# Designing inter-organisational collectivities for dynamic fit: stability, manoeuvrability and application in disaster relief endeavours

Mark E. Nissen

Naval Postgraduate School,
1411 Cunningham Road, Monterey, CA 93943, USA
E-mail: MNissen@nps.edu

**Abstract:** The rich armamentarium of contingency theory can help to overcome the challenges of inter-organisational design. However, its predominate focus on static fit is incommensurate with the fundamentally dynamic nature of organisations and their environments. This problem is exacerbated in the context of inter-organisational design, particularly where the membership of participating organisations is discontinuous. Alternatively, recent research focusing on dynamic organisational fit and misfit elucidates novel design issues and engineering techniques even in the very complex inter-organisational context. In this article, we begin with a focused summary of dynamic fit and misfit, and we illustrate the use and utility of this view through empirical application to a very complex inter-organisational case involving thousands of participating organisations attempting to provide multinational disaster relief. The article concludes with an agenda for continued research along the lines of this investigation.

**Keywords:** contingency theory; disaster relief; dynamics; engineering; fit; inter-organisational collectivities; organisational design.

**Reference** to this paper should be made as follows: Nissen, M.E. (2011) 'Designing inter-organisational collectivities for dynamic fit: stability, manoeuvrability and application in disaster relief endeavours', *Int. J. Organisational Design and Engineering*, Vol. 1, No. 4, pp.276–291.

**Biographical notes:** Mark E. Nissen is a Professor of Information Science and Management at the Naval Postgraduate School, where his research focuses on dynamic knowing and organising. He views work, technology, organisation and people as an integrated design problem, and has concentrated for years on research to understand and effect dynamic organisation and fit, and remains drawn in particular to the messy domain of inter-organisational design. His many publications span information systems, organisation studies, knowledge management, project management, command and control and related fields. He serves on the editorial boards of several leading journals and remains an active and productive researcher and teacher.

## 1 Introduction

Organisational design has long represented a challenging endeavour (Boudreau, 2004), for attempting to establish and preserve good fit – which Donaldson (2001) defines as a match between the organisation structure and contingency factors that has a positive

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effect on performance (pp.7–10) – is a complex undertaking (Burton et al., 2006). Unlike the design of engineered artefacts and physical systems (e.g., airplanes, bridges, computers), the components of which include generally highly predictable and very well-understood parts and subsystems, the design of organisations (e.g., business, government, non-profit) involves people, routines and like elements, which are comparatively much, much less-predictable and -understood (Nissen and Levitt, 2004). This challenge is exacerbated when attempting to design collectivities comprised of multiple organisations. Not only are the constituent parts (esp. people) of such organisations wilful and unpredictable, but the organisations themselves are purposeful and unpredictable as well; hence, the considerable uncertainty and unpredictability associated with design are magnified in the inter-organisational context. Nonetheless, we can bring to bear the rich armamentarium of contingency theory (Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Woodward, 1965) to help guide our inter-organisational design endeavours. Contingency theory is very well-established in the organisation and management sciences and has supported organisational design for more than half a century. Moreover, myriad empirical studies (e.g., Argote, 1982; Donaldson, 1987; Hamilton and Shergill, 1992; Keller, 1994; cf. Mohr, 1971; Pennings, 1975) support our understanding of how different organisational designs affect fit with a wide variety of multiple, often-conflicting contingencies (Gresov et al., 1989; Gresov and Drazin, 1997; Meyer et al., 1993; Whittington and Pettigrew, 2003). Further, we have for several decades been conceptualising and analysing multi-organisational designs, including divisionalised structures (Mintzberg, 1979), network organisations (Miles and Snow, 1978), clans (Ouchi, 1980), virtual organisations (Davidow and Malone, 1992), platform organisations (Ciborra, 1996) and other organisational collectivities.

A fundamental problem, however, stems from the predominate research focus on static fit, a focus that is incommensurate with the fundamentally dynamic nature of organisations and their environments (Donaldson, 2001; Sinha and Van de Ven, 2005). Most key organisational environments are inherently dynamic (Yu et al., 2008), hence, the corresponding organisational designs required for fit are necessarily dynamic too (Nissen and Leweling, 2008). This problem grows even more severe in the context of inter-organisational design, particularly where the participating organisations comprising a collectivity come and go over time, through a multi-organisational instantiation of discontinuous membership (Ibrahim and Nissen, 2007).

Addressing in part some longstanding calls in the literature for more dynamic conceptualisation of fit (Burton et al., 2002; Zajac et al., 2000), a stream of recent research focusing on dynamic organisational fit and misfit elucidates novel design issues and engineering techniques even in the very complex context of inter-organisational collectivities. In this article, we begin with a focused summary of dynamic fit and misfit, and we illustrate the use and utility of this view through empirical application to a very complex inter-organisational case involving thousands of participating organisations attempting to provide multinational disaster relief.

## 2 Organisational fit and misfit

In this section, we draw from the stream of research focusing on dynamic organisational fit and misfit to elucidate organisational design and engineering techniques that can be applied to inter-organisational collectivities. Following Romme (2003), we view organisational design as a solution-finding activity that builds upon and complements organisation science. Focusing primarily on the *organisation* as its unit of analysis and *fit* as the key criterion (Boudreau, 2004), organisational design is conceptualised and practiced broadly as a set of largely non-routine, managerial actions taken to bring organisations into better fit with their environments, technologies, strategies and other contingency factors (Burton et al., 1998).

Indeed, the relations between such contingency factors and prescribed managerial actions are understood sufficiently well to be expressed in 'if-then' rule form to address a variety of organisational misfits (Burton et al., 1998; Burton et al., 2002; Burton and Obel, 2004). Although different than co-evolution in terms of intentionality (Lewin and Volberda, 1999), organisational misfit is viewed consistently as the converse of organisational fit [Donaldson, (2001), p.14]: "misfit produces a negative effect on organisational performance" and "implies inefficiencies, substandard performance, and the potential death of the organization" [Pérez-Nordtvedt et al., (2008), p.785]. In other words, misfit is a deviation from the ideal or goal state and provides a basis for comparing and estimating relative fit across a variety of organisations and their contingency contexts (Parker and van Witteloostuijn, 2010). Estimates of fit and misfit are based primarily upon performance (Payne, 2006).

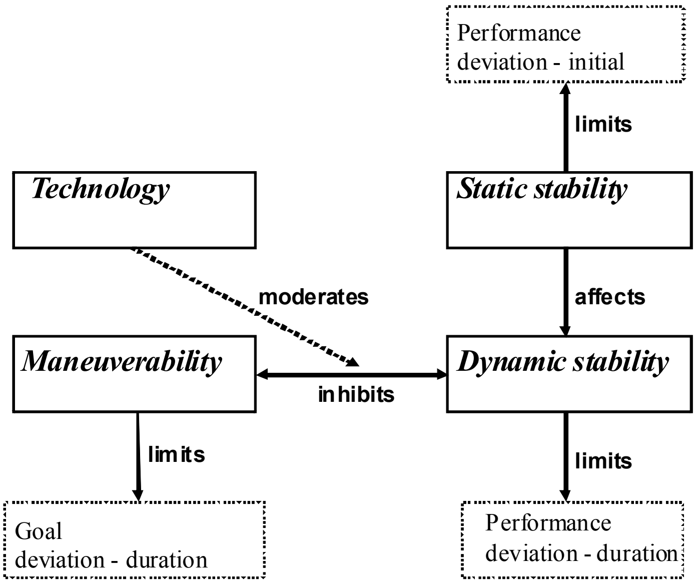
*Performance* represents a multidimensional construct, however, which can be difficult to assess without understanding the design goals and management strategy of the organisation. An organisation designed to be stable in the face of environmental turbulence, for instance, may appear to perform well in terms of consistent results, but the same organisation may be assessed as performing poorly when measured in terms of flexibility, adaptability and like change-oriented variables (Eisenhardt and Tabrizi, 1995; Eisenhardt and Martin, 2000; Teece et al., 1997). Likewise, forward looking management strategy, for instance, may manoeuvre an organisation purposefully out of fit (Burton et al., 2006; Pant, 1998; Westerman et al., 2006) and sacrifice current performance in order to anticipate or respond to changing contingencies.

Nissen and Burton (2011, p.420) extends these ideas, noting that most conceptualisations of fit would suggest that organisations "spend much of their time in conditions of misfit". Drawing from the engineering field aerodynamics (Houghton and Carruthers, 1982), which concerns the motion of highly dynamic, controlled systems designed for flight (e.g., airplanes), they view organisations through rough analogy to airplanes. In the case of airplanes, they are systems that reflect designed-in dynamic capabilities (e.g., speed, stability, manoeuvrability), but which receive directional inputs (esp. from pilots) routinely during flight (e.g., taking off, climbing, turning).

Likewise in the case of organisations, they too are systems that reflect designed-in dynamic capabilities (e.g., coordination, responsiveness, innovation), but which receive directional inputs (esp. from managers) routinely during operations (e.g., product launch, marketing, redesign). This view helps to reconcile problems such as those above by considering both design goals and management strategy. It also becomes insightful when considering inter-organisational collectivities, particularly those focusing on performance outside of conventional business measures such as *profit*, *market share*, *return on investment* and others applicable mostly to profit-seeking enterprises.

A basic conceptual model is depicted in Figure 1 and illustrates the aerodynamics concepts and relationships between *static stability*, *dynamic stability*, *manoeuvrability* and *technology* in a manner that applies to the domains of both airplanes and organisations and that considers performance as a multidimensional concept reflecting both design and strategy.

**Figure 1** Basic conceptual model




*Source:* Adapted from Nissen and Burton (2011)

Briefly, Table 1 summarises the four key concept definitions and provides examples from both the airplane and organisation domains. First, static stability, which concerns a system's initial resistance to deviation from its dynamic trajectory from an external force, maps from airplane design to organisation design by considering performance. A statically stable airplane resists deviation from its intended altitude, for instance, by wind gusts, and a statically stable organisation resists deviation from its intended profit[1] level, for instance, by changed consumer preferences. Hence, static stability limits initial performance deviation (e.g., maintaining desired airplane altitude, maintaining desired organisation profitability). This represents a capability that is designed into many airplanes (esp. large commercial jets emphasising passenger comfort and efficiency) and organisations (esp. large commercial firms and government agencies emphasising consistent results). *Static stability* is conceptually very consistent with *fit* in its traditional, cross-sectional (i.e., static) sense as characterised above (Nissen and Burton, 2011).

Dynamic stability, which concerns the quickness of a system's return to its dynamic trajectory after deviation from an external force, maps from airplane design to organisation design by considering performance also. A dynamically stable airplane returns quickly to its intended altitude, for instance, after deviation by wind gusts, and a dynamically stable organisation returns quickly to its intended profit level, for instance, after deviation by changed consumer preferences. Hence, dynamic stability limits the duration of performance deviation (e.g., maintaining desired airplane altitude, maintaining desired organisation profitability). This represents a capability that is designed into many airplanes and organisations also. *Dynamic stability* is conceptually consistent with *fit* in a longitudinal (i.e., dynamic) sense as characterised above.

**Table 1** Concept definitions and examples

| *Concept* | *Definition* | *Airplane* | *Organisation* |
|---|---|---|---|
| Static stability | A system's initial resistance to deviation from its dynamic trajectory from an external force. | Initial resistance to deviation in altitude from wind gust. | Initial resistance to deviation in profit level from change in consumer preferences. |
| Dynamic stability | Quickness of a system's return to its dynamic trajectory after deviation from an external force. | Quickness of return to initial altitude following a deviation from wind gust. | Quickness of return to initial profit level following a deviation from change in consumer preferences. |
| Manoeuvrability | Quickness of a controlled system's planned change from one trajectory to another. | Quickness of planned change in direction. | Quickness of planned change in product lines. |
| Technology | Enhances control of a dynamic system. | Computer flight control system enables human control despite quick direction change. | Management information system enables human control despite quick product line change. |

*Source:* Adapted from Nissen and Burton (2011)

Manoeuvrability concerns the quickness of a controlled system's planned change from one trajectory to another. A manoeuvrable airplane can change direction or altitude, for instance, in response to the pilot's goal change, quickly. Hence, manoeuvrability limits the duration of goal deviation (e.g., achieving a new airplane heading or altitude). Like static and dynamic stability above, manoeuvrability represents a capability that is designed into airplanes (esp. military fighter jets emphasising combat tactics and lethality), but such airplane designs are very different than their stable counterparts are.

Indeed, an important trade-off in aircraft design exists between stability and manoeuvrability. The trade-off obtains because design aspects that contribute to aircraft stability (e.g., size, front loading of mass, rear concentration of pressure) degrade manoeuvrability and vice versa. In design terms, one must decide the extent to which stability is relatively more or less important than manoeuvrability is, for most airplanes are unable to excel in terms of one without sacrificing performance in terms of the other. This provides an important analogical insight into organisational design.

In terms of organisations, an analogous design trade-off would imply that highly stable organisations would not be particularly manoeuvrable and vice versa. The implication is that, when designing an organisation to produce consistent results through environmental disruptions (i.e., emphasising stability), for instance, management would have to sacrifice some capability for rapid organisational change (i.e., de-emphasising manoeuvrability). Likewise, when designing an organisation to enable rapid change (i.e., emphasising manoeuvrability), as a counter instance, management would have to sacrifice some capability for robust performance (i.e., de-emphasising stability).

Hence, the myriad calls for organisations capable of manoeuvring through dynamic, high velocity markets (Eisenhardt and Martin, 2000) and balancing (Fiss and Zajac,

2006) or rebalancing (Cardinal et al., 2004) to restore fit when an organisation loses its balance, as well as organisations that are ambidextrous (Tushman and O'Reilly, 1999), resilient (Lengnick-Hall and Beck, 2005), edge (Alberts and Hayes, 2003; Gateau et al., 2007), and possessing dynamic capabilities (Eisenhardt and Martin, 2000; Teece et al., 1997) would need to consider, deliberately, the inherent design tradeoffs between stability and manoeuvrability. In other words, such manoeuvrable organisations would tend to be comparatively unstable; they would require some way to balance order with chaos and to keep organisational processes from flying out of control (Brown and Eisenhardt, 1997). Following this logic, it would be somewhat futile for stakeholders of a large, stable organisation to expect rapid organisational change or for stakeholders of a comparatively small, manoeuvrable organisation to expect stable performance results.

In the context of inter-organisational collectivities, many are comprised of large, stable organisations as well as comparatively small, manoeuvrable ones, with the collectivity as a whole reflecting the composite, inter-organisational design. This sets the metaphorical stage for our examination of a large and complex inter-organisational collectivity assembled to address the Indian Ocean earthquake and subsequent tsunami disaster of 2004 through this theoretical lens. This also equips us with new empirical techniques for separating inter-organisational performance into its two constituent elements (i.e., pertaining to stability vs. manoeuvrability) and provides a novel capability to examine these competing design influences together as a set.

## 3 Empirical case

In this section, we summarise briefly the pertinent aspects of a very complex inter-organisational case involving thousands of participating organisations – large and small – attempting to provide multinational disaster relief following the 2004 earthquake and resulting tsunami in the Indian Ocean. Here our intent is not to detail results from an in-depth case study; rather, we draw from several secondary data sources (e.g., Comfort, 2006; SAS-065, 2008, 2010; Schulze, 2006; Sharpe and Wall, 2007; Telford and Cosgrave, 2006) to establish sufficient context and grist to illustrate and apply dynamic fit and misfit as described above. The interested reader is directed to the list of references for additional details.

Beginning with the key dates, on 26 December 2004 an extremely powerful (e.g., magnitude greater than 9.0 on the Richter scale) undersea earthquake struck in the Indian Ocean just west of Indonesia. The nearby Aceh Province was devastated by a strong tsunami that was generated by this earthquake. 200,000 of Aceh's people were killed, including 50% of the civil service officials. More than a half million people were left homeless, and nearly a quarter of the infrastructure was destroyed, including most of the government offices located in coastal areas. Initially, the affected people did whatever they could to survive. After the tsunami receded, people's attention turned to rescue and relief. This effort reflected negligible, formal organisation: people in local communities worked in an ad hoc manner to help others in their communities.

On the following day, the Indonesian Vice President and advisory staff surveyed and assessed the tsunami devastation, and shortly afterward, the Indonesian Military massed to lead search and rescue, as well as mass burial, activities in the region. The military also initiated an effort to help coordinate aid. The military, with its stereotypical, unified chain of command and hierarchical organisational control structure, operated effectively within the scope of tasks that it set for itself, and during this initial period of reaction to and relief from the tsunami devastation, the two 'organisations' (i.e., the Indonesian Military and the ad hoc collections of people in local communities) operated independently of one another for the most part.

The international community responded then with an outpouring of assistance. For several instances: the United Nations Disaster Assessment and Coordination Team arrived before New Years day; nearly 5,000 military troops from 11 foreign countries (e.g., Australia, Singapore, the USA) came to assist the Indonesian Military with its relief efforts; and by 31 January 2005, more than 3,500, mostly small, non-government organisations had arrived to provide humanitarian assistance and disaster relief. Several parts of the Indonesian Government beyond its military (e.g., its Central Planning Agency BAPPENAS, the Aceh and Nias Rehabilitation and Reconstruction Board BRR) got involved in the effort as well. Combined, this represents a huge number and broad diversity of relatively unaffiliated organisations attempting to work together in a hastily formed, inter-organisational collectivity.

Moreover, although all of these organisations were operating on scene at the request of and to assist the Indonesian Government, the government was not in charge in the sense of directing their activities; rather, most of the various organisations accomplished the tasks that they knew best and perceived as most appropriate. Also, although the Indonesian Military coordinated with the militaries of several other nations, the resulting multinational military coalition did not coordinate actively or effectively with the myriad non-military organisations that were participating in the area.

Further, although the participants of this inter-organisational collectivity shared several common goals at a relatively high level, the collectivity as a whole was far from goal-congruent. Indeed, reports abound of considerable conflict, mistrust and friction between many of the different participating organisations, particularly those representing different interests (e.g., Indonesian Military vs. foreign militaries, militaries vs. non-government organisations, Indonesian vs. international non-government organisations). Moreover, the affected region marked the location of considerable anti-government rebel activity; yet, even the Indonesian Military and opposing rebel forces shared the goal of overcoming the tsunami effects.

For certain, this inter-organisational collectivity was not designed explicitly; rather, it emerged and grew in a largely ad hoc manner, albeit on a grand scale. Nonetheless, such collectivity reflected at least partially shared goals, and through a rational organisational lens, it can be considered to represent an 'organisation' (Scott, 2003). As such, fitness would apply, and although somewhat messy, the collectivity can be described in terms of its (organisational) structure and (design) configuration. Hence, it provides a challenging yet feasible application of our dynamic fit conceptualisation.

Following the tsunami relief phase of activity, which took place roughly December through May, the most pressing needs in terms of emergency response had either been met or become moot, and the composition and character of the inter-organisational collectivity shifted toward longer term efforts associated with recovery and reconstruction. Many of the several thousand organisational participants in the collectivity dropped out, and the ad hoc nature of the inter-organisational collectivity began to give way to more centralised organisation led by the Indonesian Government.

We focus principally on the initial phase, concentrating in particular on the tsunami relief that followed immediate response in terms of search and rescue, for it reflects in particular the implications of dynamic organisation and fitness. Further, our secondary data (SAS-065, 2008, 2010) provide an empirical basis for assessing stability and manoeuvrability as characterised above. For instance, we have a timeline of roughly six months (i.e., December through May) that can be used to measure inter-organisational performance in terms of maturity level, which characterises roughly (e.g., on a 5-level Likert scale) the relative degree of sophistication and efficacy in terms of inter-organisational collaboration and management. Moreover, we gain insight into the *required degree* (i.e., Level 4) of sophistication and efficacy [SAS-065, (2010), pp.76–78].

In particular, a total of three, different, modal maturity levels are reported [SAS-065, (2010), pp.99–101] during this time period:

1. the Indonesian Military and foreign military organisations operated at the relatively high Level 4
2. interaction of the militaries with non-government organisations (and between the myriad non-government organisations themselves) was evaluated at the very low Level 1
3. a 'characteristic' Level 3 mode was assigned to the time periods and activities preceding and following our tsunami relief efforts of interest.

When viewed in terms of inter-organisational design and fit, we consider the entire set of participating organisations, including the Indonesian and foreign governments and militaries as well as humanitarian, local and other non-government organisations, and we draw upon the corresponding ratings to examine and consider the entire inter-organisational collectivity through a design perspective.

## 4 Empirical illustration

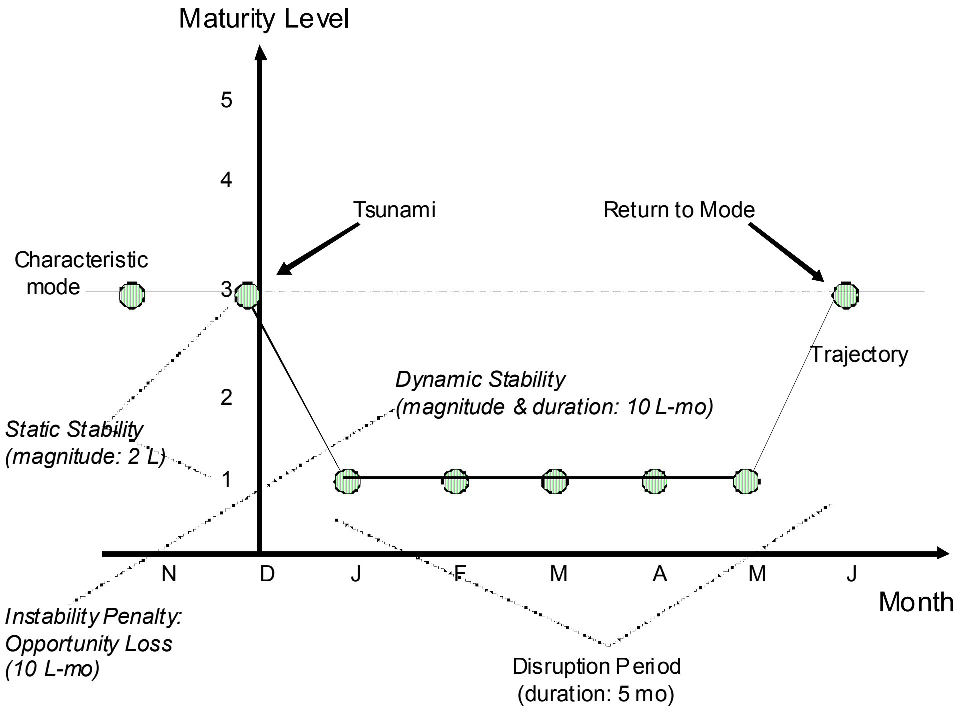
In this section, we build upon the fit and misfit discussion above to illustrate inter-organisational dynamic stability and manoeuvrability through empirical application to the tsunami relief. This discussion is kept purposefully at a relatively high level in terms of concepts; the interested reader can peruse the theoretical basis (Nissen and Burton, 2011) for details concerning conceptualisation and technique.

### *4.1 Dynamic stability illustration*

Figure 2 illustrates our initial application of inter-organisational dynamic stability. On the horizontal axis, we display the applicable months in 2004 and 2005 (i.e., December through May) pertaining to the tsunami relief effort, and on the vertical axis, we include the maturity level ratings (1 to 5 scale) assigned in the case.

The trajectory is delineated by circles plotted for each monthly time period and pertains to performance of the inter-organisational collectivity as a whole (i.e., Indonesian and foreign governments and militaries as well as humanitarian, local and other non-government organisations) from November 2004 through June 2005. It begins at the characteristic mode Level 3 (i.e., in November and December) and reflects the two-level degradation to Level 1 (i.e., in January) corresponding to the tsunami relief effort. As noted above and illustrated in the figure, this level persists through about May, after which the effort transitions toward the next phase, and the maturity level returns to its characteristic modal level.

**Figure 2** Dynamic stability: tsunami relief application (see online version for colours)




Following Nissen and Burton (2011) here in Figure 2, static stability can be measured[2] through the two-level decrease to Level 1 (i.e., static stability = 2L: 2 levels), and dynamic stability can be measured through additional consideration of the five month disruption period with performance at this level (i.e., dynamic stability = 2L × 5 mo = 10 L-mo: 10 level-months). This reflects the inherent instability associated with the (implicit) inter-organisational design, which we quantify here as the area beneath the characteristic mode line to calculate an instability penalty of 10 level-months.

Unlike examining the performance of a business or like profit-seeking enterprise (esp. measured in terms such as *profit*, *market share*, *return on investment*) affected by environmental disruption (e.g., shifts in consumer preferences), it is more difficult to provide concrete implications of instability penalty in terms of tsunami relief. Nonetheless, when thousands of people's lives are at stake and millions of people are displaced, such penalty has very real implications in terms of human death and suffering. If 10 level-months of instability penalty corresponds to, say, 100,000 deaths and a quarter million people displaced (i.e., roughly half the number of deaths and displacements reported in the case), then every 1 level-month translates to an associated instability penalty in terms of 10,000 lives that could have been saved and 25,000 people that could have avoided displacement. This instability penalty can be interpreted in terms of opportunity loss as well; during this period of instability, 100,000 people lost their lives, and a quarter million people lost the opportunity to lead productive lives while they were displaced by the disaster. Such operationalisation adds considerable perspective to the importance of inter-organisational design and fit in the disaster relief context.

In order to illustrate this application case more fully, we draw from contingency theory and speculate a bit on an alternate, inter-organisational design that may have contributed to greater dynamic stability. Notice that we use the term *design* here even though the inter-organisational collectivity observed was never 'designed' per se; nonetheless, an implicit design emerged through inter-organisational action and interaction. Notice also that we draw from (organisation) contingency theory to address an inter-organisational design problem; although imperfect, such theory has expanded over the years to apply increasingly to multi-organisational designs in the inter-organisational context (Nissen and Burton, 2011).

In terms of an inter-organisational design alternative, the environmental context of conflict and mistrust between organisational participants stands out as a particularly dominant contingency in terms of results observed and reported through the tsunami case. The inter-organisational collectivity that emerged to provide disaster relief appears to have provided poor fit with respect to this aspect of its environment. Hence, an inter-organisational redesign to address such poor environmental fit would represent a theory-consistent approach to take.

Say, for instance, that the Indonesian and foreign militaries were able to embrace the non-government organisations as important partners and work to at least mitigate areas of major conflict between them. As such the inter-organisational collectivity may have managed to at least resolve one of the crippling conflicts experienced (i.e., between military and non-government organisations), which could have reduced the instability penalty.

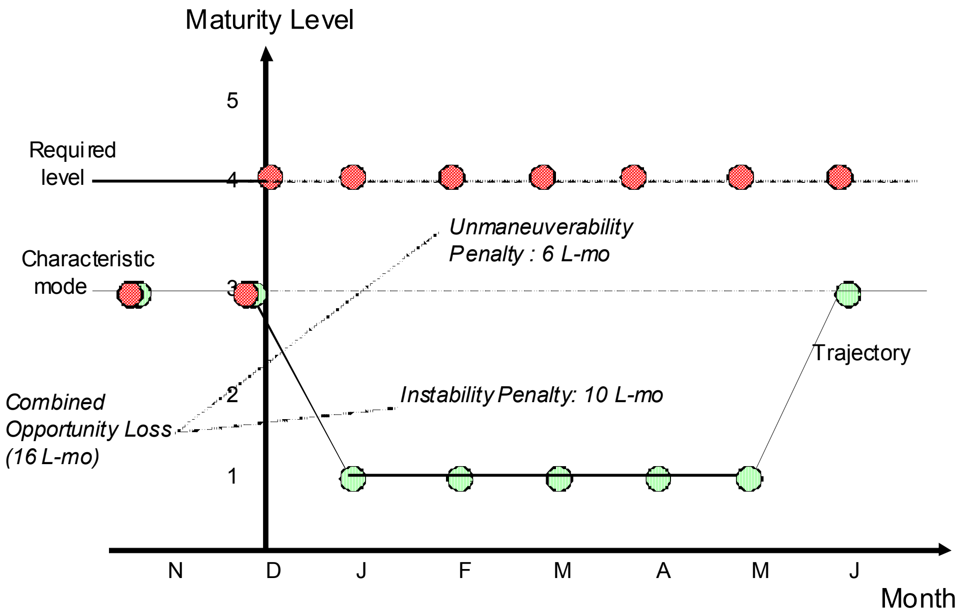
Consider, i.e., an inter-organisational *adhocracy* or *divisionalised structure* design (Mintzberg, 1979) that includes military and non-government organisations alike. In the adhocracy design, the various organisations would coordinate only loosely and work according to their own, self-selected, core competencies within the operating core of an inter-organisational collectivity. In the divisionalised structure, alternatively, such organisations would coordinate more formally with a central authority and work according to its, negotiated or assigned, priorities as separate divisions of an inter-organisational collectivity. Given the emergent and emergency nature of tsunami relief efforts, the former would appear to be more likely and responsive than the latter, unless considerable preplanning and inter-organisational preparation were to take place well before a disaster struck.

In terms of the case and dynamic stability, by simply deconflicting their activities, the inter-organisational collectivity could potentially raise its performance from Level 1 to Level 2 (SAS-065, 2010). Notice that even a one-level increase in maturity level such as this would cut the associated instability penalty and opportunity loss in half (i.e., to 5 level-months from the 10 level-months observed). Considering the implications in terms of human death and suffering, this represents 50,000 lives that may have been saved and 125,000 people that may have avoided displacement.

### *4.2 Manoeuvrability illustration*

Figure 3 illustrates our subsequent application of inter-organisational manoeuvrability. In addition to the dynamic stability annotations discussed above, we draw further from the case to delineate the *required level* (i.e., Maturity Level 4) of sophistication and efficacy in terms of inter-organisational collaboration and management. The trajectory corresponding to this required level is clearly above both the characteristic modal level and observed trajectory. Although this, required level does not represent a goal, per se, we can use it as a goal proxy for purposes of measuring manoeuvrability.[3] As such, the figure highlights an unmanoeuverability penalty in this case (i.e., manoeuvrability = 1L × 6 mo = 6L-mo: 6 level-months) stemming from the inter-organisational collectivity being unable to manoeuvre to achieve the required performance level.

**Figure 3** Manoeuvrability: tsunami relief application (see online version for colours)




Like the instability penalty discussed above, such unmanoeuverability penalty translates to an opportunity loss as well, an additional six level-months in this case. Moreover, these penalties stack on top of one another; we combine the ten level-months of instability penalty discussed and delineated above (i.e., the area beneath the characteristic modal level) with an additional six level-months of unmanoeuverability penalty (i.e., the area between the required level and characteristic modal level) for a total of 16 level-months (10 L-mo + 6 L-mo = 16 L-mo) combined opportunity loss. As with the example above, this unmanoeuverability penalty translates to an additional 60,000 lives that could have been saved and 150,000 people that could have avoided displacement.

In order to illustrate this application case more fully, we draw from more recent yet still developing organisation theory, and we speculate still further on how other inter-organisational designs may have contributed to greater manoeuvrability. We understand, for instance, how ambidextrous organisations (Tushman and O'Reilly, 1999) are able to operate simultaneously in multiple modes. Through such multimodal operation, an inter-organisational collectivity may be able to preserve dynamic stability – and hence limit both the magnitude and duration of disruption from the tsunami – while enhancing manoeuvrability – and hence enabling performance at Maturity Level 4 – at the same time. Our fundamental trade-off between stability and manoeuvrability, however, raises serious questions regarding how such simultaneous enhancement of *both* stability and manoeuvrability could be effected.

Similar arguments pertain to resilience capacity (Lengnick-Hall and Beck, 2005) – which emphasises responsiveness, flexibility and an expanded action repertoire, along with the capability to select and enact the corresponding routines – and organisational semi structures (Brown and Eisenhardt, 1997) – which focus on balancing order and flexibility. Likewise with edge organisations (Alberts and Hayes, 2003) – which integrate aspects of adhocracy, professional bureaucracy and simple structure (Gateau et al., 2007) to enable knowledge and power to flow from the tops and centres of (inter-)organisations to the bottoms and edges – and the dynamic capabilities approach (Teece et al., 1997) – which prescribes capabilities such as timely responsiveness, rapid and flexible product innovation, along with management capability to coordinate and redeploy resources as key. As above, they raise serious questions regarding how to achieve such goals given mutually inhibiting interactions between stability and manoeuvrability. Indeed, if the stability-manoeuvrability trade-off is fundamental as outlined in our discussion above, then the inter-organisational designer must necessarily sacrifice performance in one area for improvement in the other.

Alternatively, analysis of the case reveals that many of the participants in this inter-organisational collectivity represent relatively small organisations, most of which are likely to be comparatively more manoeuvrable (esp. due to small size) than their larger counterparts are. Consider, for instance, an inter-organisational design that partitions the work into two groups (esp. tasks requiring considerable manoeuvrability vs. those requiring abundant stability). Those organisations with greater manoeuvrability inherent in their designs could conceivably address the inter-organisational demands associated with rapid goal changes, whereas those with greater inherent stability could possibly address the corresponding demands requiring stable performance.

Notice that this represents an approach to implementing an inter-organisational application of ambidextrous organisation, with small, manoeuvrable organisational participants performing in one mode and accomplishing one set of tasks and large, stable participants performing in and accomplishing another. It remains unclear whether tasks and organisations can be partitioned effectively along the lines of this inter-organisational ambidexterity design, but this represents a compelling topic for future research that can build upon the results of our investigation.

Drawing further from aerospace engineering and the airplane-organisation analogy, specific technologies (esp. computer flight control systems) are able to moderate the fundamental stability-manoeuvrability design trade-off in some aircraft. Indeed, such technologies are required for a highly manoeuvrable yet unstable airplane to be controlled at all and not crash; without computer flight control system technology, aircraft designed with high levels of manoeuvrability and instability cannot be flown by human pilots.

In terms of organisations, substantial research addresses the role of information technology in balancing organisational flexibility with control (Brown and Eisenhardt, 1997; Eisenhardt and Martin, 2000; Kauffman, 1995) through real-time information, forecasting, marketing, product design and supply chain management (Sabherwal et al., 2001). Organisational instability through design, combined with analogous 'flight control' management processes and information technology (Arciszewski et al., 2009; Fan et al., 2010), may lead to greater manoeuvrability and may be essential for highly manoeuvrable (inter-)organisations to be controlled at all by human managers. It remains unclear which if any information technologies offer potential to moderate stability-manoeuvrability tradeoffs in the inter-organisational design context, but this represents another promising area of continued future research that can build upon the results of our investigation.

## 5 Conclusions

In this article, we build upon an important stream of research focusing on dynamic organisational fit and misfit to elucidate novel organisational design and engineering issues in the complex context of inter-organisational collectivities. Drawing further from aerodynamics, we interrelate concepts and relationships between *static stability*, *dynamic stability*, *manoeuvrability* and *technology* to inform inter-organisational design. We also highlight an important, mutually inhibiting design trade-off between stability and manoeuvrability and illuminate the potentially enabling role of technology in terms of moderating such interrelationship.

We then illustrate the use and utility of this approach through empirical application to a very complex inter-organisational case involving thousands of participating organisations attempting to provide multinational relief following the 2004 Indian Ocean disaster. Such application reveals how to address performance in terms of both stability and manoeuvrability, and it elucidates instability and unmanoeuverability penalties, which can stack on top of one another for combined opportunity loss and detriment to an organisation. We further characterise some important implications of poor inter-organisational fit through human death and suffering, along with some inter-organisational design alternatives offering potential to address deficiencies reported in the case, and we identify several promising topics for continued research along the lines of this investigation.

As with every study, the present investigation has several limitations. The aerospace-inspired, analogical, dynamic organisational fit ideas remain relatively novel and primitive; hence they can benefit from considerable refinement and extension. Also, our application of dynamic stability and manoeuvrability to the tsunami relief efforts illustrates only one of many possible cases that could be used for illustration; hence incorporation of and comparison with additional cases offers potential for increased insight. Application to other, organisational and inter-organisational designs and contexts represents a wide open avenue for continued research along these lines as well, particularly empirical work to refine and measure the key dynamic fit constructs (esp. *dynamic stability*, *manoeuvrability*, *instability* and *unmanoeuverability penalties*). The research described in this article highlights ample potential for refinement and extension. This represents a direct challenge for our international community of inter-organisational design scholars to address.

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## Notes

1 As a note, we can substitute a multitude of alternate performance measures for airplanes (e.g., heading, speed, attitude, fuel efficiency, passenger comfort) or organisations (e.g., market share, cycle time, liquidity, operating margin, employee welfare) to emphasise model generality.

2 Static stability is measured by the degree of performance deviation experienced by an organisation following an environmental shock or disruption; in the case of the figure, this is two performance (i.e., maturity) levels. Dynamic stability incorporates the length of time required to reestablish the previous performance level; in the case of the figure, this is two performance levels multiplied by the disruption period (i.e., five months) of degraded performance.

3 Maneuverability is measured as the level of performance below goal (i.e., 1 maturity level to the modal line) multiplied by the disruption period (i.e., 6 months) of subgoal performance.