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CONCEPTUALISING ORGANISATIONAL RESILIENCE: AN INVESTIGATION INTO PROJECT ORGANISING

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Organisational resilience is a capability which enables organisations to adjust to perturbation, moderate the effects of risk and uncertainty and take advantage of emergent opportunities. The concept of organisational resilience has in the main been developed and operationalized in relation to permanent and stable organisations. The concept is, however, far less applied to project-based forms of organisation, where the temporary, cross-functional and dispersed nature of delivery teams renders some of these concepts problematic. This paper identifies the challenges in applying the concept of organisational resilience to project organisations by systematically reviewing and relating the lines of literature on organisational resilience and project organising. For example, the temporary nature of project organisations hinders learning and knowledge sharing necessary to ensure a dynamic response to evolving threats and perturbations. Other inherent factors, such as the distributed locations of project personnel, also impede this development. This paper goes on to refine the research necessary to develop the concepts so as they respond to the challenges of project-based working.

Keywords: adaptive capacity, organisational resilience, project organising, risk.

INTRODUCTION

Organisations are complex entities which manage and maintain our infrastructure and contribute to the economy and the society as a whole (Seville *et al*. 2006). As such, organisations need to adjust to perturbations and take advantage of available opportunities and mitigate threats (Giezen 2013; Seville *et al*. 2006). Perturbations are major external or internal spikes in pressure beyond the normal range of variability in a system (Gallopın, 2006). The notion of resilience; 'a functional capacity of a system to manage perturbations' has been used to reflect the ability of organisations to moderate the effects of risk and uncertainty and take advantage of any available opportunities (Gunderson 2000; Luthans 2002; Folke 2006; Gallopin 2006). However, the notion of organisational resilience has in the main been developed and operationalized in relation to permanent and stable organisations (Luthans 2002; Vogus and Sutcliffe 2007; McManus 2008).

The current promotion of continual improvement and development of innovative ways (Emmitt 2010; Gareis 2010; BSI 2014) of executing an activity or endeavour in both permanent and temporal organisations has called for continual employment of personnel from diverse organisations with complementary skills to come together (Hodgson and Cicmil 2006; van Donk and Molloy 2008) to execute a project, thus,

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forming an unstable and temporary organisation; project organisation (Killen *et al*. 2012; Winch 2013). In a project based sectors such as construction, the employment of the notion of resilience has largely been infrastructure and asset-based focused (Bosher 2008; Boin and McConnell 2007) with minimal or no focus on the personnel who execute the works. However, authors such as Packendorff (1995), Söderlund (2004), Winch (2013) and Giezen (2013) have called for research into developing measures to strengthen these forms of organisations so as to continually withstand future possible perturbations.

Arguably, the temporary, cross-functional and dispersed nature of delivery teams renders employing the notion of organisational resilience in project-based forms of organisations problematic. This paper therefore identifies the specific challenges in applying the concept of resilience in project organising by systematically reviewing the lines of literature on organisational resilience and project organising. The review is divided into three parts comprising defining the notion of resilience and its dimensions in general and in organisations, the identification of the challenges in embedding resilience in project organising, and the suggestions as to the research that is necessary to develop the concept of resilience so as to respond to the specific challenges of project-based working.

DEFINING RESILIENCE

Evolution of the Construct

The first application of resilience in systems was in the 1800's in mechanics (physics) to describe the capacity of steel as a material to withstand stress (Pimm 1984; Alexander 2013). This capacity to 'absorb shocks and maintain function' has come to be known as engineering resilience (Pimm 1984; Holling 1973, 1996; Tilman and Downing 1994). Thus, the focus of engineering resilience is efficiency, stability, predictability and return time to normal functioning (Holling 1973; Walker *et al*. 2004; Folke 2006). The notion of engineering resilience was then employed in psychology in the 1950's to describe how children suffering from schizophrenia could withstand shock (Garmezy *et al*. 1984; Glantz and Johnson 1999).

Another definition of resilience emerged in ecology in the 1970's following Holling's (1973) seminal paper in which he introduced the notion of 'ecological resilience'. This notion captures resilience as 'the capacity for renewal, re-organisation and development' and, thus, focuses on persistence, change and flexibility (Holling 1973,1996; Folke 2006; Gunderson 2000) . Therefore, ecological resilience subsumes the concept of engineering resilience and emphasizes a dynamic adaptive response to change and higher and better levels of functioning (Holling 1996; Folke 2006; Klein *et al*. 1998).

An engineering resilience perspective, thus, implies a reactive focus on building in resistance to or developing response mechanisms for predictive perturbations (Bruneau *et al*. 2003; Rice and Sheffi 2005). In other words, engineering resilience primarily focuses on risk and usually involves the use of mathematical tools in assessing the likelihood and impact of each perturbation (Winkler 1996; cf. Knight, 1921). On the other hand, the ecological resilience perspective implies a proactive focus, on managing both risk and uncertainty; hence the emphasis on flexibility and dynamic and continual development of the system to sustain higher and better levels of functioning (Carpenter *et al*. 2001; Seville *et al*. 2006). In building on these engineering and ecological foundations of the construct and focusing on different targets and research domains, scholars have developed numerous definitions of the

resilience construct. These definitions of the resilience construct, which compete for primacy across numerous research domains stand in the way of a unified understanding of the theoretical dimensionality, antecedents and outcomes of the construct. These issues are discussed in the following subsections.

Review of definitions used in previous research
Growth in resilience research over the past few years has been marked. For example, a Google Scholar search conducted by the authors in April 2014 revealed that research in resilience increased by 10% from 1991 to 2002 and over 60% from 2002 to 2013. A comprehensive review of the studies on resilience reveals 35 emergent definitions of the construct from the engineering and ecological perspectives. The review shows that resilience is clearly a malleable and nebulous term that has been appropriated across a multiplicity of different application domains and blended with a range of other related concepts. Its malleability might explain the enduring utility of the term to account for so many natural, organisational and societal phenomena, including being: a process (Rutter; 1999; Coutu 2002); an outcome (Klein *et al*. 1998; Timmerman 1981); and 'circumstance dependent' (Carpenter *et al*. 2001; Bhamra *et al*. 2011; Gunderson 2000). However, the versatility of the resilience construct has also meant there is, as yet, no agreement on its theoretical dimensionality, antecedents and consequences (McCubbin 2001; Seville *et al*. 2006).

Table 1: Representative definitions of resilience

Author	Focus	Broad Perspective	
		Engineering	Ecological
Klein et al, (1998) p. 259	Coast	-	'The self-organising capacity of the coast to preserve actual and potential functions under changing hydraulic and morphological conditions'.
Bruneau et al (2003) p.735	Community	-	'Ability of social units to mitigate, contain hazards and carry out recovery activities'.
Holling (1973) p.14	Ecological system	-	'A measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables'.
Bosher (2008) p.13	Infrastructure	'A quality of a built environment's capability (in physical, institutional, economic and social terms) to keep adapting to existing and emergent threats'.	
Coutu (2002) p.4.	Individual	-	'The ability to accept, have a strong belief that life is meaningful and that there is the need to improvise'.
Rutter (1999) p. 119;	Individual Child	'A process of relative resistance to psychosocial risk experiences'.	-
Bhamra et al., (2011) p. 5587	Organisation	-	'Resilience is the emergent property of organisational systems that relates to the inherent and adaptive qualities and capabilities that enables an organisation's adaptive capacity during turbulent periods'.
Timmerman (1981) p. 21	Society	'The measure of a system's or part of a system's capacity to absorb and recover from the occurrence of a hazardous event'.	-
Walker et al, (2004) p. 2	Socio-ecological system	'The capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks'.	-
Pimm (1984) p. 322	Specie	'The speed with which a system returns to its original state following a perturbation'.	-
Rice & Sheffi (2005) p.41	Supply chain	-	'Ability to recover from disruption quickly by building redundancy and flexibility into its supply chain'.
Adger (2000) p. 347	Workgroup/ community	-	'The ability of groups or communities to cope with external stresses and disturbances as a result of social, political, and environmental change'.

Table 1 summarises the main definitions of the notion of resilience reviewed from the 35 emergent ecological and engineering resilience definitions. (Glantz and Johnson 1999; Adger 2000; Gunderson 2000; Rice and Sheffi 2005; Bhamra *et al.* 2011). From Table 1, it can be seen that the definitions of resilience from an engineering resilience perspective, such as those by Walker *et al* (2004) and Rutter (1999), emphasize stability and resistance during perturbation and, thus, imply hardening the organisation against shocks through building in redundancy or by hardening systems. On the other hand, definitions of the resilience construct from an ecological perspective place emphasis on responding flexibly to perturbations, bouncing back to a stronger, more resilient states (Rice and Sheffi 2005).

There is also a lack of conceptual clarity on how resilience is different from related concepts such as vulnerability, adaptation, and transformation. For example, Janssen *et al.* (2006) define vulnerability as a characteristic of a system which makes it susceptible to possible future harm, a potential change or transformation when struck with a perturbation or stress. A meta-analytic review of definitions of vulnerability by Ionescu *et al.* (2009) identified the key concepts of exposure, sensitivity, coping, persistence, stability, and adaptive capacity as underpinning the dominant interpretations of the vulnerability construct. The concepts of persistence, stability and adaptive capacity are also employed in explaining the notion of resilience (Carpenter *et al.* 2001; Gallopin 2006; McManus 2008; Timmerman 1981). Gallopin (2006) defines adaptive capacity as the common attribute of a system which provides it with an ability to adjust to change, moderate potential damages, take advantage of opportunities and cope with consequences. This is the definition that has also been given to the concept of 'coping ability' (Cumming *et al.* 2005). Some authors use the term 'adaptive capacity' to refer to the capacity of response of organisations (Seville *et al.* 2006) and 'adaptability', for individuals' capacity of response (Folke 2006) to perturbations; yet others use the terms the other way around (Luthans 2002; Coutu 2002).

The applications of the above dimensions are influenced by the context in which they are applied. For instance, Carpenter *et al.* (2001) points this out by explaining that, the system configuration and interested perturbation drives resilience, hence authors should begin by clearly defining resilience in terms of what to what.

ORGANISATIONAL RESILIENCE

Defining organisational resilience

The construct of organisational resilience suffers from the same conceptual-definitional issues with the general construct of resilience, as discussed above. For example, there is no agreement on what a resilient organisation is. According to Weick and Sutcliffe (2001), the notion of resilience in organisations seeks to promote competence, restore efficacy, and encourage growth through the behavioural processes of mindful organizing enacted by front-line employees; therefore, a resilient organisation is one that is able to do this on a sustainable basis. Mallak (1998) describes a resilient organisation as one which is able to design and implement effective actions to advance organisational development and ensure survival. These definitions, thus, seem to conflate the notion of organisational resilience with that of organisational competitiveness. One definition of a resilient organisation that has gained considerable traction in the literature is as a high reliability organisation (HRO; Weick and Sutcliffe 2001): an organisation which works in highly trying conditions, with few to no errors due to its very flexible systems. The HRO conceptualisation of

organisational resilience has been criticised for (McManus 2008): oversimplifying accidents, hence underestimating accidents and the vulnerability of an organisation to perturbations; prioritising, through its 'culture of safety' approach, risk management over uncertainty management. Also, there is as yet no agreement on the source of resilience in organisations: some authors argue that organisational resilience is dependent solely on the resilience of the individual (e.g. Mallak 1998); others argue that individual characteristic do not necessarily justify organisational resilience (e.g. Hone and Orr 1998); and some authors settle for the middle ground (e.g. Bhamra *et al*. 2011).

More crucially, the notion of organisational resilience has to date only been explored in relation to stable and permanent organisations (McManus 2008; Bhamra *et al*. 2011). Within this context, the literature identifies redundancy (i.e. time and resource buffers), organisational learning, co-location and continuity of employment, knowledge management, team development and managerial participation as being central to the development of adaptive capacity (McManus 2008), flexibility (Keong and Mei 2010), coping ability (Vogus and Sutcliffe 2007) and persistence (Hamel and Valikangas 2003); all fundamental tenets of organisational resilience.

However, not all organisations are permanent in nature; temporary organisations abound. Specifically, project-based organisations are used in diverse fields such as advertising (Grabher 2002a), construction (Emmitt 2010) and biotechnology (Powell *et al*. 1999). Winch (2013: 8) defines a project organisation as the *"configuration of permanent organisations coming together to form a temporary coalition to deliver a particular outcome"*. Indeed, it has been suggested that most permanent organisations use projects as the means for organising and executing organisational functions due to the beneficial consequences of this approach, such as innovation and continual improvement (Winch 2013;Emmitt 2010; Gareis 2010). Therefore, it is essential to create and develop resilience in all forms of organisations, specifically projects. However, there is a paucity of research on the theme of resilience in projects; for example, it is not clear what a resilient project is. In particular, the peculiarity of projects may pose significant challenges to the theoretical utility and substantive relevance of the organisational resilience construct in areas such as construction. These challenges are discussed next.

Challenges of employing resilience in projects

The diversity in the definition of the notion of resilience and its 'circumstance dependent' (Carpenter *et al*. 2001) nature poses challenges to employing resilience in project organising. For instance, for resilience in ecology, the more species that are available, the more the other specie tend to be stable and adaptive in the environment due to contingencies (Gallopin 2006). However, this is not the case with personnel in project organising because Lundin and Soderholm (1995) reveal that, the more personnel from diverse organisations are made to make critical decisions on projects, the more inconsistent and unstable the project is and this is due to interpersonal conflict it creates. Hence, if this analogy is brought into project organising, it might rather impede on the development of resilience.

The most related concept of resilience that could be employed in project organising is the notion of organisational resilience. However, the antecedents which lead to the employment of this notion in organisations are absent in project organising. This is due to the temporary, cross-functional and dispersed nature of delivery teams in project organising (Emmitt 2010). Hence it is essential to explore these challenges and

identify whether the notion of organisational resilience can be embedded in project organising or new avenues should be explored in embedding resilience in project organising.

Concept building towards resilience in project organising

Since the first application of resilience (to describe the capacity of steel as a material to withstand stress) in systems in the 1800's (Pimm 1984; Alexander 2013), there has been a growing recognition of the concept within academic publications. Scholars have developed numerous varying definitions of the resilience construct, which compete for primacy across a number of research domains. These varying definitions of the concept of resilience stand in the way of a unified theoretical understanding of resilience in project organising. Researches such as Bosher (2008), Seville *et al*. (2006), Burnard (2013) and McManus (2008) have also mentioned within their review about the diversity and variation in the definition of the notion. As such, research into unlocking the definition of the notion of resilience and related dimensions (as stated under research agenda in table 2) will enable project-based organisations to attain a congruent understanding of the notion of resilience.

Authors of the notion of organisational resilience explain that, organisational resilience is dependent on fundamental tenets such as the organisational personnel's adaptive capacity (McManus 2008), flexibility (Keong and Mei 2010) and coping ability (Vogus and Sutcliffe 2007) hence, developing the organisational personnel in order to allow organisations to cultivate the essential capabilities is required. However, the time and resource constraint of project organising (Emmitt 2010) hinders the redundancy required to develop these fundamental tenets of resilience (Luthans *et al*. 2002; Braes and Brooks 2010 and Vogus and Sutcliffe 2007) as such, research outlined in table 2; into exploring the potential of redundancy in project organising will provide the awareness and avenues for the development of the fundamental tenets of resilience.

Organisational resilience is based the organisations ability to continually promote knowledge management, situational awareness and organisational learning in order to be able to adapt and take advantage in the face of potential opportunities and certain discontinuities so as to reduce the rate of ambiguity and uncertainty during a perturbation (Seville *et al*. 2006; Carpenter *et al*. 2001; McManus 2008). However, the dispersed, temporary and unique nature of projects hinders the continuity in communication and knowledge sharing required to continually keep project personnel up to date on perturbations. Hence research agenda outlined in table 2 about unveiling avenues for developing continuity amongst project personnel will aid project organisations to adequately manage and be abreast with perturbations.

The efficient employment of the notion of resilience in organisations as stated by Glantz and Johnson (1999), Bhamra *et al*. (2011) and Giezen (2013) is mainly driven by the development of a resilient culture. However, this culture is driven by the leaders and management team. However, swift change in project leaders (mainly influenced by type of project being executed) and the affiliation of project personnel to different parent organisations before, during and after the project hinders the commitment and collaboration (van Donk and Molloy 2008) required sustain and develop the resilient culture to withstand perturbations. Hence, investigating into resilient culture development (as stated under research agenda in table 2) during project execution will aid the efficient employment of the notion of resilience in project organising.

Below in table 2 presents identified issues in project-based forms of organisations which hinder organisational resilience as discussed above together with the emerged research agenda for the efficient and effective employment of the notion of resilience in project-based organisations.

Table 2: Summary of assumptions, issues and research agenda

Assumptions of resilience	Issues in project-based organisations which challenges organisational resilience	Research agenda
Resilience is a malleable and nebulous term	The diversity of definitions of resilience instigates important issues about any common understanding of this construct across research domains.	Unlock the theoretical definitions and the dimensions of resilience
Redundancy (i.e. time and resource buffers)	The time and resource scarcity hinders the development of adaptive capacity (McManus 2008), flexibility (Keong and Mei 2010), coping ability (Vogus & Sutcliffe 2007) and persistence (Hamel & Valikangas 2003); all fundamental tenets of resilience	Explore the potential of redundancy in project organising
Organisational continuity (i.e co-location, permanent, monotonous)	The dispersed, temporary and unique nature of projects hinders the continuity in learning and knowledge sharing required to continually keep project personnel up to date on perturbations	Unveil avenues for keeping up to date on perturbations in project organising
Resilient culture development (managerial participation, team development)	The affiliation of project personnel to parent organisation before, during and after project hinders the development of a resilient culture required to sustain commitment and collaboration amongst project team members during a time of perturbation.	Investigate into resilient culture development in project organising

The above listed research agenda provides a foundation for both theoretical and practical tendencies to embed resilience in project organising to be explored.

CONCLUDING REMARKS

In this paper, a synthesis of literature on resilience has been undertaken to explore the discourse and challenges of embedding resilience in project organising. It has been argued that the characteristic nature of project organising, diversity in resilience definition and circumstance dependent nature of resilience renders its employment in project organising problematic. As such it is essential to explore opportunities of resolving the research issues identified to employ the notion of organisational resilience in project-based organisations. Hence, the identified research agenda form the basis for future studies into developing strategies to facilitate effective resilience implementation in project organising.

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