STRATEGIC ALINGMENT: TOWARDS A HOLISTIC PERSPECTIVE EMBRACING COMPLEXITY – ADVANCING THE RESEARCH AGENDA

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Abstract:

Strategic alignment has been extensively researched and reviewed. However, the field seems to have reached a stagnant stage in regard to the theoretical, methodological and philosophical foundations employed. In addition, existing research has been criticised due to its inability to capture the messy reality of organisations as well as it being undesirable for firms – as organisations must always change. This paper offers a review of the critique and address them in a constructive manner that reveals the underlying assumptions of which the criticisms are derived. In doing so, new perspective is offered that draws on concepts of complexity theory such as emergence and co-evolution. Special issues have proposed embracing complexity – but the publications to date do not reflect this. Therefore the aim is to offer a stepping stone for further research that builds on the foundation and insights provided by previous alignment research.

Key Words: Strategic Alignment, Emergence, Co-Evolution, Process, Complexity

1.0 Introduction:

Strategic alignment (SA) has been a core part of the strategic information systems research stream (Gable, 2010). It is thoroughly reviewed and discussed (see Chan & Reich, 2007a, 2007b; Coltman et al., 2015), perhaps due to the fact that it has remained a top management concern for the last three decades (Kappelman et al., 2018). Scholars engaging in the inquiry of SA have drawn on information systems research, strategic management and organisation theory. While these three domains have continued to advance in terms of theoretical underpinnings and methodologically tools – the SA literature has not followed the suit. Due to the stagnant stage of SA (in regards to new perspectives), it has received criticisms – as presented by Chan & Reich (2007a). Much of this criticism stems from the of the researchers sticking to 'classical' or 'traditional' theoretical frameworks and methodologies that have not allowed this topic to be advanced at the same pace as other topics in SA's neighbouring domains.

These traditional, contingency-based approaches are reflective of reductionism. The reductionist methodology seeks to reduce (break) the organisational system into smaller parts and use contingency-based analytical frameworks to construct a theory to understand how these smaller parts function (Sayer, 1992; Pollalis, 2003; Burgelman, 2011). As Rashidiard & Colleagues (2015) note in regard to strategic management: the predominant reductionist approach led to inconsistencies in findings regarding strategy constructs and performance

which may not be appropriate to capture a firm's reality. Reductionist approach is rooted in the positivist paradigm which disregards stratification, emergent powers (Sayer, 1992) and other complexities of social reality (Sachs & Ruhli, 2001). To counter these issues – scholars have proposed a holistic approach which captures reality in flight, identifies complex interrelationships and acknowledges emergent processes such as improvisation by adopting complex systems concepts and perspectives such as co-evolution (Weick, 1998; Lewin & Volberda, 1999; Kogetsidis, 2012) or a configurational approach (Rashidiard et al., 2015).

As physics Nobel Laureate Laughlin (2006) claims, we are now at the 'emergent age' which replaces the reductionist approach that gave rise to positivism. This era refers to emergentism which "looks for the underlying mechanisms under which these phenomena come about" (Lai, 2007: 570). Although the natural sciences were first to embrace the concepts of complexity after realisation that systems are not stable, certain and composed of linear relationships – but rather characterised by instability, uncertainty and non-linear processes (Prigonene, 1997), social scientist, management scholars and IS researchers have realised the usefulness of embracing complexity in attempting to construct holistic approaches to understanding, researching and examining organisational phenomena (Lewin & Volberda, 1999; Merali, 2006; Merali & McKelvey, 2006; Jaccuci et al., 2006; Merali & Allen, 2011; Thietart & Forgues, 2011; Merali et al., 2012; Condorelli, 2016).

Therefore, the aim of this paper is to address these criticisms in a constructive manner and to continue the proposals set out by special issues on embracing complexity in the information systems field (see Jaccuci et al., 2006; Merali & McKelvey, 2006). First, the criticisms are stated, examined and discussed. This will give the reader an understanding of the context as well as promoting the need for processual research. Secondly, complex adaptive systems, emergence and co-evolution will be discussed as a possible future avenue to advance SA research. Finally, a discussion is provided to suggest future possible research topics and questions to further the agenda put forward in the special issues.

2.0 Criticisms:

The following section will address the four major criticisms noted by Chan & Reich (2007a: 298) by providing a counterargument. The criticism arise from scholars who argue that SA literature has so far failed to effectively capture the phenomenon and claiming that SA in itself being not being desirable. Thus the question is – should we abandon the quest to further examine SA? The short answer is – No. The long answer is that Chief Information Officers

have ranked it a top priority for the last three decades (Kappelman, 2018), suggesting that research should still make an attempt to understand this phenomenon in a holistic manner. This can be achieved by taken an alternative perspective; namely one that overcomes the criticisms and allows for a new perspective on the phenomenon that has the ability to capture real organisational dynamics and offers practical insights to the practitioners.

2.1 Criticism #1: Alignment research is mechanistic and fails to capture real life

The first argument against SA presents mechanistic approach adopted by previous research – emphasising the use of static variance-based scientific method where researchers employed models to test various relationships for significance and attempted to understand human interaction (Chan & Reich, 2007).

As Ciborra (1997: 71) notes in a commentary on SA, the world is messy and that 'sophisticated' models developed on SA "remain a de-worlded image of the organisation". This statement refers to the use of static methodological approaches that are not able to capture the characteristics of a 'messy' world. For example, some authors report that SA does not remain constant due to 'muddling through' and tinkering' (Vitale et al., 1986) or that the use of technology is characterised by improvisations and 'bricolage' (Orlikowski, 1996; Ciborra, 1998). Thus, in order to capture the reality of organisations one must incorporate the ontological concept of 'becoming' to understand improvisation, emergence and micro practices that enact order within the firm (Weick, 1998). Although this point-of-view has already been incorporated by processual strategy researchers such as Mintzberg and Burgelman as well as by process theorists such as Pettigrew, Dawson and Van de Ven – these have not been translated to the approach taken by SA researchers specifically and IS in general to the extent as in the neighbouring domains; and hence, the research is too mechanistic and fails to capture real life.

The second issue is the use of contingency theory which led to previous research being reductionist. Alignment in the general management arena was derived from both contingency theory and population ecology – which paved the way to understand the contingency variables that influence performance and firm survival. Within the contingency tradition, the presented models all have the underlying assumption that context (internal or external) and structure must fit to achieve and maintain performance (Drazin & Van de Ven, 1985). Following this, contemporary fit-based research has sought to understand and measure the alignment between various constructs to determine the influence on performance. Common contingencies used in

SA literature include: firm size (Ein-Dor & Segev, 1982; Raymond et al., 1995; Chan et al., 2006), industry (Tan, 1995; Chan et al., 2006); strategic orientation (Tan, 1995; Croteau & Bergeron, 2001; Chan et al., 2006; Tallon 2008, 2011), and environmental uncertainty (Choe, 2003; Yayla & Hu, 2009). These studies are reminiscent of the linkage-exploring domain of strategy research, that attempt to understand the link between contingencies, firm performance and alignment (Hutzschenreuter & Kleindienst, 2006). These studies are also reflective of the reductionist era, by breaking down the system into smaller parts to understand their 'links'.

Contingency-based studies have been criticised in the management field in general (e.g. Schoonhoven, 1981; Drazin & Van de Ven, 1985; Fry & Smith, 1987) as well as in IS and SA literature specifically (Weill & Olson, 1989; Brown & Magill, 1994; Sambamurthy & Zmud, 1999). The first issue relates to the lack of clarity in theoretical assumptions that are used to guide contingency research. Schoonhoven (1981: 351) notes that the assumptions such as – this structure fits this specific environment – is too 'ambiguous' and requires more precision; suggesting that "it is quite possible that environment and technology are related to distinctly different structural variables rather than to the same unspecified set". In that manner, contingency theorists also tend to misinterpret alignment to be contingency effects rather than merely congruent relationships – thus attempting to 'mix apples and oranges' to understand and predict organisation phenomena (Drazin & Van de Ven, 1985; Fry & Smith, 1987).

The mixing apples and oranges refers to using different conceptualisations of SA with different analytical methods to understand the relationship of SA with firm performance. In that sense, it is close to impossible to combine findings to produce a coherent and generalisable framework of contingency variables. Venkatraman (1989) developed an overview of six types of alignment approaches – each with distinct theoretical meanings and analytical methods – that have been used in strategic management literature. Due to differing approaches, differing and contradicting results have occurred. Bergeron & Colleagues (2001 : 139) tested each six types of alignment as proposed by Venkatraman in the IS field and found that different measures of alignment lead to different results regarding the achievement of abnormal returns. Furthermore, they concluded that the inability of research to "specify the exact perspective of fit… often lead researchers to obtain contradictory, mixed, or inconsistent results". Additionally, while Parthasartathy & Sethi (1993), Chan & Colleagues (1997) and Li & Ye (1999) found significant relationship between SA and firm performance using the moderation approach (criterion specific), Kearns & Lederer (2000) found a non-significant relationship using the criterion-free matching perspective (Oh & Pinsonneualt, 2007). Venkatraman acknowledges the limitations

of the various alignment approaches during longitudinal operationalisations of fit and states that alignment "is a dynamic and never-ending task, whereby the organisation is continually "shooting at a moving target of coalignment (Thompson, 1967: 234)… [and] it is unclear whether the six perspectives identified here are appropriate for testing them" (Venkatraman, 1989: 441).

The aforementioned contradictions have been known to refer to as the alignment paradox (see Gerow et al., 2014; Liang et al., 2017; Zhou et al., 2018). Interestingly, the plethora of contradictions is not unique to the SA literature, but common among all domains that employ contingency theory as a result of a reductionist approach. Edwards (1994: 51) identifies the same issue in the organisation behaviour field – stating that the use of contingency theory "present numerous substantive and methodological problems that severely threaten the interpretability and conclusiveness of the obtained results".

Weill & Olson (1989: 59) also present a critique of contingency theory, concluding that "research in MIS has been hampered by the use of a naïve meta-theory, conflicting empirical results with low explained variance, ill-defined concepts of performance and fit, and a narrow perspective of researchers". They suggest specific recommendations to overcome the narrow focus and naïve meta-theory derived from contingency theory. The recommendations revolve around employing a different set of methodologies, such as qualitative case studies, ethnographic studies, longitudinal studies, and a mixed-method methodology to support theory building in the MIS research domain (Weill & Olson, 1989). Indeed, the majority of SA and IS research in general have adopted a positivist epistemological perspective (Orlikowski & Baroudi, 1991; Chen & Hirschheim, 2004) in contrast to interpretivism and the more recent critical realist approach (Wynn & Williams, 2012; Mingers et al., 2013). The positivist approach has led to numerous assumptions being adopted from the natural sciences where scholars "are in effect attempting to freeze the social world into structured immobility and to reduce the role of human beings to elements subject to the influence of a more or less deterministic set of forces" (Morgan & Smircich, 1980: 498). Thus, it may be beneficial to adopt a new lens with differing ontological and epistemological assumptions.

2.1.1: Summary

The message is clear. The current methodological toolset does not allow to capture the social reality nor to understand the complex processes at play. Secondly, the research is confronted with contradictory and mixed results – which is less beneficial to the practitioner. The general

consensus is that alignment leads to better performance and efficiency. Therefore, continuing the investigation of construct-performance linkages using differing analytical approaches to understand alignment and performance advances the field to a lesser extent. Rather, practitioners and researchers are may be better served by investigating how alignment is achieved and how it evolves in an organisation. In order to do so, scholars in the aforementioned sections argue for the use and adoption of qualitative methods and a processual ontology. This research approach allows for a holistic understanding that acknowledges the emergent nature of processes and the dynamic context in which SA is achieved.

2.2 Criticism #2: Alignment is not possible if the business strategy is unknown or in progress

The second argument is based on the premise that alignment of the IS strategy cannot occur if the business strategy is unknown or in progress (Chan & Reich, 2007a). The argument is also reminisce of an older debate within organisation theory that is representative of divergence in research that adopts either a voluntarist or deterministic approach to organisational adaptation and strategic change (Astley & Van de Ven, 1983; Hrebiniak & Joyce, 1985). These schools directly relate to the assumptions on how strategy and change can be characterised. While some adopt the approach that strategy and change is planned (Voluntarist: e.g. Child, 1972; Quinn, 1980) others state that strategic change emerges naturally from the responses of the environment (Determinist: e.g. Weick & Quinn, 1999). Although some authors adopt these approaches as competing perspectives, Burnes (2004, 2012) as well as Bamford & Forrestor (2003) asserts that these approaches are complementary – representative of the dynamics of complex adaptive systems (Allen et al., 2011). Therefore, it is possible that this criticism arose of the use of a voluntarist approach, to the extent that strategy is only identified within plans and doesn't consider the emergent forces at play in the strategising process.

If there are no plans, actors still tend to take actions towards a goal – characterised by a more dominant emergent approach (Mintzberg, 2007). Within SA literature, Sabherwal & Collegues (2001) acknowledge the treatment of alignment as a static end-state and make the case for needing to view alignment as 'a moving target' (Javenpenaa & Ives, 1993) and as an emergent process. Furthermore, in a recent study on the influence of entrepreneurial action on SA in new ventures, Street & Colleagues (2018) a more dominant emergent aligning activities in one case study. In that sense, there seems to be some evidence for the emergent nature of alignment, but it is not yet examined in-depth – in the form of understanding and tracing the emergent strategy overtime and its influence on the SA process.

SA research typically focused on intended strategy and not taking into account the emergent nature of strategy processes. The intended strategy never becomes realised but rather there are emergent actions, events and decisions that influence and alter the intended strategy. The key is to distinguish between alignment in terms of strategic plans (what firms intend to do) and alignment in terms of realised strategy – what firms actually do (Coltman et al., 2015). As Moncrieff (1999: 273) notes: "not all intended strategies are realised, and not all realised strategies were intended. Realised strategy is often emergent in nature". This is supported by Mintzberg & Water (1985) who argue that strategy cannot be pure deliberate nor pure emergent, but rather in-between the continuum. To understand the complex organisation process of strategy, one must study the interplay between intended and realised strategies (Mintzberg, 1978), which is also suggested by IS Scholars (Chan et al., 1998). This will require "examining the existing documentation (IS strategy statements, documents, minutes of planning meetings, etc.), coupled with asking questions of key informants regarding the organization's formal IS directions and strategic intent" (Chan et al., 1998: 274).

Finally, they state that "very little research has examined realised IS strategy. Also, very little research has addressed the measurement of either intended or realised IS strategy" (Chan et al., 1998: 274). The issue here is that previous SA content researchers have commonly analysed the 'intended' IS and business plans and strategies (e.g. Earl, 1989; Keen, 1991; Raghuanthan & King, 1988; Ward et al., 1990), although Mintzberg & Water's (1985) make a clear and solid case that no strategy is realised as intended. In that regard, SA researcher must examine how the unintended, autonomous and emergent strategy shapes and shifts the final realised SA configuration – which has not yet been examined.

2.2.1: Summary

Overall, to advance the field of SA – both intended/deliberate and autonomous/emergent strategies must be traced over time to understand how the realised state of SA comes about. In doing so, the conceptualisation of strategy must be altered to incorporate its dynamic and emergent nature. Since much evidence suggests that strategy formation is not static and "rarely conforms to the ideal of rational decision-making an subsequent planned change", it is better to view strategy formation as a process of change (Mintzberg et al., 1990; Chia 1994; Langley et al, 1995; Laroche, 1995; Hendrey 2000; cited in Sminia, 2009: 98).

To exemplify the aforementioned statement regarding planned change, top management may not even be aware of strategic change occurring (Burgelman, 1996) due to autonomous strategy

processes at the lower level of the organisation (Burgelman, 1983). Therefore, if researchers get top management to fill out surveys or questionnaires or even interview them – they will not be able to identify the emergent bottom-up change that is occurring. In that case the conceptualisation of strategy must be altered to include one that can – such as strategy as pattern (see Mintzberg & McHugh, 1985).

To develop a tool for identifying strategising actions and events that are deliberate and ones that are emergent, Burgelman's (1991, 1994, 2002) framework for interorganisational ecology of strategy making and organisational adaptation can be utilised. Burgelman (1991, 2002: 347) conceptualises induced (deliberate) strategy as one that "exploits initiatives that are within the scope of a company's current strategy" and autonomous (emergent) strategy as one that "exploits initiatives that emerge through exploration outside of the scope of the current strategy". Using these conceptualisations may allow one to trace both emergent and deliberate strategic alignment processes over time and see how the final strategy is realised. These findings and explanations can assist the practitioner in understanding how to manage these emergent autonomous processes that can positively or negatively influence the final realised strategy.

2.3 Criticism #3: Alignment is not desirable as an end in itself since the business must always change

The third major criticism of SA contains two components: 1) that traditional research has classified SA as an 'end-state'; and 2) that alignment creates inertia. Initially, SA was characterised as an outcome or end state – something to be achieved (e.g. Lederer & Salmela, 1996; Mentzas, 1997; Grover & Segars, 2005; Newkirk et al., 2008). However, scholars now argue that SA is not an end state, but rather a continuous process of adaptation and change (Henderson & Venkatraman, 1993), 'a moving target' (Jarvenpeena & Ives, 1993; Sabherwal et al., 2001) or a continuous balancing act (Burn, 1993, 1996). The second component, path dependence, refers to long-term alignment when a trajectory eventually leads to a 'lock-in' that produces inertia (Sydow et al., 2009). However, this criticism doesn't take into account re-alignment. It would be counterproductive to disregard alignment purely on the fact that it leads to inertia, as any IS routine, activity or strategy carried out over a long period produces inertia – whether structural, political or psychological (see Besson & Rowe, 2012). Rather, the concept of re-alignment needs to be embedded within SA literature (as done with Sabherwal et al., 2001) to understand how firms have managed re-alignment efforts and to avoid undesired trajectories.

Inertia is a function of alignment (Hannan et al., 2002; Schwarz, 2012) – and therefore should be integrated within SA literature. The implication of fit within an open-systems perspective is that maintaining a long-term 'steady-state' leads to inertia through path dependence. However, positivist quantitative methodologies are not able to effectively analyse inertia and trace the trajectory of the path that leads to a 'lock-in'. In terms of complexity-based concepts, when a strategy gets initiated (to fit with internal structures/components or with the environmental context), actors within the organisation will commence the implementation phase which produces a trajectory through self-reinforcing mechanisms (Sydow et al., 2009) – via recursive positive feedback loops. This suggests that the set path is difficult to reverse (and shouldn't be reversed as 'fit' leads to greater performance) – due to resistance. The path then leads to a 'lock-in', which results in inertia – the inability for the firm or subsystem to realign without a major trigger, such as revolutionary change (as illustrated in the punctuated equilibrium model; Sabherwal et al., 2001). Thus, short-term fit is beneficial for performance while long-term fit is negatively associated with firm performance.

To avoid or overcome the current trajectory of a 'lock in', strategic renewal is required; which is defined as "the activities a firm undertakes to alter its path dependence" (Volberda et al., 2001: 160). Strategic renewal takes place in the form of autonomous and induced strategy processes. The autonomous strategy processes refer to lower level change agents who initiate actions outside the defined scope of upper management. Contrarily, induced strategy process emphasises management top-down action to drive renewal initiatives that are defined within the scope of the company's overarching strategy (Burgelman, 1983). Both induced and autonomous processes regarding strategic renewal (altering path dependence) should be examined in the SA context – in an attempt to understand and help resolve the autonomous vs induced tension in strategic renewal literature (Schmitt et al., 2016).

2.3.1: Summary

Overall, the majority of SA research has viewed alignment as static. Due to this reason, inertia was never a concern to be addressed using variance studies. In contrast, the aim of the processual school in SA is to understand how inertia occurs (Chan & Reich, 2007a). Knowing how it occurs, the practitioners can use techniques to alter the path dependence that may lead to a failed IS strategy implementation that is not aligned with the business or corporate strategy. The first SA paper to examine the concept of inertia was Hirschheim & Sabherwal (2001) who identified three SA profiles based on the Miles and Snow (1978) typology. The authors offer a framework that organisations can adopt in their strategic IS realignment efforts. Chan & Reich

(2007b: 344) state that the key lesson to be learnt from the authors' three-firm case study "is that it is important for organisations to understand the dynamic and emergent nature of business-information systems alignment". Therefore, one can argue that inertia does exist and can offer efforts for realignment and that practitioners in organisations may find it useful in identifying these trajectories. Furthermore, inertia can constrain organisations since they generally want to maintain their status quo – thus it can comprise the development of innovation strategies (Chen et al., 2010). In that sense, a processual lens can be used to identify and trace bottom-up emergent strategies that arise outside of the scope of the predefined plan that will influence the final realised strategy. Finally, in a recent variance-based study, Liang & Colleagues (2017) found that social alignment moderates the relationship between intellectual alignment and inertia. This means that social alignment has the ability to prevent intellectual alignment from producing inertia via path dependence. Therefore, inertia provides a promising avenue for investigation.

2.4 Criticism #4: IT should often challenge the business, not follow it.

This criticism is derived from the fact that much of previous IS literature – and SA's theoretical precursors – have viewed IS as a support tool for the organisation. As Peppard (2018) notes, the concept of an IS organisation has changed over the last 60 years in terms of name, role, function and position in an organisation. Initially, strategic alignment was conceptualised as the alignment of business and IS planning (e.g. King, 1978; Ein-Dor & Segev, 1978) where management viewed IS as mainly a support role. Afterwards, management realised the strategic potential of planning alignment and integrated IS into a firms structure to support corporate objectives (e.g. Pyburn, 1983; Henderson & Sifonis, 1988). However, now scholars view SA as a two-way relationship, defining SA as "the degree to which the IT mission, objectives, and plan support and are supported by the business mission, objectives, and plans" (Reich & Benbasat, 1996: 56). This view gives way to the idea of reciprocal alignment (Reich & Benbasat, 2000; Hirschheim & Sabherwal, 2001) which overcomes the view that IT is purely a support tool. To develop this further, Peppard & Ward (2016) present numerous studies arguing that SA should be viewed as a co-evolutionary process where business and IS strategies evolve and mutually influence each other. Although a conceptual paper was offered (see Benbya & McKelvey, 2006) – no empirical study has empirically demonstrated SA as a co-evolutionary process.

2.4.1: Summary

As noted in the preceding section, strategic alignment is a two-way relationship with the business and IS strategy. This means that SA should be conceptualised as a co-evolutionary process in that both strategies get formulated together (thus IT having equal chance to influence business) and that both vulnerable to changes from bottom-up emergent strategising by agents at the individual-level. Thus, in general, this criticism is derived from the 'old' conceptualisation of SA at the point when management viewed IT purely as a support role. However, as evidence shows, IS significantly influences the business strategy – thus the criticism is actually unfounded.

2.5 Conclusion:

Overall, the addressment of issues identifies the need to move away from the traditional theoretical perspectives and methodological approaches – similar to what is happening in other fields within both the natural and social sciences. As noted, the organisation – and the world in general – is messy. To capture and obtain a good understanding of how the organisation is enacting strategies and activities, a change in theoretical and methodological approaches is required. The new theoretical underpinnings can be related to concepts of complex adaptive systems: namely, emergence and co-evolution. Strategy is not purely intended and deliberate but rather influenced by emergent processes and alter the final realised strategy. Additionally, authors in the processual area have also called for the incorporation of co-evolution to contextualise strategising. Co-evolution can offer insights into how micro-level processes and activities form and develop, that eventually lead to macro-level outcomes (Koume & Langley, 2018).

To incorporate the new theoretical approaches, a 'modern' methodological toolset is required. Whereas previous SA literature has utilised statistical and mathematical models to understand contingencies and other linkages between SA and performance in a reductionist manner, qualitative methods can allow one to "study social systems characterised by complexity and nonlinear causation" (Burgelman, 2011: 591). To utilise qualitative methods such as longitudinal case studies to explore the SA phenomenon, an alternative epistemological standpoint needs to be taken. In the field of IS, the critical realist approach has been starting to gain momentum – evident by the special issue in MIS Quarterly (see Mingers et al., 2013). Critical realism (CR) is best suited for SA research as: 1) it is a "practice-based research domain encompassing aspects of both natural science and social science" (Zachariadis et al., 2013: 856); 2) SA is a co-evolutionary process occurring within a complex adaptive system which is

supported by the CR view of reality as complex systems where multiple differing mechanisms and conditions exists (Benbya & McKelvey, 2006; Zachariadis et al., 2013); 3) that using a single research perspective (i.e. positivist) for understanding IS phenomena is unnecessarily restrictive (Orlikowski & Baroudi, 1991; Mingers, 2001).

3.0 Complex Adaptive Systems, Emergence & Co-evolution

In general, complexity paradigm has been proposed in two special issues to advance the field of information systems (Jaccuci et al., 2006; Merali & McKelvey, 2006) and within organisation science (Anderson et al., 1999; Tsoukas & Dooley, 2011). The aim of all three issues was to stimulate dialogue and present new was of theorising by using complex adaptive systems as a new tool to simplify complexity of organisations and their environment. Although these issues attempted to 'nudge' the researcher in incorporating these concepts to further the field, the publications since have not presented these initiatives (see Coltman et al., 2015). In addition, Merali (2006: 216) notes that the use of complexity science has stalled due to conflicting views regarding the application of complexity concepts in field of management as well as "fundamental principles being inappropriately applied to organisations". Therefore, the aim of this paper is to convey how CAS concepts may prove useful in further developing and investigating SA – to overcome the hurdles and criticisms of previous research.

The focus of complex adaptive systems "is not to search for simple causes to complex outcomes but, rather, to understand how simplicity emerges from complex interactions" (Gell-Mann, 1994; in Thietart & Forgues, 2011: 56). Furthermore, McKelvey (1997) argues that these interactions within CAS should be observed through a co-evolutionary lens since these interactions do not occur in isolations, but rather influence each other through non-linear dynamics. Therefore, this section explores emergent (as it relates to emergent strategies as described by Mintzberg), co-evolution (to understand the dynamic relationship between business and IS strategies as well as micro-macro interactions). Additionally, processual sensemaking strategies are discussed as a way to study these phenomena.

3.1 Emergence

Emergence has been discussed in organisation change and strategic management literature. What both these streams have in common is that change and strategies emergence from the bottom up. In the context of CAS, emergence refers to "the phenomenon whereby the macroscopic properties of the system arise from the microscopic properties (interactions, relationships, structures and behaviours) and heterogeneity of its constituents" (Merali, 2006:

220). To understand emergence as defined by Merali, the CR perspective is useful as it seeks to understand mechanisms on an ontological basis. The domain of real is comprised of mechanisms and structures, structures referring to 'real entities' that are the subject of investigation – commonly a company. These structures can also contain components (e.g. departments) or be part of a larger structure (e.g. industries). Mechanisms are defined as "causal structures that generate observable events"; particularly of interest are micro-macro mechanisms due to their explanatory value that can explain emergent behaviour where micro actions (interactions between varying components) can produce outcomes at the macro level (Henfridsson & Bygstad, 2013: 911). These 'outcomes' are events enacted from one or more mechanisms where observable events are 'experiences' that can be empirically observed (Wynn & Williamson, 2012).

The planned approach views "change as a process that moves from one 'fixed state' to another through a series of pre-planned steps" (Bamford & Forrester, 2003: 547). However, an organisation is not 'frozen' but is a 'fluid entity' where change is 'ubiquitous and multidirectional' (Kanter et al., 1992). Thus, we shall look at emergent change with is based on the "assumption that change is not a linear process or a one-off isolated event, but a continuous, open-ended, cumulative and unpredictable process of aligning and re-aligning an organisation to its changing environment" (Burnes, 2014: 363). These key facets are of interest to scholars in organisational studies. For example, Goldstein (2011: 66) notes that "emergence has surfaced as an important construct" that offers and suggests an alternative explanation to how structures, strategies and practices arise without being imposed from command/control hierarchies". This notion should be of interest to practitioners, as it may explain why previous attempts at designing architectures to implement strategic alignment have not been successful – as IS failure is a prominent issue in both industry and scholarly research.

Regarding what could be advanced, two recent articlesaddress emergent aligning actions in SA literature (see Karpovsky & Galliers, 2015; Street et al., 2018). Karpovsky & Galliers (2015)analyse extant SA literature using a strategy-as-practice lens to classify aligning activities and offer an analytical framework that identifies intended and emergent aligning activities with a focus on tools or agents. Additionally, Street et al. (2018: 74) support the classification presented by the previous authors and find that one case firm displayed emerging aligning activities "with its bricolage-style, evolved, unplanned, sense-and-respond approach to growth and development". Although these studies advance the SA field by conceptualising SA as dynamic using a strategy-as-practice lens, a processual approach has yet to be developed

that understands how alignment emerges rather than what activities actors engage in that results in emergent.

3.2 Co-Evolution:

As a way forward, SA scholars note that SA research should adopt a co-evolutionary perspective (Agarwal & Sambamurthy, 2002; Benbya & McKelvey, 2006; Tanriverdi et al., 2010; Vessey & Ward, 2013; Peppard & Ward, 2016). As the opening article to the newly founded MIS Quarterly Executive, Agarwal & Sambamurthy's (2002) study reveals that 'leading-edge' firm encourage co-evolution of IT and the business. In that case, it is also of interest to scholars to understand how these two strategies influence one another and attempt to understand the process in which it succeeds (high-performance realised strategy) or how it fails (due to inertia, self-reinforcing mechanisms). Tanriverdi & Collegues (2010) argument shares similarity.

Co-evolution was proposed by Lewin & Volberda (1999) to advance the selection-adaptation discourse in organisation studies and strategic management. They pose the question: does intentionality matter? As mentioned in this paper, previous research has often focused on planned change which adopts the selection mechanism and takes the side of the voluntarist ideology. However, as it has been identified – that change and strategy is emergent, characterised by adaptation which takes the view of a deterministic perspective. Co-evolutionary theory aims to incorporate both aspects where change and strategy "need not be an outcome of either managerial adaptation or environmental selection but rather the joint outcome of managerial intentionally and environmental effects" (Lewin & Volberda, 1999: 526). SA researchers have typically taken the perspective of intentionality, looking at plans.

So, how far have IS scholars come in framing co-evolution within the SA domain? To date, there is only one published paper on incorporating the co-evolutionary lens to understand SA, but is purely theoretical (Benbya & McKelvey, 2006). The authors' main argument is that "the coevolutionary and emergent nature of alignment has rarely been taken into consideration in IS research and that this is the reason behind why IS alignment is so difficult" (Benbya & McKelvey, 2006: 284, emphasis in original). While the authors develop a convincing reason as to how SA is co-evolutionary and that firms and their respective environment are complex, the application of complexity theory (scale-free theories) are rather descriptive and do not offer IS researchers who are not acquainted with physics- and mathematical-derived concepts a way forward and build on the content. In addition, it is unclear which approach one should take in

examining these dynamics within a complex system. One point however that merits further attention was the use of co-evolutionary properties (as defined by Lewin & Volberda, 1999) where Benbya & McKelvey drew on them to further understand complexity within organisations and their co-evolving processes. The four co-evolutionary properties are: multilevelness/embeddedness, multidirectional causalities, feedback loops and path/history dependence.

3.2.1 Co-evolutionary Properties

The following co-evolutionary properties are of interest to scholars as they are present in all systems under investigation. What this means is that these properties have the ability to guide research and bring new insights. These properties can be identified and examined using sensemaking strategies (Langley, 1999; Kouame & Langley, 2018) from processual research.

Multilevelness and *embeddedness* suggest that coevolution takes place on multiple levels and that these levels are embedded (Lewin & Volberda, 1999). The implications for this property are the need for multi-level tracing of strategy process – which have been previous ignored in SA research (Benbya & McKelvey, 2006) and has caused limitations in contingency-based studies (Chan et al., 1997). Visual mapping can be employed as a sensemaking strategy to understand how events, decisions, actions and outcomes are connected to larger event timeline (Langley, 1999). This approach allows one to trace strategy processes over multiple levels of analysis – similar to Siggelkow's (2002) map of interactions in his single case study. Additionally, as SA researchers are interested in how micro-level processes lead to macro level outcomes (Liang et al., 2017), linking these connections due to embeddedness can bring the field forward. Kouame & Langley (2018: 565) offer two main strategies for doing so: 1) progression, to show mutual influence between micro and macro over time – which assumes that micro and macro processes are recursively interconnected; and 2) instantiation, to show how microprocesses accomplish macro outcomes which is built around the mechanism of emergence (micro constitutes macro changes).

Multidirectional causalities refer to how changes on the micro-level can produce change on the macro-level, and vice versa. Multidirectional causalities provide insights into the process of change; for example: Pettigrew (1990: 270) suggests that the analyst of change have to recognise that "activities at some levels of context may be more visible and rapid than at other levels, and thus in the short-term sources of change may appear unidirectional, while in the longer term a multidirectional pattern may appear". This will require the research to map out

long-term trajectories to identify multidirectional causalities. In this instance, temporal bracketing can be used as it allows one to decompose many simultaneously-occurring temporal processes. As Langley (1999: 703) explains, it is "especially useful if there is some likelihood that feedback mechanisms, mutual shaping, or multidirectional causality will be incorporated into the theorisation". This sensemaking strategy is also useful in analysing two strategies simultaneously in a sequential manner (Langley, 1999) – bottom-up emergent processes as well as top-down planned/deliberate processes.

Feedback refers to recursive interactions between systems and subsystem leading them to influence each other. The general systems theory is "based upon the principle of feedback… providing mechanisms for goal-seeking and self-controlling behaviour" (von Bertalanffy, 1968: 90). This property can be referred to as 'retention' in the evolutionary process, where feedback leads to the retention of certain actions and decisions that produce long-term strategic alignment. Similar to the last two properties, visual mapping and temporal bracketing can be used together to identify feedback. Specifically, once the visual map is produced and temporal bracketing initiated, one can identify the feedback loops between decisions and their resultant events.

Path and history dependence is the result of the solidifying effects of positive feedback loops (inertia). History dependence of weak SA will make it difficult to achieve or break the path towards sustainable alignment. Reynolds & Yetton (2015: 102) employ path dependence assumptions into their research to help "explain the process by which strategy persists over time", to portray that past decisions cannot be easily reversed. This is also supported by Hirschheim & Sabherwal (2001) who identify possible problematic trajectories based on three alignment profiles. To understand and trace the path dependence process in an organisational context one must observe events and decisions (as identified by the sensemaking strategies) and look at how they impact those events and decisions that have succeeded them (Koch, 2011). Additionally, the identification of these paths builds on the previous identification of feedback loops. In the context of SA, the strategic path of both business and IS strategies need to be understood to identify how trajectory is impacted by tension produced by emergent and top-down planned strategising processes. Since the area of path dependence is relatively new, Koch (2011) develops a six-step procedure to analyse strategic processes that may prove useful in future SA research – as it also explains phenomena in complex adaptive systems.

To conclude, the analysis of co-evolutionary properties may provide new insight into the dynamic nature of strategising as well as SA specifically. Many complexity theories are mathematically modelled through agent-based simulation such as the Monte Carlo simulation. However, qualitative processual research also offers the researcher an ability to investigate and understand complexity.

4.0 Conclusion

This paper addresses the criticism that the quest for continuing SA research should be abandoned and that alignment is undesirable. However, based on the counterargument – it seems that SA can be advanced significantly, as suggested by special issues that promote the use complexity-based concepts. A way to advance the SA research by the incorporation of complexity-based concepts along the lines of co-evolutionary properties. These properties can be studied using a critical realist approach in addition to the use of processual theories. Understanding these properties will bring research towards a new paradigm that embraces complexity. This is similar to the trajectory of organisation studies which took a closed-system perspective, then a cybernetic view of the organisation and top management as the dominant coalition, after an open-system – and now, a complex adaptive system perspective. Overall, previous literature employing the contingency-based approach has provided a great foundation for the topic. This foundation can now use processual insights to develop the topic further.

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