

**Challenges and Enablers of Achieving Meaningful Socio-Organisational Transformation
for Greater Good: A Reimagination of Romer's and Solow's Epistemological and
Methodological Perspectives**

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Abstract

This conceptual paper examines existential threats to human, organisational and societal existence and using significant contributions from an interdisciplinary theoretical and research field from ecology to business and management and organisational transformation, change, and development (OTCD) scholarship. Drawing from epistemological panarchy theory, a theoretical framework is developed for OTCD research. The new framework identifies five areas of societal-organisational-environmental sensitivities and proposes a three-phase embedded approach for its implementation, namely 1) emergence, 2) acceleration, and 3) stabilization. These help to facilitate greater and scalar increases towards not only a fundamental paradigmatic shift in epistemological thinking from decreasing returns to one focusing on increasing returns on ideas-driven growth but also greater societal good. We extend Solow, Lucas, Romer, and Jones's models to extend experiential matrix theory, highlighting some emergent properties of transformational business and societal processes and suggesting areas of future research endeavour in this emerging field.

Key words: innovation; organisational transformation, change and development; knowledge

1. Introduction

A growing body of literature in ecology scholarship suggests we face a looming global extinction-level threat due to environmental degradation (Ceballos et al., 2015; Crutzen & Stoermer, 2000; Novacek & Cleland, 2001; Verburg et al., 2016). Another emerging body of scholarship on productivity increasingly highlights how environmental pressures caused by the energy sector pose adverse risks to agricultural production and human survival (Rogelj *et al.*, 2021). There is also growing scholarship on the socio-economic challenges faced by organisations' management and the need to develop technical and networking competence to resolve the growing, wider range of challenges associated with organisational transformation (Roehrich et al., 2023; Dessaigne and Pardo, 2020). While organisations' management try to apply technical knowledge to enhance their internal economic ecosystems (Majekodunmi, 2020), and to boost firms' organisational resilience, profitability, and sustainability within transformation and transforming environments (Di Vaio et al., 2020; Paiola et al., 2021; Monderjar et al. 2021) via management's technical abilities (Nasiri et al., 2022; Guandalini, 2022) these efforts have often failed to materialize (Feroz et al., 2021). Additionally, while such challenges require new ways of thinking about knowledge creation, or new epistemologies in management theorising (Callaghan & Mitchell, 2023; Mitchell, 2019; Mitchell et al., 2020), these issues seem to be understudied to date in the organisational transformation literature.

Research tells us that solving real-world existential threats requires interdisciplinary Mode 2, or real-world-oriented research (Gibbons, 2000) and novel epistemological thinking is needed to not only address the role of management in averting environmental catastrophe but all manner of *existential threats*, including those potentially posed by geopolitical conflict, value-enhancing and technological and interorganisational change, particularly related to artificial intelligence (AI) (Callaghan, 2018; Jones, 2023a). Given the key role of managers in combining resources in the production process to produce goods and services and the various transformational processes

needed to do so, Business and Management, including Organisational Transformation Change and Development theory development and its derived practices, might need to account for associated aspects like pollution, waste, and environmental degradation. These aspects also include considering the consequences of technological change as part of the production and socio-organisational transformation processes because its consequences can flow from the production of new technological goods and services and socio-organisational transformation.

The objective of this paper is to develop a theoretical framework for management, including OTCD research epistemology that reflects the *fundamentally interdisciplinary nature* of research, and that reflects the *fundamental shifts in epistemology* associated with the *switch from a paradigm of marginal thinking focused on decreasing returns* to one focused on *increasing returns to scale in ideas-driven growth*. This shift is relevant to and timely for Management and OTCD theory, as it locates *organisational productivity and the transformation and change dynamics* as the source of the fundamental generative driving mechanisms of growth at all levels- individual, organisational, industry, country, regional, and global. In doing so, we extend work on experiential matrix theory (Callaghan, 2023b), which builds on the models of Solow, Lucas, Romer, and Jones (Jones, 1995a; Lucas, 1988; Romer, 1990; Solow, 1956) , to operationalize Nordhaus's explanations of how costs of lighting have dropped exponentially (Nordhaus, 1997), to predict some emergent properties of business-related systems, and to help frame problems associated with organisational transformation processes and to generate effective solutions. We suggest that these theoretical developments 'make visible' these emergent properties, and the scale and nature of organisational transformation processes as they help to reveal patterns in the co-evolution of transformational systems within business and economic activities. Furthermore, our proposition suggests the potential of developing a common or shared epistemological lexicon or common/shared epistemology based on socio-organisational transformation and growth, a phenomenon that garners both support and concerns across the Social and Natural sciences' disciplinary spectrum.

Accordingly, in the next section, we highlight some interdisciplinary trends in the evolution of theory over time, suggesting that *specific theoretical developments generate corresponding methodologies* in their wake, which then *form systems of epistemologies that are shaped and shape their ‘adjacent’ ontological spaces* (Callaghan, 2023a).

We also suggest that over time, especially in the social sciences in general and, OTCD in particular, the salience of theoretical meta-ideas, or meta-theories (those that explain substantial ‘variance’ in the material world), have increased, but the *disciplinary locus of these theories*, and their corresponding theoretical systems of methodologies, has *shifted from philosophical to socio-organisational materialities, such as those involving socio-organisational transformation processes. Therefore, we argue, that such a shift also needs to be reflected increasingly in how we generate/develop theories on organisational transformation and the wider disciplines of Business and Management and Organisational Behaviour.* In this paper, we aim to track these significant changes to develop a theory corresponding to the methodological, epistemological, and material change and identify key theoretical mechanisms accounting for/that have given rise to them. In doing so, *we seek to chart and thereby develop forecasts of future methodological and epistemological trends* across the field of Business and Management, and indeed OTCD, focusing our argumentation on theoretical reasons why they highlight the role of Business and Management, and OTCD theorising in future scenarios involving organisational and human transformation and survival in the face of existential, environmental threats. This conceptual study will help in highlighting not only what the existing trends in the field are, but also the potential enablers and constraints to socio-organisational transformation, change and development and greater societal good.

2. Literature and theory

Having examined and argued why developments in Ecology (Ceballos et al., 2015; Crutzen & Stoermer, 2000; Novacek & Cleland, 2001; Verburg et al., 2016), and the productivity literature (Rogelj et al., 2021) have failed to fully account for, and address the potential socio-organisational

good of resolving global extinction, environmental degradation and organisational transformation (Roehrich et al., 2023), we now examine key strands/trends in the OTCD literature to see what additional developments (if any) may have been conducted in advancing issues related to wider societal good. The recent emergence of AI research and applications is an interesting development to explore. The literature suggests that previous technological change has failed to generate a productivity revolution on the scale of that experienced over the 1870-1970 period. Work in relation to the global productivity growth slowdown is typically associated with the work of Robert Gordon (Gordon, 2016). We underscore the importance of such work because it provides the basis for and an explication of any relationship between technological change, socio-organisational transformation, and productivity growth. One would assume that if AI were to disrupt (or transform) society and organisations, the effects of doing so would be expected to show up in the productivity statistics, a leading indicator of societal disruption that would qualify it as a 5IR phenomenon.

1.1. The post-1970s global productivity growth slowdown

While it is paradoxical that trends in the confluence of technologies in discussions of the fourth industrial revolution (4IR) (Chen, 2017; Hutchinson, 2017; Park, 2018; Schwab, 2017) have emerged alongside a global productivity growth slowdown (Callaghan, 2021; Cowen, 2011; Gordon, 2016) and declining research productivity- as ideas seem to be becoming ‘harder to find’ (Bloom et al., 2020; Jones, 2009), we examine what is happening in OTCD related areas. It is recognized that technological change has tended to occur across sectors such as information and communications (ICT) and entertainment rather than across the broader spectrum of economic activities (Brynjolfsson & McAfee, 2014).

ngside a global productivity growth slowdown (Callaghan, 2021; Cowen, 2011; Gordon, 2016) and declining research productivity- as ideas seem to be becoming ‘harder to find’ (Bloom et al., 2020; Jones, 2009),

However, there is also yet another paradoxical set of theoretical developments in OTCD scholarship. For example, there is a key theoretical paradox in technological change literature that relates to its causal contributions to global productivity growth. This theme has a long theoretical history, which the scope of this paper cannot allow for a much fuller exploration. As such, we will attempt a synopsis, highlighting its key areas. A description of this is found in what is referred to as the Solow Paradox, which is based on Solow's observation that you "can see the computer age everywhere but in the productivity statistics" (Solow, 1987). Similarly, according to Gordon (1992), the "worldwide slowdown in productivity growth since the early 1970s has continued to puzzle economics. While such a failure to identify any convincing cause has led to a shift in research away from aggregate studies toward more detailed research at the industry level", and based on his seminal work in the energy sector, Gordon suggests a productivity slowdown is to a large extent explainable by the 'depletion hypothesis' related to the limits in technology associated with reaching a technological frontier that could influence socio-organisational transformation (Gordon, 1992). Such an argumentation and explication has impacts on the extent to which socio-organisational good is attainable.

In recent work, Bloom et al. (2020) have applied Solow's (1957b) growth accounting approach to decompose long run growth into components of research productivity and the numbers of researchers engaged in this area of endeavour. They found that while research productivity continues to decline sharply despite substantial increases in research efforts, other scholars have however found reversals in the downward productivity trend in patents (Kortum & Lerner, 1998; Webb et al., 2018). The same downward trend has been observable in some areas of pharmaceutical research productivity (Ringel et al., 2020), seemingly suggesting the possibility of reversal in the declining overall trend in research productivity.

Seminal work has also modelled technological change and its contributions to socio-economic growth (Lucas, 1988; Romer, 1990; Solow, 1956). For Romer (1987), “Ultimately, all the questions about the behavior of productivity reduces to a question about the joint movements of capital and labor and about elasticity of output with respect to these inputs.” It is additionally interesting to recognize that Romer also models technological change as an endogenous factor that can amplify contributions of capital and labour to growth. According to Romer, knowledge ‘recipes’ of how to better combine labour and capital as a way of boosting socio-organisational transformation and growth, are non-rival in that others can share and use them. Romer asserts that although labour and capital cannot be ‘used up’ (or exhausted) they can be shared and used by others to increase productivity and facilitate transformational processes of growth. Recombinant growth theory supports Romer’s (1990) model, predicting almost no limits to permutations of how ideas can be combined and recombined (Weitzman, 1998). The key predictions of this literature stems from the core idea that “ideas are different from all other goods in that they can be used simultaneously by any number of people” and because of nonrivalry, exponential societal and organisational transformation and growth in per capita can result (Bloom et al., 2020).

Romer’s (1990) Nobel recognized ideas have profound implications for predictions for the impacts of technological change on organisations and society. Romer’s (1990) seminal model predicts exponential returns to investments in knowledge creation and the extent to which it is shared to facilitate socio-organisational transformation.

Considering the failure to date of empirical work to find evidence of increasing returns to investments in research productivity, the objective of this paper is to develop and present a model that follows arguments in the literature that certain real world threshold constraints create a bottleneck to the contributions that technological change, including AI, can make to growth. We argue that an important constraint in this regard is the failure of technological change to reverse a declining trend in human-based research productivity. We are reminded of Romer’s (1990) original

model suggesting that incorporating productivity gains of artificial intelligence (AI) and robotics suggests profound implications. While modelling any such contributions to growth in two ways: 1) as complements to human capital, and 2) as substitutes reminds us of incorporating Brynjolfsson and McAfee's (2014) notion of an impending 'second machine age', doing so allows us to derive sets of scenarios or potential forecasts of the impacts of technological change on the world of work and organisational transformation, and in turn on human societies and the extent to which they may be transformed for greater good. We therefore seek to make the following major contributions to the theoretical domain/literature on productivity growth, socio-organisational transformation and change in the following ways.

First, Romer's (1987) longstanding theory explains how technical progress drives productivity in combination with human labour and capital, and how productivity also underlies economic and organisational growth. Additionally, Romer (1990) highlights the causal role of ideas in technical/technological change, that in turn is primarily responsible for human, product, and services' growth and progress over time. Such growth is underpinned by Romer's knowledge 'recipes' by combining human labour and capital, such that both are shared and used by countless more people to increase productivity. This process implies increasing returns in the production function, or if one wills, an ongoing 'industrial revolution' of increasing transformational processes of productivity. The paradoxical twist is that although the first industrial revolution spurred considerable global productivity growth, contributing to a century of large-scale innovation for the 1870-1970 period; in contrast, the post-1970 period has largely seen a continuous trend of declining productivity growth (Cowen, 2011; Gordon, 2016). Despite such a major shift, this has not been reflected in many popular discussions of the 4IR and in OTCD scholarship.

Second, the notion of knowledge 'recipes' has unarguably been one of the key contributors to the first industrial revolution, and by implication to socio-organisational transformational processes. (Smith, 1776) notion of specialisation and his example of a pin factory workers increasing

productivity substantially by specializing in parts of the pin production process, rather than each producing area is relevant to our second theoretical contribution in the following way. Based on the literature, we develop a theoretical model to help predict changes in the trajectory of technology and technological change at work and workplaces. To do so, we build on the work of Romer (1990) to extend his seminal model. We augment Romer's model to incorporate influences of artificial intelligence (AI) and robotics as either complements or substitutes to human capital. The modelling suggests some provocative implications in the sense that it will help to provoke novel thinking in the face of uncertain consequences/unintended consequences of technological change in society and workplaces. To show the extent to which we have extended Romer's ideas, it is important to first ground our discussions in literature suggesting that knowledge recipes, or ideas in Romer's parlance, are the fundamental cause of socio-organisational transformation, growth and productivity and could potentially impact on greater societal good (or not).

2. Ideas as the source of all productivity and growth

Our arguments here are grounded on Romer's significant work on the salience of ideas and their real-world and organisational impacts. It is thus necessary to justify the importance of this perspective, and its intuitions/assumptions. According to Romer (1992):

In a world with physical limits, it is discoveries of big ideas (for example, how to make high-temperature superconductors), together with the discovery of millions of little ideas (better ways to sew a shirt), that make persistent economic growth possible. Ideas are the instructions that let us combine limited physical resources in arrangements that are ever more valuable...

Therefore, this perspective holds that ideas are universal in their contributions to growth and socio-organisational development. This argument holds not only for technologically advanced countries for according to Romer (1992):

The abstract analysis of ideas has special relevance for poor countries. Industrial countries possess a stock of ideas that could yield large increases in standards of living if they were used

throughout the world. Moreover, since the use of an idea by one person does not limit its use by someone else, the large potential gains available to developing countries need not come at the expense of industrial countries.

In that we extend Romer's seminal model it is necessary to note the limitations of the type of model we extend here. According to Romer (1992):

...a good theoretical model should be as easy to manipulate in one's head as the mental image of a child's toy. That is, a successful model invokes a metaphor, and the metaphor has a subtle but persuasive effect on the reader's understanding of the principles behind the equations and his or her belief in the accuracy of its description of the world.

Ideas can be combined with infinite permutations, and recombinant growth theory offers predictions that overlap those of Romer' (Weitzman, 1998). There should, at least theoretically, be no limit to how we can combine and recombine ideas to produce exponential increases in productivity growth and explicate trends in socio-organisational transformations. To date, as discussed, it is paradoxical that productivity growth has declined alongside the emergence and confluence of technologies, including recent developments in AI. We will argue, however, that the inflection point in technological change will occur when technology- 'machines' properly enter Brynjolfsson and McAfee's (2014) 'second machine age', when machines go from complementing human labour to substituting/replacing it. As discussed, with a minor extension to the Romerian model we predict implications of the second machine age and the transformational processes that this entails for society and organisations.

Ideas are not equal, however, and we suggest, following Brynjolfsson and McAfee, that the substitution effect of AI and robotics for human labour- including advanced cognitive labour- amounts to the realization of a confluence of 'meta' ideas. Whereas previous incarnations of Romer's model have modelled various additional aspects, we suggest the seminal specification can

be augmented to model not just ideas, but also incorporate the notion of meta ideas. In this case, the real-world impact of AI and robotics are perhaps the most important to consider.

Our arguments here therefore extend this literature and build on some ideas within Business and Management, including OTCD scholarly work, to provoke further ideas that might take the form of institutional and transformational innovations themselves. These could be in the form of policy, that can attempt to ensure that human populations benefit from these coming changes, and to mitigate their harmful or dystopian potentials on greater societal, human, and organisational good.

Further contributions of our paper are now explicated (in greater theoretical and methodological details) in relation to what we describe as 1) stylized facts characterizing the current trajectory of technological change, and 2) epistemological framings on lineal, and 3) epistemological framings on non-lineal processes in Management and OTCD scholarship to account for organisational transformation processes, and the potential for greater societal good.

2.1 Stylized facts describing the trajectory of technological change

Literature suggests overarching trends in how technological change is affecting human societies and organisations. Although there are many ways this may happen, we have identified and will now discuss twelve of them. We recognize that although this list is not exhaustive, we make no attempt to order their importance in relation to societal and organisational transformation and the potential for greater social good. These ‘stylised facts’ are well established in the literature and account for much conceptual variance in current discussions and debates around societal and organisational transformational processes. These include (1) declining research productivity, (2) increasing difficulty in keeping up with an expanding frontier of knowledge- a burden of knowledge effect, (3) an ongoing productivity growth decline since 1970s, (4) concentration of productivity growth in a few sectors such as the internet and communications (ICT) and entertainment- rather than across broader society and the economy, (5) declining median wages

across developed countries, (6) a rise in technologically-oriented business models that dominate entire markets and reduce human labour, (7) less opportunity for state suppression of labour costs to attract manufacturing, (8) increasing concerns about security that are influencing supply chain configurations, (9) increased government spending on technologies related to defence, (10) increasing capacity for full substitution of technology for labour- a second machine age is now increasingly becoming a material reality, and (11) a technological drive toward a ‘zero’ supply chain, or full localization of manufacturing based on 3D, AI, and robotics technologies. Our scenario of substituting human labour may have direct implications for them all and the potential for greater societal good.

2.2 Epistemological Framings on Lineal Organisational and Organising Processes in Management and OTCD Research

More specifically, we suggest that methodologies and epistemologies associated with the assumption of diminishing returns as predicted by a long-standing theoretical tradition drawing from economics (Malthus, 1986 [1798]; Mill, 1871; Ricardo, 1817) have framed theoretical thinking that was still present in Solow’s (1957a) Nobel recognised work. This body of work, despite recognition of technical, or technological change as a fundamental cause of growth, nevertheless considered it ‘exogenous’ or outside of his theoretical model, echoing Mill’s exogenous conception of ‘productiveness’. We suggest that notions of diminishing returns impose a ‘tidy’ but incorrect epistemological frame on understandings of the generative processes of growth, and reflect what Mitchell et al. (2020) describe as ‘lineal epistemologies’ that do not sufficiently consider systemic complexity of ecosystem dynamics. We highlight a shift from notions of diminishing returns and a focus on capital as a generative mechanism of growth such as in Solow’s (1957a) Nobel-recognised work, to a focus on the production of innovative ideas in organisations, and non-rivalry in the production of idea recipes that increase productivity, as suggested by Romer’s (1990) Nobel-recognised work.

This shift toward recognition that entrepreneurial firms' organisational processes of productive ideation, and the creation and sharing of non-rivalrous ideas, is a primary generative causal mechanisms of growth (Romer, 1990) has a profound implication- that growth will demonstrate *increasing returns to scale*. Recent work suggests theoretical support for his notion of non-rivalry of ideas, whereby idea 'recipes' for how to combine resources more productively can be copied or shared, and the use of these ideas does not stop others from using them. Ideas are thus different from goods, which are typically rivalrous. The management discipline, and management theorising, may therefore be central to the generative process of growth, because ideation in entrepreneurial firms may be the fundamental source of growth.

The originality and significance of the proposed work relate to its development of an appropriate epistemological framework that incorporates interdisciplinary theory *to explain and predict the trajectory of epistemological developments in management research*. Our proposed framework is novel in that it is framed in terms of the *shift from diminishing returns to scale, to one of increasing returns to scale* in growth. If these theoretical trends materialise, then the epistemological predictions of our framework might provide novel insights into organisational contributions to scale amplification of growth, and radical increases in productivity. Our framework also *incorporates the notion of epistemological survival*- the notion that we face existential or extinction threats, and this notion acts as a *disciplining heuristic* to ensure our framework is aligned to principles of stakeholder benefit.

2.3 Epistemological Framings on Non-Lineal Organisational and Organising Processes in Management and OTCD Research

We derive a theoretical framework to explain how and why epistemological approaches in the Business and Management field change over time, and derive forecasts and predictions of these changes to account for socio-organisational transformation and the potential for societal good. Accordingly, we contribute to a growing body of literature identifying the causal mechanisms for such significant phenomena whereby ideas that improve productivity tend to produce economies

of scale in the growth of the ‘matrix’ of goods, and services surrounding us, and the transformational processes entailed. Such a combined mix ‘shapes’ human lived experiences (Callaghan, 2023a, c) and the propensity for societal good or not. All material human progress, or increased living standards, might then be traced to ideation, and the way ideas, through socio-organisational transformational processes of increasing productivity, increases the ‘depth’ and ‘size’ of this matrix of goods, and services and transformational activities surrounding us. We also contribute to literature highlighting the role of managers in converting ideas into constantly improving products, and services and processes of innovations that drive growth and transformational development in society and organisations. We thereby contribute to a large body of literature on the causal mechanisms of firm-level and aggregate-level endogenous growth (Aghion & Howitt, 1992; Grossman & Helpman, 1991; Jones, 2021; Romer, 1990, 1992, 1994), and semi-endogenous growth in society and workplaces (Jones, 1995a).

In developing epistemological and methodological ideas to consider instances of increasing returns to scale in societal and organisational transformation and growth we contribute to debates about the paradoxical coexistence of endogenous growth theory predicting increasing returns with countervailing and mounting evidence of declining returns to investments in research across contexts (Bloom et al., 2020; Cowen, 2011; Gordon, 1983, 2013, 2016; Jones, 1995b; Neves & Sequeira, 2018; Sequeira & Neves, 2020).

In the light of these longstanding debates and the extent to which the transformational processes that they entail may generate greater societal good, semi-endogenous growth theory (Jones, 1995a) sought to reconcile this theoretical-empirical divide in the following ways. Firstly, by considering (1) a fishing out effect associated with constraints to new idea creation and secondly, (2) via a duplication effect associated with redundant research effort. Accordingly, meta-regression studies by Neves & Sequeira (2018) and Sequeira & Neves (2020) found estimates across studies for each

of the fishing out and duplication effects, respectively. In Romer's (1990) model, while there is no fishing-out effect, we suggest that if the fishing-out and duplication effects were to be quantified, then they can be managed by organisations and society, and an increasing-returns epistemology should then suggest ways of reducing its adverse impacts on, for example, societal, personal and organisational good. A proposed focus of our theoretical model is to endogenize or to make explicit methods and ways of thinking that might help to reduce these adverse effects on socio-economic, organisational, and personal good.

Notwithstanding evidence of these identifiable constraints, recent modelling highlights the salience of Romer's (1990) theoretical mechanism of non-rivalrous ideation (Jones, 2019). Most recent work in this literature identifies the way ideas 'arrive' according to different statistical distributions (Jones, 2023b). We propose that attainment of Romerian exponential returns to investments in knowledge and the attainment of increasing returns to scale in growth is societally (and organisationally) beneficial, and is therefore a worthy goal, warranting the development of epistemological thinking to reflect the dynamic complexities of knowledge creation itself. This is a justifiable endeavour as it contributes to real-world growth and the greater propensity for greater socio-organisational good through the (knowledge) production function.

In this way, the 'epistemological gap', or the difference between conceptions of knowledge and a given research process involved in its creation, is collapsed. The explanation and underlying argument for this proposition is that if epistemology is concerned with how we generate ideas, then in this instance, we are concerned with the workings of ideas, generating a theory of epistemology from the study of ideas itself.

Accordingly, the tradition of growth theory, which has culminated in the Nobel-recognised work of both Solow and Romer, developed extensive theoretical models, which, when they were under

development were compared with real-world data. Thus, as more data is becoming available, and theoretical modelling is improving, it is fundamental to note that although Romer's theory is developed based on data and theory *at the aggregate level*, it does provide insights into the generative mechanism of growth, with its causal origin at the organisational level in the ideation process that has given rise to more productive ideas. For example, ideas about the application of dynamic capabilities to facilitate organisational transformation processes could then be shared, increasing productivity across contexts, thereby generating economies of scale. This argumentation is because better knowledge recipes about organisational transformational processes are continually being produced and shared, thereby increasing the propensity for greater societal and organisational well-being. The cross-level dynamics of this process require an epistemological approach that incorporates ideas of multilevel scalability and captures the cumulative causal processes of complex systems. Similar ideas are evident in Kaldor's work which identifies cumulative causality and increasing returns in manufacturing processes including transformation, and rejects equilibrium analysis (1957, 1972). Schumpeter's (1942) 'creative destruction' and Aghion and Howitt's (1992) model of Schumpeterian destruction are also at odds with linear thinking if equilibria are constantly being disrupted/alterd/changed. We therefore propose an epistemological model derived from a unique field that *explicitly studies human ideas*, and how they influence the world, and the potential to enhance greater societal good, through the production function to produce goods and services, or how ideas manifest in continually higher material human living standards. In so doing, we link interdisciplinary Business and OTCD literature with recent Management literature on scalability in growth and transformation (Jansen et al., 2023).

3. Discussion and Conclusions

As discussed, the proposed methodological and epistemological model draws insight from the field of endogenous growth theory (Aghion & Howitt, 1992; Grossman & Helpman, 1991; Jones, 2021; Romer, 1990, 1992, 1994) *that has studied how ideas in research are the cause of real-world outcomes* that affect us all. The Business and Management, including OTCD discipline's multidisciplinary nature

might be premised on its need to *combine organisational resources to avoid negative growth, or degrowth and avert organisational failure*. If so, then lacking a common language is problematic for the coordination of diverse knowledge resources, in that ensuring organisational survival and greater societal good requires knowledge from different scientific fields.

According to Mitchell et al. (2020) ‘lineal epistemologies’ or thinking in businesses that fails to accommodate the complexity of multiple equilibria states are failing to offer managers and organisational transformers and change agents the required knowledge tools to navigate the systemic complexity of interrelationships between businesses and ecological systems within which they are nested. Accordingly, Callaghan and Mitchell (2023) extend this work to revisit “*our thinking about our thinking*, or our meta-epistemology”, which underlies Business and Management theory development. By suggesting a theoretical construct referred to as *ecosystemic panarchy*, we underscore a way of thinking that acknowledges multi-scalar complex adaptive systems, replacing the firm as the unit of ecosystemic survival of transformational and change processes with that of the ‘organism together *with* its environment’, as per Bateson (1972). By extending Willmott’s (1993) critique and questioning the value of training managers in the principles of paradigm incommensurability, or separation of social scientific research in terms of epistemological and ontological assumptions, as conceptualized by Burrell and Morgan (1979), we recognize that this may ‘teach’ cohorts of managers, change agents and organisational transformers that it is acceptable to ‘compartmentalize’ climate consequences, or to separate instrumental or utilitarian outcomes such as profit maximization from the consequences that they generate for individuals, society and the world at large.

Developing an epistemological framework premised on a common language of growth contributes to ongoing, existing methodological debates about how epistemology might more accurately reflect the reality of a world characterized by existential threats and the ubiquity of organisational and societal transformations. With regard to the Burrell and Morgan’s (1979) notion of paradigm

incommensurability, Callaghan and Mitchell (2023) suggest 4 key areas to progress methodologies and epistemologies when identifying new ecosystems for innovation and growth in Business and Management research as follows (focus on actors, products, services):

1. The concept of panarchy links epistemological perspectives that span Burrell and Morgan's opposing meta-theoretical fields to reflect the complex reality we face in existential threats such as climate change.
2. Solving them may require interactions of scientists, both natural and social, across almost all fields, requiring reconsideration of epistemological assumptions.
3. Panarchy, as cross-paradigmatic theory, needs to integrate philosophically diffused theories of business ethics as well as understandings of social forces shaping human behavior, individually and collectively.
4. Human extinction threats unite these perspectives, requiring multi-level and trans-paradigmatic thinking.

This paper extends these four areas by adding a fifth dimension/category, which is 5) Socio-organisational good is enhanced via a combined harmonization of organisational transformational processes with the greater benefit of society at large.

Therefore, we propose an extension of these ideas beyond business ethics to consider an *ethics of epistemology* that is similarly united by human extinction threats and the potential adverse, unintended consequences of organisational transformation and change. Callaghan and Mitchell (2023) suggest reconceptualizing “key assumptions of theory-making to incorporate a socio-organisational-environmental sensitivity in the theory development process, to that by revisiting theory about theory development, at its ‘source’ to such an extent that such embedding becomes standardized”. We go beyond socio-organisational-environmental sensitivity and suggest an ethics of epistemology aligned with the reality of the wide range of existential threats facing human populations and endangering societal and even global good. We propose to build our

epistemological framework according to the twin principles of epistemic panarchy and a common language of increasing returns to transformative growth that have an epistemological origin in the genesis and sharing of increasingly productive ideas. Such a proposed framework might offer predictive forecasts for a world of increasing returns in transformation and growth- *a world no longer of growth assumptions of scarcity, but 'abundance'* as predicted by Romer's (1990) modelling, and which is supported in recent theoretical work (Jones, 2019, 2023b).

4. Future research

One of the ways to address human extinction threat and foster ideation within organisational and societal transformation processes is to consider the S-curve transformations. This transformation would only be successful if three phases are considered, namely 1) emergence, 2) acceleration, and, 3) stabilisation. The emergence phase involves innovative ideas fostering new technologies and practices that operate through and allow for experimentation and learning. Innovation gains traction during the acceleration phase thus reaching an optimal point at which sharing and adoption are facilitated. These lead to rapid, non-linear growth for firms and wider society. During the final stabilisation phase, normalisation of these technologies and practices are embedded in everyday organisational and societal life. It must be noted that the S-curve operates in the opposite direction as well, as there is alignment between innovative technologies and practices with the Sustainable Development Goals causing a decline in unsustainable technologies, institutions, and practices (United Nations, 2023).

To further support our proposition and contribution of an ethics of epistemology is to consider eco-innovation. According to Adomako and Tran (2023) eco-innovation supports environmental innovation that pursues emission reduction, recycling, and the substitution of materials with better, more improved quality ones (Adomako et al., 2023; Hellström, 2007). As a result, adopting an eco-innovative system has a positive impact on society by providing sustainable solutions, which not only help in improving the quality of life through access to clean water, sanitation, and affordable

clean energy but also a ‘societal feel good’ factor. Eco-innovation also has a positive impact on firm performance and therefore fosters research and policy making with a focus on natural resource utilisation and reductions in CO₂ footprint through active human engagement (Adomako and Tran, 2023). These societal and organisational transformation efforts towards greater social good should be underpinned by government support and strong emphases on knowledge ‘recipes’, generation, and sharing to enhance their sustainable and innovative capacities.

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