

# Improving Evidence Quality for Organisational Change Management through Open Science

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### **Abstract**

**Purpose:** Popular contingency approaches to organisational change management imply that it is known what and when practices are most appropriate and effective to manage change. The current work questions this assumption.

**Approach:** The current work critically reviews the quality of current evidence supporting organisational change management and considers the role of open science practices for the field.

**Findings:** First, evidence informing organisational change management is poor; heavily reliant upon unquestioned theoretical models and low-quality cross-sectional or case-study designs. Greater adoption of an evidence-based approach to practice could facilitate organisational change management, but only once a higher-quality of evidence is available to inform more robust practical guidance. Second, open science practices look well placed to drive a higher quality of evidence suitable for informing future change management.

**Value:** The current work highlights the problematic nature of the quality and application of current evidence to inform organisational change and raises a number of recommendations to support future evidence development using an open science approach.

**Key words:** Organisational Change; Change Failure; Evidence-based Practice; Open Science; Evidence Quality

## **Improving Evidence Quality for Organisational Change Management through Open Science**

The predominantly realist field of organisational change management describes change as “the process of continually renewing an organization’s direction, structure, and capabilities to serve the ever-changing needs of external and internal customers” (Moran & Brightman, 2001, p. 111). Change can adopt a number of different forms, including small yet distinct incremental adjustments or continuous ongoing developments and can be planned or emergent (Al-Haddad & Kotnour, 2015; Todnem By, 2005), and even the nature or type of change can change as it unfolds (Van de Ven & Sun, 2011).

Change is considered an organisational requirement to ensure its practices remain relevant and thus profitable (Branson, 2008). Change is important to execute successfully as change itself can demand high opportunity and process costs (Jacobs, van Witteloostuijn, & Christe-Zeyse, 2013; Mellert, Scherbaum, Oliveira, & Wilke, 2015). Change also has an individual cost which impacts upon emotions at an individual level (Castillo, Fernandez, & Sallan, 2018; Helpap & Bekmeier-Feuerhahn, 2016). For example, individual-level responses to change can be positive and facilitate change (Tsaousis & Vakola, 2018), or can represent insecurity and thus a traumatic experience which can lead to compromised mental health and resistance (Harvey et al., 2017). Acknowledging such demands, the success of change is of primary importance to organisational prosperity.

There is a broad consensus that planned organisational change frequently fails to achieve the outcomes for which it is implemented (Balogun & Hailey, 2008). Evidence from a variety of sources appears to converge in suggesting about 70% of change initiatives fail to achieve their primary objective. Industry estimates typically vary around 60-90% (Beer & Nohria, 2000; Raps, 2004). For example, in a survey of 300 electronic companies, Schaffer & Thomson (1992) reported that 63% failed to resolve quality defects by 10%. Academic research provides concurrent arguments, with typical estimates of 81% (Smith, 2003) and 75% (Mourier & Smith, 2001).

Whilst this body of work appears to have converged, there is often little-to-no reliable evidence underpinning these estimates (Burnes, 2011). There is insufficient evidence to establish a robust understanding of change success as outcomes often depend upon the conceptualisation, perception and measurement of change (Hughes, 2011). For example, whilst a literature review

on change rates estimated a 67% failure rate (Smith, 2002), this does appear to vary dramatically by a range of factors including the stakeholder measuring change and type of change. Median success rates are 19% for culture change and 46% for restructuring/downsizing and ratings of success are higher when rated by organisations/senior leaders rather than individuals working lower within the organisation (Smith, 2002). Furthermore, this assessment of success is almost always phrased in a positivist/rational manner, assuming that change has a single specific purpose for which performance can be monitored and evaluated, and that the reasons for its failure can be controlled (Hassard, 1995). Such percentage estimates also assume a single reality in which success or failure is binary and unanimous. As such, to attempt to categorise any change as a success or failure is a complex and thus likely misleading endeavour. However, this is not to deny that change can fail to enact its primary purpose. Whilst the likelihood of successful and sustained organisational change in any one initiative is unclear, there does appear to be an important role for exploring the evidence behind current practices towards improvements in understanding and implementation (Burnes, 2011).

To understand whether and how something works, a clear definition and explicit goal is required. However, organisational change is neither clearly defined nor interpreted consistently (Pollack, 2015). Indeed, there is little agreement on the different types of change, with a multitude of labels and definitions available (Todnem By, 2005). As such, findings often reflect the jingle-jangle fallacy (Thorndike, 1904): the erroneous assumptions that two change types are the same as they bare the same label (jingle) or are different because they hold different labels (jangle). This is true also of the variety of change models, which seem to have mostly shared underpinnings with few unique components (Bamford & Forrester, 2003; Rosenbaum et al., 2018). Similar levels of inconsistencies are reflected within change methods and outcomes (Al-Haddad & Kotnour, 2015). Inconsistencies in definitions, approaches and theories of changes have led to a fragmented and thus limited field (Burnes, 2011; Weick & Quinn, 1999). As such, the vast majority of theories and approaches accessible to academics and practitioners appear to represent inconsistent and unconvincing evidence (Burnes, 2004; Todnem By, 2005).

The most widely-endorsed perspective on change management suggests there is not a universal blueprint for optimal outcomes, and instead that a contingency approach is needed whereby the relevance of various factors to the specific organisational and change context requires ongoing negotiation (Burnes & Jackson, 2011; Dunphy & Stace, 1993; Jacobs et al., 2013; Jansson, 2013; Sturdy & Grey, 2003; Todnem By, 2005; Van de Ven & Sun, 2011). In a systematic

literature review, Mosadeghrad and Ansarian (2014) determined 55 qualitative themes and 5 broad quantitative categories of common barriers that impact the success of an organisational change. As a whole, these themes amounted to three key factors: Ineffective or inappropriate models/tools of change, methods for implementation, and inappropriate environment. This model, and perspective as a whole, implies that it is known what practices are most appropriate and effective, and when. This should be questioned. Building upon Mosadeghrad and Ansarian's (2014) review and subsequent model, the current work first explores the quality of evidence available to inform practice and thus considers whether current evidence-based organisational change management is likely to be fruitful.

### **Evidence-based Organisational Change Management**

Evidence-based practice refers to “conscientious, explicit and judicious use of the best available evidence... to increase the likelihood of a favorable outcome” (Barends, Rousseau, & Briner, 2014, p. 4). Evaluating the available evidence and implementing practices which hold the highest quality evidence, considering scientific, organisational, stakeholder and practitioner sources, should be a central priority for the effective management of organisational change. For evidence-based practice to be effective in supporting change management however, a body of quality evidence is needed (Kepes, Bennett, & McDaniel, 2014).

Empirically-driven change research has been critiqued on the basis of quality for several decades (e.g. Macy & Izumi, 1993). There is little interpretation of change built upon much more than superficial quantitative analyses, whereby the subsequent majority of theories and practices represent unchallenged assumptions (Doyle, 2002; Guimaraes & Armstrong, 1998). Edmonstone (1995, p. 16) supports this observation when stating “many of the change processes over the last 25 years have been subject to fundamental flaws, preventing the successful management of change”. Little robust empirical evidence has been provided to support these different theories, approaches and practices (Guimaraes & Armstrong, 1998; Todnem By, 2005). As such, there are many deficits in understanding, such as that informing sustained change (Buchanan et al., 2005).

Within the academic literature, there is a general consensus that randomised control trials and cohort studies typically represent high quality evidence, with case reports and cross-sectional surveys representing relatively poor-quality evidence (Kepes, Bennett, & McDaniel, 2014). In a systematic literature review of 563 academic studies on change interventions, Barends,

Janssen, ten Have and ten Have (2014a) found only 10 pre-test-post-test studies whereby participants were randomly allocated to change or control groups. As randomised controlled studies are most capable of drawing causal conclusions about the consequences of such interventions, limited uptake of this study design is highly problematic. Instead, the majority (77%) of interventions were evaluated using poor quality methods such as cross-sectional and case study designs. This lack of quality evidence in change intervention evaluation, the predominant driver of guidelines for implementation, is problematic (Packard & Shih, 2014). Even papers claiming to use evidence-based practice lack robust empirical evaluation of organisational change (e.g. Austin & Ciaassen, 2008; Newhouse, Dearholt, Poe, Pugh, & White, 2007).

Furthermore, the most commonly adopted theoretical models do not represent high-quality evidence (Raineri, 2011). For example, Kotter's (1996) eight-stage process is often praised (Appelbaum, Habashy, Malo, & Shafiq, 2012) and has been widely applied due to its accessibility (e.g. King, Hopkins, & Cornish, 2017). There is very little direct empirical testing of this model however, with the vast majority of evidence collected by Kotter himself. Furthermore, the model is most frequently applied as a post-hoc structure to explain change case studies, rather than being the primary theoretical driver of organisational change interventions (Appelbaum et al. 2012). Moreover, Pollack and Pollack (2015) and Hackman (2017) found it inadequate in representing the complexity of the change process in practice. For example, despite being presented as a linear process, different stages of the process had to be implemented at various levels of the organisation concurrently. The vast majority of theories, and thus tools, overlap in their shared assumptions and in doing so have limited the diversity of techniques available to practitioners (Bamford & Forrester, 2003). For example, Rosenbaum, More and Steane (2018) found theoretical commonalities between 13 planned organisational change models, arguing them to represent the centrality of Lewin's (1947) three-step model.

From a theoretical perspective, change is often presented using a rational approach, as "neat linear prescriptions on how to best manage change", however the reality more clearly represents a "complex muddled political process consisting of competing histories and ongoing multiple change narratives which may vie for dominance" (Dawson, 2003, p. 37). Kotter's (1996) model is one of the most praised and widely-studied approaches to organisational change, yet represents a good example of these sanitised and reductionist stories which have led to a number of simplistic and contradictory recommendations for practice (Appelbaum et

al., 2012). There are many alternatives to these realist approaches to organisational change, however they infrequently lead to meaningful guidance to support practice because they too fail to inspire a coherent and thus convincing body of evidence (Bamford & Forrester, 2003; Todnem By, 2005). It thus seems likely that the state of understanding of many organisational change models is limited (Todnem By, 2005).

There is little use of high-quality evidence in many HR and management fields (e.g. Barends et al., 2017; Kepes, Bennett, & McDaniel, 2014; Rousseau, 2006; Rynes, Colbert, & Brown, 2002), and organisational change is no different (Packard & Shih, 2014; Stouten, Rousseau, & De Cremer, 2018). A distinct academic-practitioner divide is apparent in the field of organisational change (e.g. Applebaum et al., 2012; Buchanan, 1993; Saka, 2003; Stouten et al., 2018), with a need to “translate current research into a format usable by practitioners” (Applebaum et al., 2012, p. 764). Indeed, practitioners and academics seem to discuss and hold different mental representations of change (Pollack, 2015). Because there are no unitary theories or evidence for conclusively preferable strategies or tools, practitioners can justify any given approach by arguing that some evidence is better than none. Unfortunately, this evidence is often based upon reflection of personal experience and case-studies, which are normally limited and may not be as convincing as the body of evidence for other approaches (Shaw, 2018). Indeed, organisational change practitioners acknowledge that they frequently plagiarise existing practices and methods rather than looking for best practices in each specific context (Shaw, 2018). Such decision-making clearly strongly diverges from the goal for evidence-based practices: to make decisions through conscientious, explicit and judicious use of the best available evidence considering multiple sources of evidence (Kepes, Bennett, & McDaniel, 2014).

In sum, the evidence informing organisational change management is poor, heavily reliant upon unquestioned theoretical models and low-quality cross-sectional or case-study designs, particularly with respect to organisational change evaluations. Current change management practices seem particularly problematic because they are often tautologically justified – models and tools are chosen based upon previous experience, which are often drawn from case-studies with post-hoc theory imposed, and this leads to their continued (unquestioned) use in future work. The evidence reviewed suggests that greater adoption of evidence-based organisational change management could facilitate organisational change success, but only once a higher-quality of evidence is available to inform more robust practice.

## **Open Science to Improve Evidence and Evidence-Based Practice**

Underpinning the implementation of effective evidence-based practice is quality evidence (Kepes, Bennett, & McDaniel, 2014). The literature reviewed above suggests the assumption that there is quality evidence to inform practice, and thus that evidence-based practice will likely be successful, is currently problematic. One body of practices well-placed to improve the quality of evidence available to inform organisational change management is captured by the term ‘Open Science’. Open Science represents a smorgasbord of different researcher behaviours and practices that can increase the accessibility, transparency and replicability of research across the whole research cycle (Vicente-Sáez & Martínez-Fuentes, 2018). Open science practices can include replications, making data, materials and analysis code open-access, pre-registration, and open-review. The current work now explores some of the key barriers and recommendations for the development of quality evidence, and how open science practices will be vital for the development of knowledge capable of informing evidence-based organisational change management. The benefits of the practices discussed here (replication, pre-registration and open data/code/materials) are summarised in Table 1, alongside some initial reading for guidance as to how to implement them.

Developing quality organisational change research upon which future practices can be based is important but likely to be difficult. For example, longitudinal works are vital to understand the process of change using causal inference (Jose, 2016; Maxwell & Cole, 2007; Selig & Preacher, 2009), however these designs are complex and infrequent because they are difficult to manage in practice (Pettigrew, 1990). Whilst the amount of robust quality research is not changing, it appears the quantity of cross-sectional and case-study-based works published are increasing dramatically (Barends et al., 2014a). Such works are not able to draw robust causal and generalisable inferences about change, a phenomenon so inherently tied to time and thus such designs should not be justified on the basis of the complexity of more robust methods (Barends et al., 2014a; 2014b). The clear need for longitudinal research on organisational change is highlighted by the recent development of a theoretical framework to help structure such works (Allcorn, Stein, & Duncan, 2018).

Whilst longitudinal works are not always possible, a more pragmatic recommendation to counter the quality of cross-sectional works would be to encourage greater replication (Barends et al., 2014b; Hamlin, 2018). Whilst this does not manage all issues (Smaldino & McElreath, 2016), replication would be beneficial in minimising opportunistic researcher practices and



challenging questionable results, particularly those conclusions driven by false-positive results (type 1 errors; Murayama, Pekrun, & Fiedler, 2014; Simmons, Nelson, & Simonsohn, 2011). At present, there is very little replication of organisational change studies, and as such ‘one-shot’ studies often stand unchallenged (Barends et al., 2014a). Replications in the broader psychological literature are indeed rare (about 1 per 1000 papers: Makel, Plucker, & Hegarty, 2012), however they are important as studies in fields with infrequent replication often represent more extreme and falsified findings (Fanelli & Loannidis, 2013). From six high-profile replication projects covering 190 classic and contemporary papers in psychology such as Klein, Vianello, et al. (2018), effects were successfully replicated in 47% of replications (Nosek, 2018). Greater replication and an increase in higher-quality designs, including longitudinal and randomised control trials that facilitate alternative explanations and refinement of models, should be a high priority for researchers exploring organisational change (Barends et al., 2014a).

A key contributing factor to the lack of replications and consistency in empirical exploration is the pursuit of, and subsequent rewards associated with, novel findings (Barends et al., 2014a; Munafò et al., 2017). A diverse range of psychological constructs have been applied to the change context without sufficient theoretical grounding. For example, emotional intelligence is a popular construct (e.g. Scott-Ladd & Chan, 2004; Vakola, Tsaousis, & Nikolaou, 2004), but its application to organisational change seems problematic in context of the atheoretical approaches and unreliable measures adopted (Evans & Steptoe-Warren, 2015; Hughes & Evans, 2018). Whilst new explorations of relevant variables are imperative to the development of understanding, a less diverse and more convergent body of evidence with a consistent core is easier to evaluate and synthesise, and thus apply (Cummings, 2004). As such, a greater focus on credibility, rather than novelty, should be championed by researchers, practitioners and journals alike.

A further step towards more robust evidence is pre-registration. Transparently and publicly reporting the theoretical structure, methodology and intended analysis of a study before data is collected could mitigate risks with some of the most prevalent and problematic research practices across research, including p-hacking (manipulating analyses to produce statistically ‘significant’ results) and publication bias (when research outcomes impact likelihood of publication; Lakens, 2019; Munafò et al., 2017).

Pre-registration would be particularly beneficial for organisational change research. First, there is a high prevalence of post-hoc application of change theories to explain and structure findings (Appelbaum et al., 2012). This hypothesising after results are known (HARKing) is a problematic researcher practice which can distort understanding (Kerr, 1998). Pre-registration could minimise this practice by requiring transparency in theoretical structure *before* data is collected. This would also have the consequence of increasing the focus upon theory and its relevance to the interventions, thereby encouraging more direct and critical evaluations of the different theoretical structures and approaches adopted (van't Veer & Giner-Sorolla, 2016).

Second, pre-registration could help challenge the positivist/rational assumptions perpetuated by current practices that change has a single purpose for which it can be attributed a unanimous binary status of success or failure (Hassard, 1995). Pre-registration would allow for a more nuanced assessment of success or failure in that any relevant individual or organisational outcomes would be considered before data collection. As all outcomes specified would then have to be reported upon, pre-registration would prevent partial reporting or the suppression of negative findings and thus minimise publication bias, providing a more nuanced picture as to how change interventions impact outcomes (van't Veer & Giner-Sorolla, 2016). Furthermore, pre-registration would minimise the presentation of opportunistic or exploratory outcomes as confirmatory, the latter of which constitutes weaker evidence due to the risk of confirmation or hindsight biases (Wagenmakers et al., 2012).

Third, given the extent of diversity in change terms, types, theories and models fuelling jingle and jangle fallacies (Rosenbaum et al., 2018; Todnem By, 2005), pre-registration could facilitate a more coherent and credible body of evidence. Public registration will likely encourage researchers to be more accountable and conscientious, responsible for providing consistent, specific and transparent articulation of all relevant details to prevent later critique (Nosek, Spies, & Motyl, 2012). Particularly for reviewed pre-registrations (van't Veer & Giner-Sorolla, 2016), greater precision will facilitate development of a more coherent and consistent body of evidence of value to academics and practitioners alike. A more shared language may then have several cumulative benefits including more focussed incremental developments prioritising credibility over novelty, and more collaborative research, both capable of increasing evidence quality (Vazire, 2018).

High-quality pre-registration, due to the planning and precision required, may also encourage greater adoption of other open science practices, including providing open-access materials,

data and analysis code. This would facilitate more transparency in researcher practices and allow all aspects of the research process to receive more rigorous external verification and scrutiny (Klein, Hardwicke, et al., 2018). This seems particularly valuable in context of the common use of cross-sectional works and popular pursuit of ‘novelty’ driving questionable evidence quality in organisational change management research (Barends et al., 2014a). The value of the research conducted would further increase by facilitating testing of alternative models through secondary analyses and providing more detail to inform future research design (Gilmore, Kennedy, & Adolph, 2018), thereby increasing the pace of scientific progress (Vazire, 2018).

Greater adoption of any of the open-science practices discussed (replication, pre-registration, open materials/code/data, etc.) could subsequently lead to a culture shift whereby the benchmark quality of evidence for publication could be increased. Journals have an important role in shaping the accessibility and standard of evidence published, and widespread use of more robust practices could lead to more robust publication practices. One example within psychology is referred to as a Registered Report – a publication type whereby a research proposal is reviewed before data collection and then pre-registered such that in-principle acceptance will be offered regardless of the findings presented (Chambers, 2013). A similar practice growing in adoption is that of the “pottery barn rule” whereby journals explicitly take responsibility for, and encourage, high-quality pre-registered replications of studies previously published in their pages (Srivastava, 2012). Such practices support a more robust and thus impactful body of evidence to inform organisational change management practice and thus overcome many of the challenges limiting the impact of current research in the field.

Table 1: Overview of Key Recommendations

Open Science Practice	Role in Organisational Change Research	Guidance to Implement
Replication	Replication works present an opportunity to (dis)confirm currently unchallenged conclusions and help inform confidence in any given finding, providing a more robust and coherent body of evidence to apply.	A replication recipe: Brandt et al. (2014)
Pre-registration	Pre-registration limits the opportunity for questionable researcher practices, including post-hoc application of theory and dichotomous success/failure conclusions,	Discussion and template: van’t Veer &

	encouraging a shared language and facilitating development of more robust and credible bodies of evidence to inform practice.	Giner-Sorolla (2016)
Open Data, Materials & Code	Openness limits opportunities for questionable practices and facilitates more rigorous scrutiny of conclusions. Openness also supports development of new knowledge by facilitating secondary analyses, and provides more detail to inform future research and applied practice.	Guide to using the OSF to share: Soderberg (2018)

In sum, the quality of understanding and research surrounding organisational change is problematic and likely to have a significant impact upon change management success (Packard & Shih, 2014; Todnem By, 2005). To build a body of quality evidence more suitable for driving effective evidence-based organisational change management, a number of significant changes are necessary. Practices such as replication and pre-registration from the broader open science movement within psychology seem particularly well-placed to have significant implications for future practices. Adopting robust scientific practices should be a key strategic priority and commitment of organisational change researchers should they wish to build a robust body of evidence capable of informing practice.

## Conclusion

Evidence-based organisational change management is frequently prescribed to improve the likelihood of obtaining desired outcomes, however its success is dependent upon effectively implementing practices, tools and theories which hold a robust and thus convincing body of evidence. The evidence behind organisational change management is weak, disconnected from, and insufficiently robust to inform, organisational practice. Current practices adopted to manage change infrequently hold high-quality evidence, and in doing so increase the likelihood of suboptimal outcomes when applied. This appears particularly pronounced when acknowledging the high prevalence of cross-sectional and case-study designs, lack of adoption of open science practices, and broad range of definitions, perspectives and theories that are united by the single ‘organisational change’ label. To improve organisational change management, there is a need for higher quality evidence to inform implementation of evidence-based practices. Adopting open science behaviours will improve the accessibility, transparency

and replicability of the evidence-base informing practitioner's decision-making and thus enable more robust evidence-based organisational change management.

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