
Title registration for a systematic review:

Predictors of virtual team outcomes

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- Crime and Justice
- Education
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- Other:

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Title of the review

Predictors of virtual team outcomes

Background

In the last decades, globalizations and technological innovations made it possible for companies to set up virtual teams which collaborate across time and space. With time, the distinction between virtual and non-virtual teams has become blurred where most teams work to varying degrees virtually (i.e., non-face-to-face). Today, virtual team work is so widespread across industries and organizational levels that the question is no longer whether virtual teams should be used by organizations, but how can organizations help their virtual teams perform at their best. However, the conditions that foster virtual team effectiveness remain elusive. A quick consultation of the research literature suggests that virtuality may have a negative influence on team processes and outcomes but also that this may not be true for all virtual teams (Ortiz de Guinea, Webster, & Staples, 2012). Recent empirical work has drawn attention to certain factors that may affect virtual team performance, including the ‘richness’ of communication media (Hambley, O’Neil, & Kline, 2007), intra-team trust (Breuer, Hüffmeier, & Hertel, 2016), cultural diversity (Han & Beyerlein, 2016), and the availability of group support systems (Shin-Yuan, Chuan, & Chia-Ming, 2007). In this context, a systematic review of the team-level and contextual factors that predict virtual team effectiveness can provide comprehensive information to organizations looking to effectively design and manage their virtual teams.

Relevance for practice

Changes in the business environment, globalization, and decentralization of work processes require organizations to coordinate work across organizational, spatial, and temporal boundaries. Broadband communication technologies have enabled the distribution and coordination of work across time zones and locations with little cost (Curseu et al, 2007; Hertel et al, 2005). For example, a survey done in 2012 on 379 organizations in the USA found that 66% of the multinational ones and 46% of the whole sample were using virtual teams (Minton-Eversole, 2012). Yet, organizations often fail to proactively manage the factors that impact the effectiveness of virtual teams. Some companies like Yahoo! and Reddit even went as far as discouraging virtual work in favor of face-to-face interaction (Truong, 2014). At the same time, research on this topic is fragmented. Primary studies appear to provide mixed findings (Ortiz de Guinea, Webster, & Staples, 2012). For this reason, a systematic review of the scientific literature according the Campbell standards will provide organizations an important and trustworthy point of reference for the design and management of virtual teams.

Objectives

This systematic review seeks to answer the following question:
Which team level and contextual factors predict virtual team outcomes?

Existing reviews

To identify existing systematic reviews and/or meta-analyses, the following databases were consulted: ABI/INFORM Global and Business Source Premier. A search was conducted using combinations of different search terms, such as 'virtual team', 'remote team', 'mobile team', and 'distributed team'. We conducted five different search queries and screened the titles and abstracts of 14 studies. After screening the abstracts and full text for relevance we identified three systematic reviews and five meta-analyses. The search strategy is described in the table below:

ABI/Inform Global, Business Source Elite peer reviewed, scholarly journals, August 2018		
Search terms	ABI	BSE
S1: TI("virtual team*") OR AB("virtual team*") OR TI("virtual group*") OR AB("virtual group*") OR TI("virtual work*") OR AB("virtual work*")	977	1,067
S2: TI("remote team*") OR AB("remote team*") OR TI("remote work*") OR AB("remote work*")	109	128
S3: TI("mobile team*") OR AB("mobile team*") OR TI("mobile work*") OR AB("mobile work*")	194	239
S4: TI("distributed team*") OR AB("distributed team*") OR TI("distributed work*") OR AB("distributed work*")	274	284
S5: TI("dispersed team*") OR AB("dispersed team*") OR TI("dispersed work*") OR AB("dispersed work*")	116	118
S6: S1 OR S2 OR S3 OR S4 OR S5	1,591	1,759
S7: TI(meta-analy*) OR AB(meta-analy*) OR TI("systematic review") OR AB("systematic review")	8,454	7,599
S8: S6 AND S7	9	12
Duplicates removed	14	
Relevant	8	

One additional review has been also identified, based on the authors' previous experience in the field: Hertel, Geister, and Konradt (2005).

Reviews

1. Curşeu, P. L., Schalk, R., & Wessel, I. (2008). How do virtual teams process information? A literature review - and implications for management. *Journal of Managerial Psychology*, 23(6), 628-652. doi:10.1108/02683940810894729

2. Han, S. J., & Beyerlein, M. (2016). Framing the effects of multinational cultural diversity on virtual team processes. *Small Group Research, 47*(4), 351-383
3. Matalonga, S., Solari, M., & Maturro, G. (2013). Factors affecting distributed agile projects: A systematic review. *International Journal of Software Engineering and Knowledge Engineering, 23*, 1289-1301. 10.1142/S021819401350040X.
4. Hertel, G., Geister, S., & Konradt, U. (2005). Managing virtual teams: A review of current empirical research. *Human Resource Management Review, 15*(1), 69-95. doi:10.1016/j.hrmr.2005.01.002

Meta-analyses

1. Breuer, C., Hüffmeier, J., & Hertel, G. (2016). Does trust matter more in virtual teams? A meta-analysis of trust and team effectiveness considering virtuality and documentation as moderators. *Journal of Applied Psychology, 101*(8), 1151-1177. doi: 10.1037/apl0000113
2. Dennis, A. R., & Wixom, B. H. (2001). Investigating the moderators of the group support systems use with meta-analysis. *Journal of Management Information Systems, 18*(3), 235-257. doi: 10.1080/07421222.2002.11045696
3. Lin, C., Standing, C., & Liu, Y.-C. (2008). A model to develop effective virtual teams. *Decision Support Systems, 45*(4), 1031-1045. doi: 10.1016/j.dss.2008.04.002
4. Mesmer-Magnus, J. R., DeChurch, L. A., Jimenez-Rodriguez, M., Wildman, J., & Shuffler, M. (2011). A meta-analytic investigation of virtuality and information sharing in teams. *Organizational Behavior and Human Decision Processes, 115*(2), 214-225. doi: 10.1016/j.obhdp.2011.03.002
5. Ortiz de Guinea, A., Webster, J., & Staples, D. S. (2012). A meta-analysis of the consequences of virtualness on team functioning. *Information & Management, 49*(6), 301-308. doi:10.1016/j.im.2012.08.003

The systematic reviews and meta-analyses listed above suggest a substantial body of virtual team research emerged over the past decades. However, it is fragmented and limited in scope. For example:

- The four reviews are all descriptive reviews of literature, which are useful to map the existing literature at the point in time when they were conducted, but they do not give quantitative information on the relationships between the variables.
- Out of the five meta-analyses identified, three look at specific relationships between one variable and virtual team effectiveness: trust (Breuer, Hüffmeier, & Hertel, 2016), information sharing (Mesmer-Magnus, DeChurch, Jimenez-Rodriguez, Wildman, & Shuffler, 2011), and the existence of a Group Support System (Dennis & Wixom, 2002). However, none of these three meta analyses assessed the methodological quality of the included studies, only limited checks were made against publication bias (file drawer k was computed but not discussed in Mesmer-Magnus et al., 2011), and no checks were made to assess other biases. These limitations might affect the results of these meta-analyses.

- **Lin, Standing, & Liu (2008)** conducted a meta-analysis on 50 studies looking at the relationship between several team input factors, processes, emergent states and team performance. They found that communication, cohesion, coordination, relationship building, and trust were significantly related to virtual team performance. However, the meta-analysis has certain limits: the methodological quality of the included studies was not assessed and no checks were made for publication or outcome reporting bias. Furthermore, the meta-analysis was published a decade ago and it is likely that in the meantime many relevant primary research studies were conducted that would enrich the findings.
- **Ortiz de Guinea, Webster, & Staples (2012)** looked at the relationship between a team's degree of virtuality ("virtualness") and mediators (knowledge sharing, conflict and communication) and outputs (team performance and satisfaction). The analysis found the degree of virtuality to be positively related to task conflict and negatively related to communication frequency, knowledge sharing, performance and satisfaction. This meta-analysis has similar limitations to the previous ones, since the methodological quality of the included studies was not assessed and no checks were made for publication or outcome reporting bias.

Intervention

This review focuses on team level and contextual predictors of virtual team outcomes over time. Possible predictors include but are not limited to:

- Team characteristics (i.e., tenure, type, size, diversity in demographic characteristics, cultural or educational background, IT-related competencies, and attitudes)
- degree of team virtuality (physical/geographic dispersion of members, use of electronic communication media – frequency and type-, asynchronicity of communication, and proportion of work time spent apart);
- task characteristics (i.e., type, complexity, and level of interdependence);
- team processes (e.g., coordination, conflict management, progress monitoring, etc.)
- team states (e.g., trust, conflict)
- organizational factors (organizational support, leadership style, and availability of group support systems).

Population

Virtual teams take many forms, having diverse objectives, membership criteria, task types, and so on. As a result, a variety of definitions of virtual teams exist (Curseu et al., 2007).

However, we focus our approach on a core consensus that a virtual team consists of:

- two or more persons
- interacting collaboratively to achieve common goals
- where at least one member works in a different location or time
- using electronic media to various degrees in order to communicate and coordinate.

Outcomes

Empirical studies will be included if at least one of the following three types of outcomes (Hackman, 1983) is measured at the team level:

1. Team performance – the extent to which the productive output of the group meets or exceeds the performance standards. Measures include: production or output, goal attainment, decision making, creativity/innovation, problem solving.
2. Team viability – the extent to which the team processes occurring during task completion maintain or enhance the team members' willingness of working together in subsequent tasks. Measures include: intent to leave the team, perceived viability, etc.
3. Team satisfaction – the extent to which the team responds to/ satisfies (vs. frustrates) the team members' needs throughout task completion. Measures include: satisfaction with team members, with team organization, with roles distribution, etc.

We will include studies based on either objective measures (e.g., financial performance, number of correct answers) or subjective measures (e.g. through ratings by individuals).

Study designs

All quantitative research designs that establish a time-order relationship between a predictor and team effectiveness will be included such as randomized controlled trials, non-randomized controlled trials, before-after studies, longitudinal studies, and studies with a time lag between the measurements of the predictors and the outcome variable.

References

- Breuer, C., Hüffmeier, J., & Hertel, G. (2016). Does trust matter more in virtual teams? A meta-analysis of trust and team effectiveness considering virtuality and documentation as moderators. *Journal of Applied Psychology, 101*(8), 1151-1177. doi:10.1037/apl0000113
- Curşeu, P. L., Schalk, R., & Wessel, I. (2008). How do virtual teams process information? A literature review - and implications for management. *Journal of Managerial Psychology, 23*(6), 628-652. doi:10.1108/02683940810894729
- De Guinea, A. O., Webster, J., & Staples, D. S. (2012). A meta-analysis of the consequences of virtualness on team functioning. *Information & Management, 49*(6), 301-308. 0378-7206/\$ – see front matter 2012 Elsevier B.V. All rights reserved. doi:10.1016/j.im.2012.08.003
- Dennis, A. R., & Wixom, B. H. (2001). Investigating the moderators of the group support systems use with meta-analysis. *Journal of Management Information Systems, 18*(3), 235-257. doi: 10.1080/07421222.2002.11045696
- Hambley, L. A., O'Neil, T. A., & Kline, T. J. (2007). Virtual team leadership: The effects of leadership style and communication medium on team interaction styles and outcomes. *Organizational Behavior and Human Decision Processes, 103*, 1-20. doi:10.1016/j.obhdp.2006.09.004

- Han, S. J., & Beyerlein, M. (2016). Framing the effects of multinational cultural diversity on virtual team processes. *Small Group Research*, 47(4), 351-383. doi:10.1177/1046496416653480
- Hertel, G., Geister, S., & Konradt, U. (2005). Managing virtual teams: A review of current empirical research. *Human Resource Management Review*, 15(1), 69-95. doi:10.1016/j.hrmr.2005.01.002
- Lin, C., Standing, C., & Liu, Y.-C. (2008). A model to develop effective virtual teams. *Decision Support Systems*, 45(4), 1031-1045. doi: 10.1016/j.dss.2008.04.002
- Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, 26(3), 356-376. doi:10.2307/259182
- Matalonga, S., Solari, M., & Matturro, G. (2013). Factors affecting distributed agile projects: A systematic review. *International Journal of Software Engineering and Knowledge Engineering*, 23, 1289-1301. doi:10.1142/S021819401350040X.
- Minton-Eversole, T. (2012). *Virtual teams used most by global organizations, survey says*. Alexandria, VA: Society for Human Resource Management
- Mesmer-Magnus, J. R., DeChurch, L. A., Jimenez-Rodriguez, M., Wildman, J., & Shuffler, M. (2011). A meta-analytic investigation of virtuality and information sharing in teams. *Organizational Behavior and Human Decision Processes*, 115(2), 214-225. doi:10.1016/j.obhdp.2011.03.002
- Truong, A. (2014, March 10) Reddit Gives Remote Employees Until End Of Year To Relocate To San Francisco. *Fast Company*, Retrieved from <https://www.fastcompany.com>
- Shin-Yuan, H., Chuan, I. D., & Chia-Ming, C. (2007). A longitudinal study of virtual teamwork with and without group support systems. *International Journal of Management & Enterprise Development*, 4(6), 703-719. doi:10.1504/IJMED.2007.014990

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Roles and responsibilities

Iulia Cioca will lead the work of the team during the stages of the systematic review. She holds basic methodological expertise in systematic reviews, having experience in retrieving literature, evaluating study methodology, and synthesizing results. Furthermore, she will contribute with her experience in implementing insights from research into practice.

Oana Fodor will contribute in all the stages of the systematic review, given her expertise in teams theories and research and her applied expertise in HR consulting.

Shannon Marlow will contribute in all the stages of the systematic review, bringing content expertise and experience in conducting meta-analyses on various themes, including team-related topics.

To develop relevant search strings and perform searches in specific databases a librarian will be consulted.

Funding

Authors are not receiving funding.

Potential conflicts of interest

Shannon Marlow is co-author of a meta-analysis that might be eligible for inclusion in the systematic review. The focus of this research was not specifically on virtuality so it may not be relevant but it does examine virtuality as a moderator. Reference:

Marlow, S. L., Lacerenza, C. N., Paoletti, J., Burke, C. S., & Salas, E. (2018). Does team communication represent a one-size-fits-all approach?: A meta-analysis of team communication and performance. *Organizational Behavior and Human Decision Processes*, 144, 145-170.

Oana Fodor is a co-author on several unpublished manuscripts that might be eligible for inclusion in the systematic review. The manuscripts explore topics related to teams such as multiple team membership etc. The focus of these research projects was not on virtuality, therefore they may not be relevant, but they examine similar variables (i.e. virtual leadership). An example is:

Fleștea, A.M., Bria, M., Curșeu, P.L., & Fodor, O. (under review) Motivation to learn from multiple projects: A myth of modern work design?

Both co-authors have disclosed these interests fully to other members of the team and have in place a plan for managing any potential conflicts arising from that involvement. The other two authors will review the potentially relevant article and decide whether it is relevant for inclusion. The author of the research manuscript will not be involved in the decision.

Preliminary timeframe

- Date we plan to submit a draft protocol: May 2019
- Date we plan to submit a draft review: May 2020