

---

## **“It’s all up here”: adaptation and improvisation within the modern project**

---

**Stephen A. Leybourne**

Boston University,  
808 Commonwealth Avenue,  
Boston, MA, 02215, USA  
Email: sleyb@bu.edu

**Abstract:** This paper considers organisational improvisation, and in particular, adaptation as a specific component of improvisational work (Miner et al., 2001), and how it may assist in resolving or assisting with some of the challenges surrounding recent shifts in our understanding of project-based management. Examples focus on the use of adaptation to cope with ambiguity and uncertainty, caused by execution in problematic and turbulent organisational environments. The literature on improvisation suggests that adapting previously successful interventions reduces and manages the risk of improvising by engaging with the ‘adaptation component of organisational improvisation. This practice assists in ensuring that the additional risk of completely novel activity is avoided. This paper explores adaptation within the project domain, and also unpicks the rhetoric from the reality of adaptation within projects, confirming its benefits, setting out the circumstances where experience informs the practice, and offering readily usable and applicable insights.

**Keywords:** improvisation; adaptation; project management; ambiguity; uncertainty.

**Reference** to this paper should be made as follows: Leybourne, S.A. (2017) “‘It’s all up here”: adaptation and improvisation within the modern project”, *Int. J. Project Organisation and Management*, Vol. 9, No. 3, pp.217–229.

**Biographical notes:** Stephen A. Leybourne is internationally recognised as one of the world’s leading authorities on improvised work in project management. His research activities focus on the use and abuse of improvisational working practices, particularly in project-based work, and the location of project management within the wider academic landscape. A well-known Lecturer in Human Resource Studies, Innovation, and Project and Change Management, he has presented at conferences such as the PMI® Research Conference and the Academy of Management, winning a ‘best paper’ award at AoM2006 in Atlanta. He has been a leading manager for several international banking institutions has been an academic for the last 15 years. He has published in a variety of journals, including the *Journal of Change Management*, the *International Journal of Management Concepts and Philosophy*, and the two leading project management journals in the field, the *International Journal of Project Management* and the *Project Management Journal*.

This paper is a revised and expanded version of a paper entitled “‘It’s all up here”: adaptation and improvisation within the modern project’ presented at PMI Global Congress 2013, New Orleans, LA, 26–29 October 2013.

## 1 Introduction

The academic understanding of project management (PM) is changing in a number of significant ways (Leybourne and Sainter, 2012; van der Hooft and Whitty, 2015). We have already seen a shift over the last decade or so from a reliance on the tools, frameworks, and techniques developed since the 1950s, to a more contemporary appreciation that the behavioural aspects of managing multi-skilled and diverse teams of globally dispersed project workers are manifestly important, and to a recognition that the management of trust, commitment, and motivation are vital to the success of the modern project (Jaafari, 2003; Pollack, 2007; Svejvig and Andersen, 2015).

Notably, the 'plan, then execute with the minimum of deviation' paradigm that has historically informed the project management domain is adjusting to the notion that the world of the project is uncertain, complex, and ambiguous, and that the traditional PM model is being modified by the need to deliver in ways that are often removed from traditional project-based routines and procedures (Saynisch, 2010a, 2010b). This change is manifesting itself in a shift from project management as the epitome of planning in the prescriptive mode (Maylor, 2001), resulting in significant movement since the turn of the millennium towards a more behavioural (Jaafari, 2003; Snider and Nissen, 2003), and improvisational (Leybourne, 2007a) focus.

This is causing a tension between the relative comfort afforded by planned activity, where shared responsibility within the planning process offers shared responsibility for success or failure, and the individual exposure to risk afforded by less prescriptive activity models. Project managers are therefore embracing new ways of working and delivering within the project domain, and new areas of expertise are being developed in the intense cauldron of practice, leading to a widening gap between those practitioners that could be described as project 'mechanics', and those that see themselves more as project 'artistes' (Leybourne and Kennedy 2015).

It is however evident that the experienced project manager often deviates from planned activity in order to meet the emerging requirements of projects that are operating in turbulent environments, and also to resolve issues caused by the planning and specifying of requirements that is often less diligent and exact than the ideal. However, the experienced and adept project manager can draw on a significant personal library of actions that have been successful in past or previously completed projects (Lindkvist, 2008). The utilisation of these previously successful interventions, adapted to meet the requirements of a new or novel situation, can assist in reducing the risk attached to deviating from planned activity (Chelariu et al., 2002; Klein et al., 2015).

Organisational improvisation is often applied within the project domain (Leybourne, 2006a, 2007a, 2010; Leybourne and Sadler-Smith, 2006), and indeed, is becoming accepted as a meaningful addition to the expanding toolbox of managerial skills in all areas (e Cunha et al., 1999), and including project-based management (Klein et al., 2015). The academic literature on organisational improvisation identifies adaptation as a component of organisational improvisation that assists with the reduction of risk in improvisational interventions (e Cunha et al., 1999; Moorman and Miner, 1998a, 1998b). Miner et al. (2001) identify adaptation as one of the elements that contribute to successful improvisation, and this concept fits well within the project manager's lexicon of useful practices.

This paper considers organisational improvisation, and in particular, adaptation as a specific component of improvisational work (Miner et al., 2001), and how it may assist in resolving or assisting with some of the challenges surrounding recent shifts in our understanding of project-based management. Examples of adaptation within the organisational domain relating to project-based management are also included.

## **2 Improvisation, adaptation, and project management**

The literature relating to organisational improvisation emerged during the 1990s, drawing on the work of Weick (1979) relating to organisational sense-making. A significant body of literature relating to improvised work in a general management context emerged around the turn of the millennium (e Cunha et al., 1999; Moorman and Miner, 1998a, 1998b), and consideration of how this addition to the lexicon of working practices has expanded in the last ten years or so. The literature has evolved through a stage where jazz musicianship (Hatch, 1999) and improvisational theater (Vera and Crossan, 2004) were used as metaphors to assist with understanding the effects of improvised activity within management and work generally, through a period where improvisation was considered within many domains, including project management (Leybourne, 2006a, 2007b, 2010; Leybourne and Sadler-Smith; 2006). More recently, empirical research has strengthened our understanding of the effectiveness of improvised work across a number of organisational domains, including project management (Klein et al., 2015).

This evolution of our understanding of the impact and effectiveness of such emerging knowledge on project management practice has developed hand in hand with the recognition of the shift from a ‘tools and techniques’ based model of project-based management, towards an appreciation of the importance of managing behaviours, and engaging with the project team. This has resulted in a number of attempts to re-focus the project management domain (Cicmil and Hodgson, 2006; Svejvig and Andersen, 2015; Winter et al., 2006), and the emergence of number of potential new – and at this point, provisional and not widely accepted – models of project-based management, including Leybourne and Sainter (2012).

The original definition of improvisation as “the degree to which conception and execution converge in time” [Moorman and Miner, (1998b), p.698], highlights the temporal aspects of improvisational activity, although later definitions also link with the concept of bricolage, in that they emphasise the need to achieve with available resources. This is an important caveat within the literature, as the project manager rarely has time to marshal additional resources prior to an improvisational intervention, and the influence of the ‘bricoleur’ is gaining in acceptance (Klein et al., 2015; Joslin and Müller, 2015; Simon, 2006).

More recently, recognition has been given to the use of improvisation within project-based work (Gallo and Gardiner, 2007; Kanter, 2002; Leybourne, 2002, 2006a, 2006b, 2007a; Leybourne and Sadler-Smith, 2006). Generally speaking, this body of work considers improvisation in terms of an association with urgency. Often this urgency is to resolve issues around the emergence of new or unforeseen requirements or issues, where there is a need for action and little or no time to plan, or to generate and examine alternative courses of action. The skills of the bricoleur are particularly pertinent here.

The initial constructs that contribute to effective improvisational work are creativity, intuition, and bricolage (Moorman and Miner, 1998a), together with compression, adaptation, innovation, and learning (Miner et al., 2001).

Of the constructs or components of improvised work developed in Moorman and Miner (1998a), the one that forms the impetus for this paper is adaptation (Miner et al., 2001). At the organisational level, adaptation has been considered in terms of adapting to changing environments and conditions that may affect the success or failure of an organisation (Zammuto, 1988). Miner et al. (2001, p.314) define adaptation in terms of 'the adjustment of a system to external conditions', referencing Campbell (1969) and Stein (1989) as original sources. Lindkvist (2008) looks specifically at adaptation in a project context, defining it as a feature of project management, and suggesting that it is the ability of an organisation to be flexible and adjust to changes in the environment. However, within the emerging literature relating to improvised work in the project domain, adaptation is also linked to 're-use.' Adaptation techniques are also suggested as an effective way of delivering project value (Wysocki, 2014).

Adaptation in this context refers to the 'adapting' of something from previously improvised routines to assist in resolving emerging requirements (Miner et al., 2001). One of the resources available from the effective use of improvisational working practices is the library of previously successful improvisational interventions that project managers store tacitly, and refine based on experience. Ericsson (2006, p.699) have however suggested that a degree of 'preconception' may be involved, and adaptation of previously successful interventions meets the preconception ideal mentioned above, and also draws on the considerable experience that project managers and project team members build up over time. Arguably therefore, this adaptation of prior and at least partially tested activity assists with the control of risk, and with understanding the effects of adapted activity on the project.

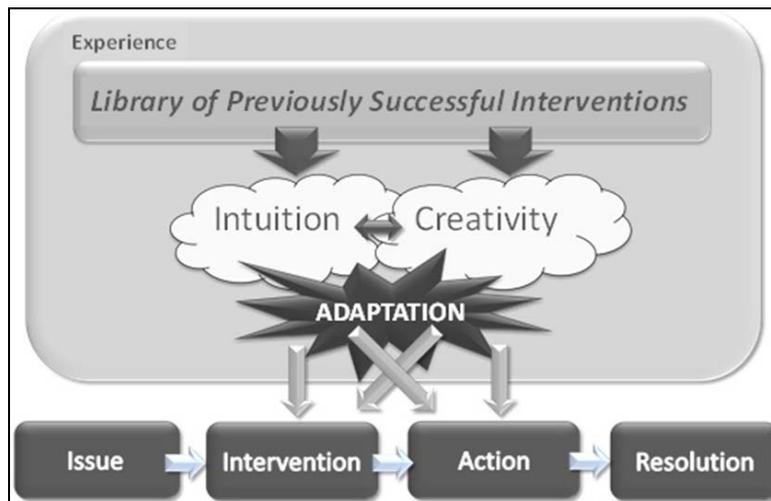
### **3 Adaptation within the project**

In many project domains the 'plan, then execute' paradigm is rarely applied without emerging or changing requirements or environments producing a need to adjust activity over the course of the project. Indeed, the more recent literature dealing with the effective delivery of project outcomes is very appreciative of changing requirements and emerging issues within the project landscape (Klein et al., 2015; Svejvig and Andersen, 2015).

The improvisation literature has recognised that the stability of strategic planning and the implementation or execution of that planning activity is compromised by the turbulence of organisational environments (Chelariu et al., 2002; e Cunha et al., 1999). This lack of stability is also carried through to project activity (Gallo and Gardiner, 2007; Leybourne, 2010; Leybourne and Sadler-Smith, 2006), especially given that project-based working is inevitably the chosen framework for the delivery of change triggered by environmental turbulence (Cicmil and Hodgson, 2006). Such issues can be resolved using creative thought, an intuitive 'gut feel' for what will work in a particular circumstance, and the adaptation of previously utilised routines (Kanter, 2002; Leybourne, 2010; Leybourne and Sainter, 2012). These are all identified as essential components of organisational improvisation.

Traditionally, when an unplanned action is required within a project, either to resolve an unforeseen or unplanned emerging requirement, or to correct a deviation from the project plan, we are undertaking a four stage process that is pictorially described in the bottom half of the graphic in Figure 1. Essentially, when an *issue* arises, a suitable *intervention* is chosen, then it is executed to produce a specific *action*, and the end result is hopefully a successful *resolution* to the issue.

**Figure 1** A developing model of adaptation to address project issues



It is argued that there are ways to assist in the effectiveness of these actions or interventions. One issue with the project environment is that project management techniques and working styles are intended for use within ‘one off’ activities or unique achievements. Given the risk involved in generating satisfactory or successful outcomes in new work, it is sensible to seek ways to mitigate that risk, and to remove some of the uncertainty from untried and uncertain activity. If this can be achieved by ‘adapting’ tasks or activities that have been successful in different but to some extent comparable circumstances, then it follows that the level of novelty, and therefore the level of risk, is reduced (Koskinen et al., 2003). This is something that the experienced project manager can take advantage of to diminish or moderate the amount of genuinely new and untried activity within a particular element of the project.

The top section of Figure 1 is a graphical illustration of how such adaptation can work. The experienced project manager, over time, accumulates a knowledge base, some of which will take the form of a library of previously successful interventions, or actions that have been used in the past to resolve or partly resolve emerging project issues (Koskinen et al., 2003). By leveraging accumulated knowledge and experience, and applying an element of creative thinking, together with an intuitive ‘gut feel’ for what will work in a particular circumstance or set of circumstances, previously successful project interventions can be ‘adapted’ to meet new or emerging issues or requirements.

It should be noted at this point that intuition, which could be partially defined as “a basis for overcoming the limits of rationality in unstable environments” [Leybourne and

Sadler-Smith, (2006), p.484], is a powerful and effective component within the adaptation process. Significant research has been carried out within the wider academic landscape, considering the contribution and effect of intuitive thought in many areas, including managerial action (Pondy, 1983), executive action (Sadler-Smith and Shefy, 2004), nursing (Benner and Tanner, 1987), and project management (Leybourne and Sadler-Smith, 2006). The results of this activity support the use of intuitive feelings to reinforce or partially replace more rational intellectual processes, offering tangible evidence of the accuracy and effectiveness of such activity.

We also need to consider creativity at this point. Described by Amabile (1983) as intentional deviation from standard practice, creativity comprises three major components or constructs; expertise (technical, procedural and intellectual knowledge), creative thinking skills (how flexibly and imaginatively people approach problems), and the motivation to approach things differently (Amabile, 1998). Within the project domain, creativity is supposedly harnessed to develop new and better ways of executing project-based work, and Leybourne and Warburton (2012) offers a comprehensive analysis of creative activity within the project, together with a framework to judge when it can be effectively utilised.

The combination of creativity and intuition, applied to a consideration of how to 'adapt' to meet a particular set of circumstances, and drawing on an existing library of tacitly acquired previously successful interventions, can be a powerful way to resolve current emerging or occurring issues.

As an example of this, a project could have an issue with resistance to change at the user level. This is not an uncommon situation, and mechanisms or actions that have assisted in reducing such resistance can be re-used. At some point in the past, a project manager may have used members of a software 'test' team to act as local or departmental champions for new or improved systems. Resistance in this situation is common, as existing 'experts' in the redundant system see their expertise being diluted, and naturally resist any situation that may weaken their 'expert' status.

The appointed local or departmental champions—who may be from any appropriate part of the project team – can act as advocates for change, extolling the benefits of new functionality. This type of intervention can be 'adapted' to meet the requirements of a new situation, and re-used in different situations or different domains, by applying some creative thought about what is required, and an intuitive feel for what will work in a particular circumstance. This is an example of the adaptation of a previously successful intervention to meet the demands of a new scenario.

Similarly, interventions involving the combination of skills or the use of previously tested interventions could include adapting test scripts, re-using motivational techniques, building commitment by celebrating milestones in certain previously proven ways, introducing technical interventions that have been beneficial in other projects, using known software to monitor specific aspects of project activity, and a variety of other actions that have been previously successful. Creativity and an intuitive feel for suitability are inherent in all of these examples.

Having considered the concept of adaptation, and how it meshes with the resolution of emerging issues within the project, it is now opportune to move to the subject of the learning that can be generated from the successful adaptation of previous interventions, and how that knowledge can be codified and shared for the benefit of the organisation. This is an area where the experience of the project manager is a significant contributor.

#### **4 Adaptation as a learning process**

Action is less effective if we fail to learn from it. Our understanding of learning is that knowledge is the application and productive use of information (Davis and Botkin, 1994). Data can be defined as the basic building blocks of knowledge, and information is data that has been arranged into meaningful patterns (Davis and Botkin, 1994). The challenge in learning from action is in the effective collection and organisation of data, and its conversion into re-usable knowledge.

Traditional project-based management has something of an inbuilt advantage here, in that as well as its use in supporting organisational flexibility, the four phase project life-cycle (Adams and Barndt, 1988) incorporates a formalised 'learning loop' that is intended to consider 'lessons learned', and use that data to inform future project activity. This makes project management an increasingly popular platform for the learning that is required for continual change in a turbulent environment (Swan et al., 2010), notwithstanding the fact that using retrospective perspectives to assess a completed project may be susceptible to partial and selective recall and defensive reasoning on the part of participants (Blackman and Kennedy, 2009).

However, much learning within the project domain is tacit; that is, it is experiential, and 'tacitly' located within the subconscious knowledge base of the person who executes it. For this reason alone, tacit knowledge can be notoriously difficult to capture, not least because it is difficult to articulate (Cooke-Davies, 2002), and it is perhaps for this reason that there is a documented tension within organisations between the desire to carry out the learning phase of an executed project, and the desire to move resources to the next initiative (Leybourne, 2002). This tension causes temporal pressure and ultimately it can negate the opportunity to capture data that might assist in future project-based initiatives (Sense, 2007).

The tendency for the 'formalised' learning process to break down means that much tacitly stored learning in projects is difficult to access and codify. Sense (2007) suggests that there is a significant tension between the rhetoric of the idealised intentions of the 'learning' phase of the project life-cycle, and the reality of intentions dashed by temporal pressure and resource-based constraints. One result of this is a cursory attention to learning from projects in many organisations, reinforcing the perception that much project-based knowledge remains in tacit form.

This type of tacit learning tends to lead to an understanding in organisations that the possession of such a knowledge base is informed by 'experience', and that the organisation looks on such individuals as *experienced managers* (Pedler et al., 1997). However, such learning, which is essentially 'tacit' learning, is only held at the individual level, and is not readily or easily shareable. The goal of organisations, and particularly those that have pursued the ambition of becoming 'learning organisations' (Pedler et al., 1997; Senge, 1990), is to codify this tacit knowledge, with a view to sharing it either formally or informally for the benefit of other organisational actors. Theoretically, this shared knowledge can then be used to revise and update organisational and project-based process, notwithstanding that empirical work in knowledge management reveals the notorious difficulty with the conversion and effective use of knowledge through codification and dissemination (Fahey and Prusak, 1998; Malhotra, 2002; Storey and Barnett, 2000).

In order to transmit or transfer knowledge, it has to be made explicit (Nonaka, 1991). This relies on a process whereby "...it is extracted from the person who developed it, made independent of that person, and reused for various purposes" [Hansen et al., (1999), p.108]. There is however an assumption here that 'extraction' is not challenging or arduous, which is questionable both practically and academically.

Some organisations have formal or informal ways of achieving this transfer effectively, but unfortunately, many do not. Some formal mechanisms for codifying information involve project databases or 'wiki' spaces, accessible over organisational intranets. Unfortunately, recent research (Koskinen et al., 2003) suggests that such information sharing is often ineffectual, either because data are not collected and input efficiently, or because project managers, either as a result of temporal pressures, or because they do not value the applicability of the data available, do not include such sources in their pre-project planning.

## **5 Discussion**

Dreyfus and Dreyfus (1986), in a study into the phenomenology of expertise, suggested that experts in any subject achieve a level of proficiency whereby they improvise constantly. As Montuori (2003, p.249) stated: "they know the rules, but do not have to think about them. They have developed the ability to act spontaneously and intuitively without needing to refer to rulebooks". Some observers [Ericsson, (2006), p.699] have however suggested that a degree of 'preconception' may be involved. This preconception is arguably based on prior experience; i.e. on the convergence of creativity, intuition, and the adaptation of previously successful interventions that have at least a partly tested provenance.

The creative thinking skills aspect of this application of expertise is usually divided into two types, conceptual fluency, which is about producing many ideas quickly, and cognitive flexibility, which recognises the ability to come up with original and unusual solutions to issues and problems (we often call this lateral thinking, or thinking outside the box).

Arguably, adaptation allows the project practitioner to 're-use' aspects of previous work, avoiding the potential risk and uncertainty of using entirely untested actions. This allows an increased level of comfort with execution, on the basis that some issues linked to the intervention are understood (or at least partially understood), and the fact that the actions are not entirely untested allows for a level of confidence.

There is also little doubt the application of such creativity directed towards adaptation can contribute to learning at both the individual and at the organisational level. Improvisational or unplanned interventions that are based around the adaptation of previously used successful interventions from other domains allow for rapid deployment of existing resources in a more effective manner. Learning from the redeployment of such adapted interventions also adds to the library of tacit knowledge retained and utilised by the experienced project manager.

This activity is however taking place at the individual, and usually at the tacit level. It is unusual for the individual project manager to 'record' his or her learning in a format that facilitates or encourages transfer to colleagues, and there is also a political implication. The literature relating to knowledge management assumes that there will be no barrier to knowledge sharing, and that new and emerging knowledge will therefore

flow freely. However, to some managers, including project-based managers, knowledge is seen as ‘power’, or at least as a reason for continued employment. Some creators of emerging expertise developed through experience and practice are therefore reluctant to share that tacitly created knowledge, feeling that it will negate their usefulness to the organisation.

It could be argued that the adaptation of previously successful interventions using creativity, intuition and adaptation is a new twist on the need for the use of lessons learned, or at least the need for a management approach that can capitalise on the use of those lessons and interventions in a slightly different way. There is however a significant difference in that the application of previously successful interventions using creativity, intuition and adaptation is more emergent and tacitly based, whereas the ‘lessons learned’ activity is more formalised and forms a part of the process of the post implementation review.

Additionally, there are challenges in capturing data and converting it into knowledge, and in making that knowledge explicit (Koskinen et al., 2003). The shift in knowledge from tacit to explicit, and the issues surrounding the sharing of explicit knowledge within and across the organisation, holds a number of challenges (Swan et al., 2010). Some of these challenges are technical, some are social, and some have a political dimension. The resolution of these challenges will be dependent on organisational culture and climate, as well as in mastering the more technical issues of codification, and developing effective forums for sharing.

Often, more informal sharing mechanisms can assist with this. Peer sharing, either through scheduled or unscheduled arrangements, often results in knowledge transfer, although the codification of this information is more problematical. Many organisations run project steering committees or review groups, and program offices can also be used as a conduit to collect and share project knowledge. Anecdotally, one of the most effective transfer mechanisms involves meeting other project managers for a beer (or two) on Fridays after work, and exchanging experiences from the weeks’ project activity.

The implications of this convergence of a number of issues around improvisation, and particularly the constructs of creativity, intuition, and adaptation, is that not only can the creative adaptive re-use of previously successful improvisational interventions assist in resolving emerging issues within the project, but that this can be achieved in a manner that reduces risk.

## **6 Summary and conclusions**

It is evident from both the literature and from emerging practice that project-based management is maturing, and that emerging practices are creating levels of expertise that differ with experience. An analogy has been drawn between project ‘artistes’, who have developed the capability and confidence through experience to step away from the more prosaic and functional methodologies, and project ‘mechanics’, who may feel more comfortable with traditional project tools and techniques, and a reliance on bodies of explicit knowledge such as *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* – 5th edition, Project Management Institute, 2013 (Leybourne and Kennedy, 2015).

The purpose of this research is to reconsider the way that interventions are made in the project domain, and to recognise the influence of improvisational activity, and specifically the re-use of 'adapted' previously successful actions that have been tacitly stored by experienced project managers. This is activity which is similar but more emergent than the re-application of 'lessons learned' from the formal Post Implementation Review that takes place after project delivery, in that it relies on tacit rather than explicit knowledge. Also, not only should interventions and lessons learned be applied to augment the mechanistic approach, but they need to be augmented by experience along with intuition and creativity at the individual level to truly fulfil their potential for improvement.

A proportion of activity around these contemporary and emerging practices is based around the recognised components of improvised work (e Cunha et al., 1999; Moorman and Miner, 1998a; Miner et al., 2001) such as intuition, creativity, and adaptation. There is significant evidence that such techniques are being embraced by the project management domain, and that project managers use (Leybourne, 2002), recognise (Leybourne, 2006a; Leybourne and Sadler-Smith, 2006) and learn from (Chelariu et al., 2002; Leybourne and Kennedy, 2015; Koskinen et al., 2003; Swan et al., 2010) these components of improvisational work.

It follows that the concept of 'adaptation' (Moorman and Miner, 1998a) of previously successful improvisational project techniques and actions, drawn from a tacitly held library of experientially generated interventions, can assist in reducing the risk and uncertainty of such interventions. The effective use of creative thought, together with the proven capacity and ability to leverage intuition to inform and apply adaptive interventions, is assisting with moving some practitioners from the 'mechanistic' to the artistic' level within the project domain, and is also helping with the effective delivery of project tasks and activities in uncertain environments.

The evidence, supported by a significant empirical academic literature base, does point to the fact that the effective adaptation of previously successful interventions at the tacit and individual level can reduce risk, negate elements of the unknown, assist with delivery against emerging requirements, and benefit the progressive and experienced project manager.

## References

- Adams, J.R. and Barndt, S.E. (1988) 'Behavioural implications of the project life cycle', in Cleland, D.I. and King, W.R. (Eds.): *Project Management Handbook*, 2nd ed., Van Nostrand Reinhold, New York, pp.206–230.
- Amabile, T.M. (1983) *The Social Psychology of Creativity*, Springer Verlag, Inc., New York, NY.
- Amabile, T.M. (1998) 'How to kill creativity', *Harvard Business Review*, Vol. 76, No. 5, pp.76–87, p.186.
- Benner, P. and Tanner, C. (1987) 'How expert nurses use intuition', *American Journal of Nursing*, Vol. 87, No. 1, pp.23–34.
- Blackman, D. and Kennedy, M. (2009) 'Knowledge management and effective university governance', *Journal of Knowledge Management*, Vol. 13, No. 6, pp.547–563.
- Campbell, D.T. (1965) 'Variation and selective retention in socio-cultural evolution', in Barringer, H.R., Blanksten, G.I. and Mack, R.W. (Eds.): *Social Change in Developing Areas; Reinterpretation of Evolutionary Theory*, pp.26–27, Shenkman Publishing Company, Cambridge, MA.

- Chelariu, C., Johnston, W.J. and Young, L. (2002) 'Learning to improvise, improvising to learn: a process of responding to complex environments', *Journal of Business Research*, Vol. 55, No. 1, pp.141–147.
- Cicmil, S. and Hodgson, D. (2006) 'New possibilities for project management theory: a critical engagement', *Project Management Journal*, Vol. 37, No. 3, pp.111–122.
- Cooke-Davies, T. (2002) 'The "real" success factors on projects', *International Journal of Project Management*, Vol. 20, No. 3, pp.185–190.
- Davis, S. and Botkin, J. (1994) 'The coming of knowledge based business', *Harvard Business Review*, Sept/Oct, Vol. 72, No. 5, pp.165–170.
- Dreyfus, S. and Dreyfus, H. (1986) *Mind Over Machine*, Free Press, New York, NY.
- e Cunha, M.P., da Cunha, J.V. and Kamoche, K. (1999) 'Organizational improvisation: what, when, how and why', *International Journal of Management Reviews*, Vol. 1, No. 3, pp.299–341.
- Ericsson, K.A. (2006) *The Cambridge Handbook of Expertise and Expert Performance*, Cambridge University Press, Cambridge, MA.
- Fahey, L. and Prusak, L. (1998) 'The eleven deadliest sins of knowledge management', *California Management Review*, Vol. 40, No. 3, pp.265–276.
- Gallo, M. and Gardiner, P.D. (2007) 'Triggers to a flexible approach to project management within UK financial services', *International Journal of Project Management*, Vol. 25, No. 5, pp.446–456.
- Hansen, M., Nohria, N. and Tierney, T. (1999) 'What's your strategy for managing knowledge?', *Harvard Business Review*, March–April, Vol. 77, No. 2, pp.106–111.
- Hatch, M.J. (1999) 'Exploring the empty pages of organizing: how improvisational jazz helps redescribe organizational structure', *Organization Studies*, Vol. 20, No.1, pp.75–100.
- Jaafari, A. (2003) 'Project management in the age of complexity and change', *Project Management Journal*, Vol. 34, No. 4, pp.47–57.
- Joslin, R. and Müller, R. (2015) 'New insights into project management research: a natural sciences comparative', *Project Management Journal*, Vol. 46, No. 2, pp.73–89.
- Kanter, R.M. (2002) 'Strategy as improvisational theater', *MIT Sloan Management Review*, Winter, pp.76–81.
- Klein, L., Biesenthal, C. and Dehlin, E. (2015) 'Improvisation in project management: a praxeology', *International Journal of Project Management*, Vol. 33, No. 2, pp.267–277.
- Koskinen, K.U., Pihlanto, P. and Vanharanta, H. (2003) 'Tacit knowledge acquisition in a project work context', *International Journal of Project Management*, Vol. 21, No. 4, pp.281–290.
- Leybourne, S. A. and Warburton, R.D.H. (2012) 'The creativity matrix: balancing architectural and process creativity', *PMI Global Congress North America*, Vancouver, BC, Canada.
- Leybourne, S.A. (2002) *Project management and the implementation of strategic change within the U.K. Financial Services Sector*, Unpublished Doctoral Dissertation, Cardiff Business School, UK.
- Leybourne, S.A. (2006a) 'Managing change by abandoning planning and embracing improvisation', *Journal of General Management*, Vol. 31, No. 3, pp.11–29.
- Leybourne, S.A. (2006b) 'Improvisation within the project management of strategic change: some observations from UK financial services', *Journal of Change Management*, Vol. 6, No. 4, pp.365–381
- Leybourne, S.A. (2007a) 'The changing bias of project management research: a consideration of the literatures and an application of extant theory', *Project Management Journal*, Vol. 38, No.1, pp.61–73.
- Leybourne, S.A. (2007b) 'Change and transformation in the UK financial services sector: equipping employees to cope with change', *Annual Meeting of the Academy of Management*, Philadelphia, PA, August.

- Leybourne, S.A. (2010) 'Classifying improvisation: comments on managing chaotic evolution', *Proceedings of Project Management Institute (PMI) Research Conference*, Washington, DC.
- Leybourne, S.A. and Kennedy, M. (2015) 'Learning to improvise, or improvising to learn: knowledge generation and 'innovative practice' in project environments', *Knowledge and Process Management*, Vol. 22, No. 1, pp.1–10.
- Leybourne, S.A. and Sadler-Smith, E. (2006) 'The role of intuition and improvisation in project management', *International Journal of Project Management*, Vol. 24, pp.483–492.
- Leybourne, S.A. and Sainter, P. (2012) 'Advancing project management: authenticating the shift from process to "nuanced" project-based management in the ambidextrous organization', *Project Management Journal*, Vol. 43, No. 6, pp.5–15.
- Lindkvist, L. (2008) 'Project organization: exploring its adaptation properties', *International Journal of Project Management*, Vol. 26, No. 1, pp.13–20.
- Malhotra, Y. (Ed.) (2002) *Why Knowledge Management Systems Fail. Enablers and Constraints of Knowledge Management in Human Enterprises*, Springer-Verlag, Heidelberg, Germany.
- Maylor, H. (2001) 'Beyond the Gantt chart: project management moving on', *European Management Journal*, Vol. 19, No. 1, pp.92–100.
- Miner, A.S., Bassoff, P. and Moorman, C. (2001) 'Organizational improvisation and learning: a field study', *Administrative Science Quarterly*, Vol. 46, pp.304–337.
- Montuori, A. (2003) 'The complexity of improvisation and the improvisation of complexity: social science, art and creativity', *Human Relations*, Vol. 56, No. 2, pp.237–255.
- Moorman, C., and Miner, A.S. (1998a) 'The convergence of planning and execution: improvisation in new product development', *Journal of Marketing*, Vol. 62, No. 3, pp.1–20.
- Moorman, C. and Miner, A.S. (1998b) 'Organizational improvisation and organizational memory', *Academy of Management Review*, Vol. 23, No. 4, pp.698–723.
- Nonaka, I. (1991) 'The knowledge-creating company', *Harvard Business Review*, Vol. 69, No. 6, pp.96–105.
- Pedler, M., Burgoyne, J. and Boydell, T. (1997) *The Learning Company: A Strategy for Sustainable Development*, 2nd ed., McGraw-Hill, London, UK.
- Pollack, J. (2007) 'The changing paradigms of project management', *International Journal of Project Management*, Vol. 25, No. 3, pp.266–274.
- Pondy, L.R. (1983) 'Union of rationality and intuition in management action', in Srivastva, S. (Ed.): *The Executive Mind: New Insights on Managerial Thought and Action*, Jossey-Bass Publishers, San Francisco, CA.
- Project Management Institute (2013) *A Guide to the Project Management Body of Knowledge PMBOK® Guide*, 5th ed., Project Management Institute, Newtown Square, PA.
- Sadler-Smith, E. and Shefy, E. (2004) 'The intuitive executive: understanding and apply 'gut feel' in decision making', *Academy of Management Executive*, Vol. 18, No. 4, pp.76–91.
- Saynisch, M. (2010a) 'Beyond frontiers of traditional project management: an approach to evolutionary, self-organizational principles and the complexity theory – results of the research program', *Project Management Journal*, Vol. 41, No. 2, pp.21–37.
- Saynisch, M. (2010b) 'Mastering complexity and changes in projects, economy, and society via project management second order (PM-2)', *Project Management Journal*, Vol. 41, No. 5, pp.4–20.
- Senge, P.M. (1990) *The Fifth Discipline*, Century Business, London, UK.
- Sense, A. (2007) *Cultivating Learning within Projects*, Palgrave Macmillan, Basingstoke, UK.
- Simon, L. (2006) 'Managing creative projects: an empirical synthesis of activities', *International Journal of Project Management*, Vol. 24, No. 2, pp.116–126.
- Snider, K.F. and Nissen, M.E. (2003) 'Beyond the body of knowledge: a knowledge-flow approach to project management theory and practice', *Project Management Journal*, Vol. 34, No. 2, pp.4–12.

- Stein, D.L. (1989) 'Preface', in Stein, D.L. (Ed.): *Lectures in the Sciences of Complexity*, pp.xiii–xxiii, AddisonWesley, Redwood, CA.
- Storey, J. and Barnett, E. (2000) 'Knowledge management initiatives: learning from failure', *Journal of Knowledge Management*, Vol. 4, No. 2, pp.145–156.
- Svejvig, P. and Andersen, P. (2015) 'Rethinking project management: a structured literature review with a critical look at the brave new world', *International Journal of Project Management*, Vol. 33, No. 2, pp.278–290.
- Swan, J., Scarbrough, H. and Newell, S. (2010) 'Why don't or do organizations learn from projects?', *Management Learning*, Vol. 41, No. 3, pp.325–344.
- van der Hooft, B. and Whitty, S (2015) 'A Heideggerian paradigm for project management: breaking free of the disciplinary matrix and its Cartesian ontology', *International Journal of Project Management*, Vol. 33, No. 4, pp.721–734.
- Vera, D. and Crossan, M. (2004) 'Theatrical improvisation: lessons for organizations', *Organization Studies*, Vol. 25, pp.727–749.
- Weick, K.E. (1979) *The Social Psychology of Organizing*, 2nd ed., Addison-Wesley Publishing Company, Reading, MA.
- Winter, M., Smith, C., Morris, P. and Cicmil, S. (2006) 'Directions for future research in project management: the main findings of a UK Government-funded research network', *International Journal of Project Management*, Vol. 24, No. 8, pp.638–649.
- Wysocki, R.K. (2014) *Effective Complex Project Management: An Adaptive Agile Framework for Delivering Business Value*, J. Ross Publishing, Plantation, FL.
- Zammuto, R.F. (1988) 'Organizational adaptation: some implications of organizational ecology for strategic choice', *Journal of Management Studies*, Vol. 25, No. 2, pp.105–120.