes to practice' (RR10) and built trust and respect (RR6). 'Long-term relationships' also contributed to shared interest (RR5).
Capability	RR4 respected 'expertise in the field', which led to 'funding', (RR5) felt that 'expertise across disciplines' built a more capable team, and this was echoed by RR4 who pointed out the value of an 'interdisciplinary research team'.
Good project management	RR1 appreciated the 'clear structure and division of work' that reduce ambiguity while RR3 felt it 'balanced the workload'. RR5 appreciated the 'regular meetings at a fixed space' that helped with the progress and the inclusion of non-academic social activities (RR10).
Barriers	
Administrative issues	RR1 pointed to 'difficulties in hiring competent and specialised people' and 'logistics issues' to work smoothly with collaborators. RR7 complained about bureaucratic processes such as 'time-

	consuming efforts to establish contracts' while RR3 pointed out 'delays in mutual agreements funding'.
Mismatch between university and funding agency expectations	Poor allocation of time for research was mentioned by a few of the respondents. RR2 complained of being 'swamped by teaching and service responsibilities'. RR5 supported this by stating that there was 'no relief for teaching load'. RR1 Also faced 'misaligned expectations between the funding agency and academic work'. RR10 felt that there were different 'academic expectations' from the research project. Due to the mismatch sometimes 'universities were forced to subsidise the funding' (RR5), causing more administrative hurdles.
Collaborators	The collaborators also posed barriers such as 'partners not prioritising the project' (RR7), 'causing delays and lack of regular updates against action points' (RR9) and differences in expectations, while 'some focused on theory and others had different expectations' (RR10) and publications were delayed 'due to different viewpoints' (RR5)

Barriers and enablers

The enablers had similarities to what we found from the PMI research. The new items that became apparent in the second survey were the importance of a multidisciplinary team (which was not a major issue in the PMI research project as it did not require multidisciplinary input). Another significant aspect was creating a space for social activities to develop interpersonal relationships. Although the 'fun' aspect of working together was mentioned by one of the researchers in the PMI research it was not a point that was emphasised in the project, which was mostly deliverables driven.

Most of the barriers had to do with administrative factors such as logistics, funding, contractual matters, lack of time to do the research (due to the institutions not providing teaching relief in some cases). There were a couple of remarks on non-performance or difference in expectations in the second survey.

Surprises

Now we turn to an open question that was included in the two surveys.

In both surveys, besides quantity and variety of outputs, which are reported in the conclusions, we asked whether there were any interesting events or surprising incidents. This helped us to compare out finding with the literature in the discussions.

The following is a list of surprises collected from the first survey.

R1 found that his participation helped him to find a job with the company he was researching, which gave him an opportunity to apply the theory of balanced leadership in practice. He reported: 'I got a job offer from a company I conducted research interviews at. As a global director of a software firm now, I can directly implement balanced leadership.' While we did not set out to test our theory in the original research, this quote gave us an indication that what we had found was useful to practice. R9 said that the theory of balancing leadership seemed to make sense when he presented the findings: '[I am encouraged by] the attractiveness the study has for the community as observed at a public lecture on it.'

Clearer direction and alignment of the project with the deliverables helped to ensure that the project was completed on time. Thus, aspects of project management helped to improve the performance of collaboration. R12 confirmed this by observing: 'As we became very enthusiastic in capturing discussions about the nature of trust and control in projects, we became eager develop at least two more papers on that topic, but principal investigator 1 wisely calmed us down, to concentrate on what we have to deliver.'

There was also confusion among interviewees about the difference between management and leadership. R5 recalled: 'I remember that it was very difficult to get one of the interviewees from an outsourcing firm to stop talking about management instead of leadership.' This topic has been debated in management research often (Zaleznik 2004; Kotterman 2006; Lunenberg 2011). In a discipline such as project management (Cleland 1995; Turner, Müller & Dulewicz 2009), where management has been emphasised due to the transactional nature of projects, the importance of the difference between leadership and management is still unclear. However, R6 observed that 'I found it interesting that leadership was such an emotive topic for the participants', showing that it has been valuable to discuss leadership in the context of projects.

Although much of the research was carried out remotely, the data analysis workshop held in Oslo at a critical milestone where the researchers met face to face in a focused discussion proved very beneficial. Several researchers commented on this event as a highlight. R9 found the value of the workshop where 'development of the theoretical framework [which resulted in] the team's unconscious contribution', supported by another researcher who was surprised by 'the team not realizing that the mystery construction [process to develop theory] was over [during the data analysis] workshop' (R10). The discussions at the data analysis workshop were also found to be very valuable. R4 stated that one of the highlights for her was the 'interesting discussions and analysis at the [data analysis] workshop', which was supported by R7, who found 'the [data analysis] workshop to be very good and critical for team alignment'.

The importance of the joy of working together to reach a goal was also appreciated by R4, who stated that 'writing a paper can be a lot of laughter together' and remarked on the 'ongoing interesting discussions during joint paperwork'.

Participants in survey 2 provided the following outputs:

RR1 found a conference at MIT 'to be a [good] bonding activity' and the 'research meeting to prepare for the conference showed 'how the different parts of the work were converging into a bigger story'. This was like the feedback about the workshop in Oslo that resulted in a balanced leadership theory. RR7 also valued the 'Creative times at face-to-face workshops [where] we could see across all the data and discuss'. On the other hand, 'Skype meetings weren't that creative'. RR9 agreed that 'physical meetings and workshops tended to spur people on and motivate them more than emails, voice or video'. RR10 found that when 'we organized a workshop with decision makers and professionals in the healthcare sector, it was an extraordinary means to share early findings from the research'. RR2 recalled an incident when one of the members of the research team 'wanted to submit a paper before it was ready' and had to be pulled in line by the lead researchers. RR3 observed the enjoyment of 'attending a conference together', the '[virtual] meetings across time zones' with a 'drink in hand in the evenings'. In the PMI research the three lead researchers also had to meet at unearthly hours due to the time differences much to the 'annoyance of their families'. R6 was delighted that his co-researcher 'was able to collaborate with others at RMIT', which was valuable for the institution where he was working.

A focused face-to-face meeting dedicated to analysing data was a common feature that motivated researchers who participated in both surveys. Although teleconferences were essential, they were mainly useful to keep track of the project. The leadership of the principal investigators to guide publications from the collaboration was also deemed important in both surveys.

In terms of what could be done better to enhance collaboration, more responses were provided from survey 2. These are discussed below.

RR1 felt that it was wise 'not to accept so many commitments outside of the research collaboration'. RR2 suggested that it is important to 'agree on order of authorship right away' and 'prestige [sometimes] may be an important consideration for the order'. RR1 lamented that their co-researcher could not 'get better funding from her institution to present papers jointly'. RR6 also said more funding for co-researchers was needed. RR5 suggested better 'funding of activities related to collaborating together' and logistical support 'for making agreements'. RR7 wanted 'easier ways of making contracts'. RR4 expressed a desire for 'more industry participation' and 'more quality than quantity'. RR7 wanted to find a way for 'enforcing time frames'. RR9 expressed a similar desire to have 'more updates and reporting against action points'. RR10 expressed an interest to increase 'the number of face-to-face workshops to discuss emerging concepts'.

The funding of members of a collaborative research team who are not part of the institution that received the grant where lead researchers were located was a clear inhibitor of the ability to mentor younger researchers. Making bureaucratic processes easier would help researchers to find more time to focus on the research itself. Often the time required to engage in collaboration with outsiders is not recognised by parent institutions, which are not sympathetic towards providing teaching relief.

From the statements in Table 1 (based on feedback from survey 1) we can see that the process (especially the research protocol) and the leadership of the project were appreciated by all the researchers. Emerging researchers enjoyed working on an international research team and with experienced researchers. There were differing opinions on how the deliverables and schedules were understood, which indicates some issues with uniformity of communication even though, in general, communication and collaboration were found to be satisfactory and inspiring. Researchers who did not get opportunities to meet others at conferences felt that an online conference would be useful. There were some performance issues with some team members becoming silent and not delivering or delivering at a lower quality than what they had promised. In such cases, others in the team compensated for the shortcomings.

From the responses from survey 2, proper guidance from the lead researchers emerged as an important factor. The desire to be able to meet face to face was restricted by funding. Proper project and process management was also found to be important. Despite the virtual interactions, face-to-face meetings for specific purposes, such as data analysis or preparing for a conference proved to be of great value. Emerging researchers learnt a lot by being part of the experience.

Discussions
We start our discussions with a comparison between what we found in the literature review on scientific collaboration with the findings from the two surveys.

Although the literature (Katz & Martin 1997) emphasised criteria for co-authorship, the two surveys did not highlight any problems with this aspect except to emphasise that author order should be established upfront. One of the responses in survey 2 did point to the reputation of the researchers as an important factor in assigning author order in journal articles. In the PMI research some younger researchers reached out to the lead authors to participate in their articles in the belief that this would help them publish in higher-ranked journals.

Although the focus of the research as a reason for collaboration (Sonnenwald 2007) was expressed in both surveys, the importance of having a multidisciplinary team was only highlighted in survey 2 either due to funding requirements or due to the knowledge required to carry out the project. However, overall, it was beneficial to consider the diversity of the research team in terms of expertise. The importance of having practitioners in the mix was also mentioned in the second survey, which would be important in a practice-based discipline such as project management.

The prior relationships between the lead researchers was important in both surveys in agreement with Hara et al. (2003)'s observations on successful collaboration. The demonstration of the 'right chemistry' among the leaders was found to be critical. Although working with people you know provides some security, the literature also mentions the issue of 'homophily' or choosing only who you know thus not choosing the best team to address the topic. Often in competitive grants the composition of the team matters although previous track record of collaboration is also important. Both need to be considered and a good balance is suggested.

Most of the researchers surveyed worked on research projects related to project management although there were a few exceptions. This led to a common work interest although there were differences in priorities between academic outputs and more actionable outcomes. A common incentive was prestige in winning the research grant from funding bodies such as national governments or professional bodies such as PMI. So too was the desire to publish in prestigious journals and the ability to co-author articles with leading researchers in the field.

Conducting 54 case studies in the PMI research project would not have been possible without the cooperation of researchers from across the world. Therefore, establishing a model to work together as a team was important (Hunter & Leahy 2008). The processes and procedures established helped with this. Project management processes did work in the collaborative research projects examined in this article although no specific methodologies (such as waterfall or agile) were mentioned by respondents (Brocke & Lippe 2015; Lippe & Brocke 2016). The lead researchers of the PMI research as well as the respondents from survey 2 highlighted the importance of a firm hand to meet the milestones set by the grant provider.

In terms of the paradoxes presented by Brocke and Lippe (2015) and the balance between firmness and flexibility, the authors feel that more firmness in the PMI research project might have improved the quality of the data analysis. Project management also emerged as an enabler from survey 2. The authors of this article did not face any cross-cultural issues in terms of collaboration mainly because they have worked with different cultures in the past and were generally aware of cultural sensitivities while collaborating. The authority of the authors was also never questioned perhaps because all three were knowledgeable about the topic as well as the processes. Knowledge of the topic by the leaders was also considered to be important from survey 2.

However, some aspects mentioned in the literature that were not observed might have helped the PMI research project. One was setting a vision for the research, which could have helped prevent the silent loss of some members in the middle. The other was the variability in the data analysis. A workshop on data analysis at each location or together might have helped to improve the quality of the data analysis. The importance of having a face-to-face workshop to look at all the data together has also been highlighted by the respondents from survey 2.

One unexpected barrier in the PMI research project was the journal review process. The fact that many articles were published by the authors within a short time frame (i.e. the lack of a

long history in balanced leadership theory), and the relatively small number of authors who published them made reviewers question the validity of the theory. This shows how difficult it is to come up with new knowledge in a period of two years, even though academics claim to generate new knowledge constantly.

Table 3 summarises what was found from the literature on scientific collaboration with what we found from our analysis of our case studies and information collected from the two surveys.

Table 3 Comparison between literature and findings from this study on research collaborations

Source(s)	Themes	Observations
Beaver (2013)	Factors supporting collaboration -Access to expertise -Professional advancement -Increased productivity -Share bigger problems -Getting to know collaborators -Learning new tools/breaking into new territory -Wider dissemination of knowledge -Advancing knowledge and learning -Cost reduction trough sharing -Intellectual reasons	*Case Study and Survey 1* Previous track record of working together helped. The lead investigators had expertise in the knowledge domain of the topic of the research and methodology that was acknowledge by co-researchers. The workshop in Oslo for an intermediate data analysis was very productive. The research resulted in several publications, presentations and now a book that helped wider dissemination of the research. It is too early to comment on the citations rates. The early career researchers enjoyed working with the principal investigators and were able to publish with them in reputed journals. *Survey 2* Previous experience of working together was helpful. Multidisciplinary teams were required in specific projects. There were joint outputs beyond traditional outputs such as journal articles and conference papers. Having intermediate workshops and regular face-to-face meetings helped. Knowledge advancement was a motivation in some of the projects.
Lassi & Sonnenwald 2010	Career factors – advancement Social factors- -Enjoyment in working together Economic- Cost/Benefit	*Case Study and Survey 1* The survey did report on the enjoyment of working together at the data analysis workshop and subsequent publications. The external funding was insufficient to cover the costs. Collaboration helped find additional resources and local funding that helped. *Case Study and Survey 2* Social factors were highlighted.

Lippe & Brocke 2016;	Having common goal and shared vision	*Case Study and Survey 1* Common goals based on agreed milestones helped. A vision could have been useful
		Survey 2 Common vision was not used but commitment to goals emphasised
Hunter & Leahy 2008; Birnholtz 2006	Indicators and rules for co-authorship	*Case Study and Survey 1* No detailed processes were used but it was mutually understood who will lead the articles and who will be included. If a researcher contributed but did not contribute to the article his/her contributions were recognised
		Survey 2 Suggested early agreements on co-authorship
Laudel 2002	Prestige of institutions; methodology; availability of large data	*Case Study and Survey 1* Prestige of lead researchers was more important
		Survey 2 Expertise was important especially when experts were required to form an effective team
Brocke & Lippe 2015	Management – Flexibility and firmness	*Case Study and Survey 1* Setting procedures and processes using project management principles helped. Could be explained by the fact that the researchers knew about project management and were also not pure scientists.
		Survey 2 Firmness would help. However bureaucratic processes caused delays and created hurdles wasting valuable time

Table 4 provides a comparison between barriers identified from the literature reviewed and the reflections on barriers from the leadership research and the second survey

Table 4 Comparison between literature and findings from this study on barriers to research collaborations

Source	Findings from literature	Case Study and Survey 1 (See below for Survey 2)
Brinholtz & Bietz (2003) Lowe & Phillison (2009) Hockman et al. (2010) Evans et al. (2011)	Reusability of data took too much effort	Data was stored by each research team and exchanged using Dropbox
	Governance and assessment due to too many agencies involved	Overall project was governed by single research protocol and a master schedule. Priority was set by agreed common schedule.
	Different priorities, competitive tensions hierarchical culture credit sharing	Some evidence of looking at lead researchers to lead showed hierarchical tendencies. Credit sharing in articles did not pose problems but a protocol on authorship could help in future projects
	Working across borders	Working across countries was not a major issue although some researchers from countries other than where lead researchers located missed the face-to-face interaction between themselves as they worked mainly, with PIs. PIs used teleconferences and meeting at international conferences to minimise hurdles due to working from different geographical locations. The data analysis meeting mid-way brought also helped to bring researchers across the world together
	Homophily resulted in institutional and geographical constraints	Homophily could have played a part in the formation of local teams as members of the team usually came from the same institution or knew each other before.
	Sociotechnical factors that also enable collaborations were ignored due to putting priority on technical factors	Sociotechnical factors were addressed by mentoring team members from other countries to publish articles together with PIs

The only barrier that corresponded to the literature from Survey 2 was working across borders:

Working across borders and different times did cause issues (RR2 and RR8) but were overcome by driving across borders to have regular meetings (RR5).

Table 5 provides a comparison between enablers identified from the literature reviewed and the reflections on enablers from the leadership research and the second survey.

Table 5 Comparison between literature and findings from this study on enablers to research collaborations

Source	Enablers	Case Study and Survey 1 (See below for Survey 2)
Pennington (2008) Beaver (2001) Jirotka et al. (2013) Farooq et al. (2009)	Language barriers resolved by scientists familiar with principles	The PIs. had worked with some of the team members from other countries previously which eliminated any language barriers.
	Internet technology overcame issues due to location in other countries	Teleconferences were successfully used by PIs to manage progress and direct the research
	Collaboratory structures helped in setting up powerful computer-based infrastructure	There was no need for a powerful computer-based infrastructure for this research

None of the enablers described in the literature were evident from Survey 2.

Conclusions

We started this inquiry with the research question:

How and why is collaborative research conducted in project management research?

A retrospective analysis of collaboration in the PMI research project using action research cycles has helped the authors to understand how collaboration worked in a research project led by the authors. It also highlighted how surprises at each stage of the cycle prompted new considerations or activities in the next cycle of action research that helped move the projects forward as well as contribute to its success. We briefly summarize the major improvements.

AR Cycle 1 – The realisation that senior managers in organizations also influenced the sharing of leadership that resulted in adding questions to our questionnaire. We identified social and cognitive factors that affected the distribution of leadership, which led us to the concept of socio-cognitive space to make a theoretical contribution from our research.

AR Cycle 2 – A theory of balanced leadership developed during this cycle made us realise that we could have several publications based on the five events we identified that enable the movement of leadership between a vertical leader and a horizontal leader during a project. We decided to ask all the researchers in the study to contribute papers based on the five events, which has resulted in many more publications that what we promised PMI as outputs from the grant. This had the effect of strengthening our collaboration through the additional activities involved in publishing these papers.

AR Cycle 3 – We realised that since we were submitting several papers on our research topic around the same time we had to find new journals to submit our papers to other than just project management journals.

Since research outputs were cited as a measure of effectiveness of collaboration in the literature (Brinholtz 2006; Hunter & Leahy 2008; Sonnenwald 2007), we counted the number and types of publications that have resulted from the study in Table 6.

Table 6: List and characteristics of outputs

Type	Total	Authored by PI	Authored by Non-PI	Lead Author PI	Lead Author Non-PI
Journal	8	8	0	4	4
Book Chapter	2	1	1	1	1
Conference Paper	12	9	3	8	4
White Paper	1	1	0	1	0
Magazine Article	1	0	0	0	Journalist
Master's Thesis	1	0	1	0	1
PhD Thesis	1	0	1	0	1

Table 6 shows that there were equal number of journal articles that were led by the principal investigator and non-principal investigators showing that the collaboration benefitted Non-PIs to benefit from the collaboration. The research also contributed to higher degrees research providing emergent researchers to make us of this study to advance their research,

The study received a research excellence award from an international project management association. This indicates that it was considered important by the international project management community.

No direct comparison could be made between the research projects examined from the second survey with our research project, as some of these projects are still ongoing. However, it was noted that researchers use a variety of outlets such as book chapters, blogs and films besides journal articles and conference papers to disseminate their research outcomes. It was also observed that journal articles take time, while conference papers can serve as intermediate points to present and discus intermediate results.

Tables 6 shows that collaborative research can support or generate several outputs including publications in ranked journals as well as non-traditional outputs which is also mentioned in the literature (Choudhury & Uddin 2018; Frenken et al. 2005). Some doctoral students who participated in the study also gained experience in conducting research and co-authored some publications.

In general, no conflicts were observed regarding authorship of publications. There were no 'free riders' nor were there instances of an experienced researcher being included as a co-author without any contribution from them. This demonstration of trust, honesty and integrity helped in people coming forward to write papers.

As the authors reflected on the answers to a question on interesting incidents during the first survey, a supplementary research question arose:

What are the barriers and enablers to collaborative research in project management?

Hence, a question on barriers and enablers was added to the second survey. The responses from these questions have been analysed into themes in the data analysis section. See Table 2 and subsequent discussions.

Using three action research cycles on how collaboration occurred in the case study discussed in this article, and two comparison tables between the literature on research collaborations and the findings from the case study and the analysis of responses from the two surveys presented, this article contributes to theory and practice in the following ways.

The combined analysis has contributed to a better understanding of how collaborative research takes place in a practice-oriented discipline such as project management, adding to the existing literature on scientific collaboration as well as collaboration in social science. It has also contributed to the literature on barriers and enablers to collaboration when the research is carried out across geographical boundaries and different national cultures. In addition, it has contributed to the use of action research as a metamethodology for evaluating research collaborations as a phenomenon.

From the point of view of practice, this research has provided some useful ideas in Table 1 for project management researchers to take into consideration in setting up collaborative research projects. The findings from the two surveys also showed that project management processes did help with collaborative research while the literature had mixed views on their effectiveness. This may require further investigation.

We used action research as a metamethodology to frame this article. While the research was framed using three reflective cycles using a typical model of action research based on Perry & Zuber-Skerritt (1992), we would like to add some reflections on how our efforts to portray action research as a metamethodology fared based on a recent papers on the use of action research as a metamethodology in management research.

Erro-Garcés &Alfaro-Tranco (2020, p. 8) found that 'AR as a metamethodology is not closely linked to the specific problems but is related to the "context" where the AR is put into practice'. In our research AR was not the methodology we used in our research project, where we used case studies, but it was used to reflect on collaboration in project management research to 'develop a holistic understanding' (p. 9) of how and why collaboration took place during our study.

With reference to Attwater (2014), we found that by using AR as a meta-methodology we learnt 'the way into the details and complexity of the situation of interest' (p. 532), which helped us to understand collaboration in project management research.

In terms of people who participated in the research (mostly academics with a few practitioners), we learnt more about our research questions through our personal reflections and surveys. The reflections helped us to understand how to improve collaboration in the future such as the need for a vision and online meetings with a broader group. We also found a theoretical explanation of executed tasks through modelling the study into three cycles which could serve as a guideline for future collaborative endeavours.

However, this research has some limitations.

It is a single case study and has limited response from a small sample using a survey. An extension of this research would be to interview researchers from multiple case studies of collaborative research in project management to discuss the finer aspects of collaboration. This could provide more insights into enablers, barriers and ways to enhance more collaboration. There is also a need for more research on the trend of co-authorships in project management journals and conferences, which would help us to understand the performance of collaboration better.

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Figure 1. - Multimethod used for this paper

Reflect
progress and replan

Action Research Meta-Mathodology

Observe
research progress

Plan
the research

Act
to conduct research

AR Cycles

Plan Goal

Reflect **1** Act

Observe

Plan Goal **3**

Reflect **2** Act etc.

Observe

Plan
how to report results

Paper Writing

Reflect
on data and results

Act
collect data from researchers
(internal and external)

Observe
by comparing data

Conclude and submit Paper

Adapted from Perry & Zuber-Skerrit (1991: 76)