



# A theory of benchmarking

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## Abstract

**Purpose** – The purpose of this paper is to identify the necessary or sufficient methodological elements contributing to benchmarking's effectiveness and to establish them within an acceptable theoretical framework: a theory of benchmarking.

**Design/methodology/approach** – A causal approach is applied to organizational benchmarking's current definitions and implementation frameworks. The resulting theoretical framework is compared with current benchmarking praxis to explain its effectiveness and satisfy historical criticisms. Supervenience and entailment relationships between benchmarking parties, within the umbrella of Peircean Causation, determines the feasibility of a benchmarking proposition.

**Findings** – Benchmarking effectiveness can be established from an organizational axiom and five logical conditions. This paper proposes a new encompassing definition of benchmarking, reduces its typology to a single form, explains current practices and addresses historical criticisms. The logical conditions also explain the effectiveness of business excellence frameworks such as the Malcolm Baldrige National Quality Award and ISO 9000.

**Research limitations/implications** – A theoretical framework for benchmarking provides a platform for extending the theory of organizational improvement.

**Practical implications** – A theoretical framework for benchmarking has potential to enhance organizational sustainability by reducing wasted effort.

**Originality/value** – The research establishes a new definition of benchmarking and the necessary and sufficient conditions for its effectiveness.

**Keywords** Benchmarking, Theory, Organizations, Taxonomy, Causation, Sustainability

**Paper type** Conceptual paper

## Introduction

Organizational benchmarking has undergone many developments since its first appearance as a component of modern quality management principles in the 1940s and subsequent publications by Juran (1950), Shewhart (1980) and Deming (1982). Practitioners wishing to implement benchmarking programs currently face the prospect of distinguishing between a plethora of praxis-driven forms, typologies and frameworks where none of them offer an assurance that efforts will be successful (Wolfram Cox *et al.*, 1997, Wöber, 2002, Francis and Holloway, 2007). The appeal of benchmarking reduces if its chance of success is easily outweighed by the certainty of its effort and cost. The purpose of this paper is a theoretical framework for benchmarking, reducing its forms and typologies to a concise set of necessary and sufficient conditions which will assist successful implementation.

There are between 40 to 60 plan, do, check, act (PDCA)[1]-based frameworks (Watson, 1993; Andersen and Moen, 1999; Kozak and Nield, 2001), four principal types (Zairi, 1994) and at least six generational developments (Kyrö, 2003; Moriarty and Smallman, 2009). Could these be a reflection or approximation of its underlying theory?

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Could such a theory be deduced from careful synthesis of the exemplary characteristics of benchmarking praxis?

Moriarty and Smallman (2009) examined the epistemology of benchmarking's methodological elements and advanced a provisional definition that suggested its causal roots: "an exemplar driven teleological process operating within an organization with the objective of intentionally changing an existing state of affairs into a superior state of affairs". In this process anomalars intentionally seek exemplars for the purpose of implementing improvements. But the central question remains – how? What is the essence of this teleological process and how might practitioners determine the rules for successfully improving the anomalar's states of affairs?

Anand and Kodali (2008) advanced two principal conclusions from analysis of 35 PDCA-based benchmarking frameworks: "there are really two kinds of benchmarking: internal and external" and "greater detail within the benchmarking framework addresses the pitfalls of benchmarking". The first conclusion is welcomed since the forms of benchmarking have grown remarkably since inception (Watson, 1993; Zairi, 1994; Ahmed and Rafiq, 1998; Kyrö, 2003) with new forms advanced as a means of accommodating ever-increasing organizational scope and complexity. Their second conclusion perpetuates belief that even greater attention to detail will satisfy benchmarking's critics. Applying increasingly specific rules, or even more rules, may be an effective a posteriori technique for improving empirical benchmarking frameworks, but can also lead to unintended consequences such as confusion (Alstete, 2008) or complexity (Deros *et al.*, 2006).

Many excellent analytical techniques associated with benchmarking such as Analytical Hierarchy Process (AHP) (Partovi, 1994; Ragavan and Punniyamoorthy, 2003; Punniyamoorthy and Murali, 2008), Data Envelopment Analysis (DEA) (Charnes *et al.*, 1978; Banker *et al.*, 1984; Wöber, 2002), Principal Component Analysis (PCA) and Common Factor Analysis (CFA) (Büyüközkan and Maire, 1998) have also contributed to improvement but have defied generalisation into a single benchmarking framework. Wolfram Cox *et al.*'s (1997) long-held lamentation of the lack of "a sufficiently developed theory that would explain the differences between effective and ineffective efforts" remains relevant.

Any underlying theoretical framework must also rest comfortably with either simplicity or complexity. Internal benchmarking is evidently simpler than its external alternatives (Bhutta and Huq, 1999; Southard and Parente, 2007), and is cited as a major contributor to failure where ignored (Huq *et al.*, 2008) or underutilised as a basis for external benchmarking (Elmuti and Kathawala, 1997). Whilst examining benchmarking in the automotive sector, Deros *et al.* (2006) further differentiated the gap between simplicity and complexity. They concluded that:

[...] current frameworks (whether academic or practitioner based) are overly prescriptive, most suited to larger organizations and unsuited to SMEs" and that "simple, tangible and SME-friendly measures such as "reject or rework %", "work in progress (WIP) levels", or "lead times" can be benchmarked either internally or externally and implemented gradually in pursuit of better rather than best practice.

These conclusions suggest that praxis-based approaches to benchmarking have yet to tap into deeper streams of explanation in search of explanation that satisfy benchmarking's operational weaknesses: indistinction between effective and

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ineffective practitioner efforts and recourse to multiplication of its forms and framework details to accommodate its critics.

According to Popper (1987, 1996) the “correct method of critical discussion starts from the question: what are the consequences of our thesis or our theory? Are they all acceptable to us?” Weick (1989) addressed the question of “acceptability” claiming good theory to be:

[. . .] plausible, and more plausible if it is interesting (versus obvious, irrelevant or absurd), obvious in novel ways, a source of unexpected connections, high in narrative rationality, aesthetically pleasing or correspondent with presumed realities.

Current benchmarking praxis does not fare well under these observations and we might look elsewhere for explanation of its underlying behaviour and role as one of the motors of organizational improvement or change.

Van De Ven and Poole (2005) advance the perspective that organizational change is characterised by two approaches: process and variance; the former broadly subjective and the latter broadly deterministic or deductive. These also relate to the functionalist and interpretive organizational perspectives (so-called paradigms) of Burrell and Morgan (1979). Gioia and Pitre (1990) maintained that organizational behaviour is seldom neatly explained by a single perspective. There may be multiple contributing perspectives, even though there might be an evident bias towards one of them. But whatever the organizational perspective, whether simple or complex, the teleology of benchmarking is organizational improvement.

Benchmarking is both process and variance-driven. Identification of the need for a superior state of affairs within an anomalar’s organization or the need for improvement is deductive and exemplifies a variance approach. This is deterministic and supported by specific relata (environmental variables that constitute a state of affairs) that evince the relative superiority of the exemplar over the anomalar. In contrast, the intention of attaining an improved state of affairs within the anomalar’s organization exemplifies a process approach where the anomalar experiences versatility, changes in the meaning of things and reflects those within the organization experiencing the structuring processes. In their distinctions between process and variance driven organizational perspectives, Van De Ven and Poole (2005) rely on Aristotelian Causation to explain the teleology and actions underpinning organizational behaviour. Causation is a good starting point for examining the nature of organizational benchmarking.

### **A causation approach**

The mechanism that gives rise to a sensed or experienced effect is held to be its cause and causation is its epistemology. Causation has a long and fractious philosophical history. The ancient Greeks envisioned an elemental world comprised of earth, air, fire, water and aether where relationships between them caused all that was sensed by man. Ontological issues advanced medieval and renaissance philosophers beyond this purely elemental world yet retained many of the forms, arguments and causal classifications of the ancients. Developments in the eighteenth and nineteenth centuries saw rationalist and empiricist schools holding different views that in many ways have yet to be settled. Charles Peirce (1898/1992) cautioned that those making causality a fundamental category of thought have to contend with the fact that a proposition at one period of history may be entirely different in another. Each contribution to the theory of causation

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is relevant to an understanding of the mechanisms of change and also relevant to the concept of organizational benchmarking.

Aristotle advanced an approach that has endured the test of time: satisfying the question “why is this so?” Via decomposition into four elemental components called the material (species), formal (archetype), efficient (primary source) and final (sake) types of explanation, or causes that satisfy knowledge of something (Aristotle, *Physics II* 194b16):

- (1) Material cause identifies that from which it came: its components, constituents or properties.
- (2) Formal cause relates to the pattern or form of something: governing principles, laws or nomology.
- (3) Efficient cause is that from which something starts: its primary source, actions or agency.
- (4) Final cause is the sense of end or sake for which something is done: teleology.

To Aristotle the form of a substance also established limits or boundaries on the extent of possible change: what it was not! Aristotle’s “causes” generally occurred in neatly separated situations. For example, a person walking (material and formal cause) from one place to another might do so not simply to change location (efficient cause) but for the sake of exercise – or for the sake or desire of “good health” (final cause).

These concepts dominated European philosophy for almost 2000 years until challenged by the new physics of Galileo Galilei (1564-1642), Descartes (1596-1650), Newton (1642-1727), Leibniz (1646-1716) and Spinoza (1632-1677). Their mechanistic perspective gave primacy to efficient cause because it identified the effects of transitions from one state of affairs to another via natural laws.

Aristotle’s perspective of causation excluded the empirical organizational features of chance and dependency. His concept of chance was spontaneous coincidence – a serendipitous conjunction of events (efficient cause) (Aristotle, *Physics II* 195b 31). Modern perspectives hold chance to be a nomological attribute of materials or events and needs to be recognised as such. Dependencies also remain as one of the unsettled areas of causation. Russell (1979) lamented that western scholarship might have advanced more rapidly if action was studied independently of purpose, but Peirce (1935a, I.220) contended that action without purpose was pure chaos! Benchmarking is not satisfactorily encompassed by efficient cause as there are evidently other components such as properties, laws and purpose that are also associated with organizational improvement.

Many significant historical contributions to causation are also pertinent to organizational benchmarking and particularly so where the exemplar and anomalar are differentiated solely by mechanistic processes.

Galileo (1623) proposed the existence of necessary and sufficient conditions for causation. Descartes (Woolhouse, 1993, p. 194) contended the sole necessity of efficient cause, severing a historical link with teleology. Spinoza (Nadler, 2002) introduced dependency: knowledge of an effect depends on, and involves, knowledge of its cause. Hobbes (Chappell, 1999, p. 34, TL §23) argued that the antecedents of effects may consist of chains of causal relata. Hume (1739/1999) cautioned that cause is the experiential inference of one object followed by another and experience, not argument, infers that objects similar to the first are followed by objects similar to the second

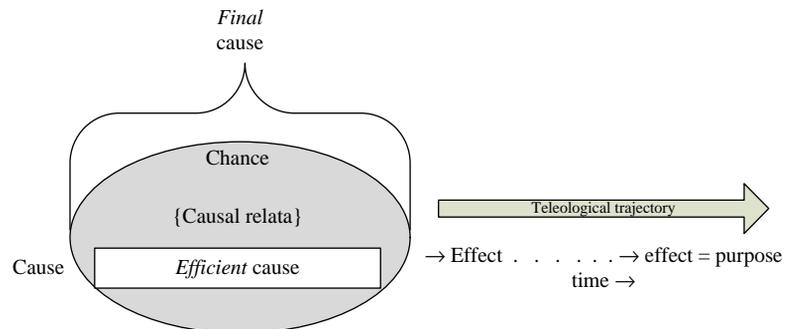
at some other time. Mill (1872/1973) claimed that effects have invariant antecedents (A is the cause of B and B is the effect of A, if and only if A is immediately followed by B and things similar to A are always followed by things similar to B, where A and B may also consist of complex combinations of necessary conditions – or formally,  $A \leftarrow B$ , iff  $A \rightarrow B$  and  $\{A\} \rightarrow$ ).

These contributions reflect a positivist, rather than pragmatic foundation for organizational explanation as each fails to explain the behavioural and statistical nature of change.

**Peircean Causation**

Charles Sanders Peirce (1839-1914) developed an original, triadic theory of causation; a modernised Aristotelian perspective involving efficient cause, final cause and chance (Figure 1). Peirce held that final causes were teleological processes of a general nature that tended to be realised through determining processes of efficient causation. Hulswit (2000, III.1) interpreted this to mean that final causes were akin to habits – whether like human habits or habits of nature because they tended towards an end state (e.g. nature’s inherent minimisation of energy).

This view is reminiscent of Aristotle’s example of a person undertaking exercise, not merely to change location, but for the sake of their health (i.e. longevity, survival). In keeping with this theme, Peirce held final causes might not be static, evolving over time, perhaps developing from one intermediate state to another, and so on. In describing personality Peirce (1935b, VI.156) recognised that this characteristic was more than a purposive pursuit of a predetermined end, it was developmental (“a developmental teleology”) and was influenced at later times by what was currently not conscious. Efficient cause is dyadic and relates two events but also contains an element of chance. Peirce (1893/1998, 1#308) theorized chance as a spontaneity or characteristic of the universe where it acts always and everywhere, though restrained within narrow bounds by law, “producing infinitesimal departures from law continually and great departures with infinite infrequency”. This is not inconsistent with Darwin’s theory of natural selection where rare, random, but helpful changes in fauna and flora abet the survival (sake) of a species. Peirce clearly recognised that there may be unapparent complexities in the cause-effect transition which might sometimes deliver other than what an observer ordinarily expects. This pragmatic observation



**Figure 1.**  
Peircean Causation

**Sources:** Adapted from Hulswit (2000, 2002)

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addressed some of the difficulties experienced by earlier causation theories – how to deal with Hume’s and Mill’s regularity and reduction of observations into deterministic components? More fundamentally, Peirce concluded that without chance there is no teleology as pure efficient causation would simply result in determinism.

A teleological view of causation accords well with organizational behaviour since changes (whether purposeful or not) that do not contribute to the overarching sake of success or survival or, at more elemental levels, improvements in current states of affairs, are at best inefficient or at worst terminal.

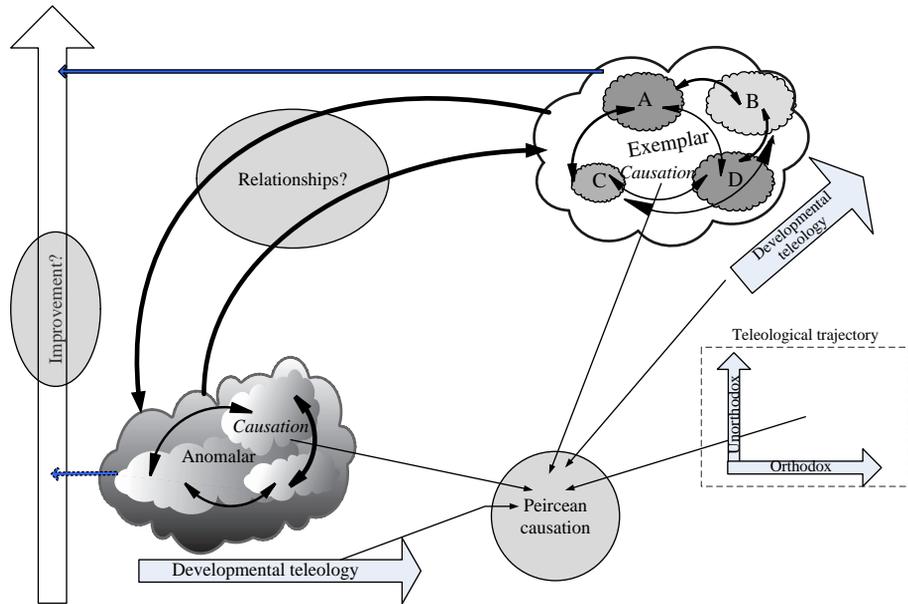
Peircean final causes are not necessarily end states, but physical possibilities. There might be many different ways and timescales progressing, irreversibly, towards these possibilities: “boys grow into men, but not men into boys” (Peirce, 1935b, VI.554). Peirce (1935b, VII.471) also held that in the natural world it was inevitable that a sequence of efficient causes reached some final state. He acknowledged that the word “teleology” might be too strong a word to apply to these natural laws and suggested the use of “finious” to express the empirical tendency of such natural laws toward a final state. This semantic does not alter Peirce’s hypothesis that the absence of final cause makes efficient cause chaotic.

Peircean Causation advances our understanding of benchmarking by addressing what earlier theories did not – the purpose (both fixed and developmental) and chance elements of change. However, earlier epistemologies on causation also advance our understanding of benchmarking and are not entirely swept away by Peirce, quite the opposite. Peirce places efficient causation within a purposeful context that had, post-Aristotle, either been theological or, post-Descartes, substantially disregarded as an unnecessary causal relatum in a deterministic world. By addressing the nature of purpose and chance, explanations that previously struggled now enjoy better illumination. The combination of modern theories on efficient causation and the triadic framework of Peirce establish a robust platform to construct a theory of benchmarking. In particular, the dyadic relationship between efficient and final cause establishes a pathway to include modern welfare theory as a basis for a developmental organizational teleology: success or survival based on progression towards future satisfaction-generating possibilities.

### **A general framework**

Aristotelian and Peircean Causation’s contribution towards a theory of benchmarking is essentially holistic: providing a general framework that identifies three important organizational motors – those of action, chance and purpose. This remains insufficient because benchmarking is also an organizational practice that cannot be implemented without explaining how these motors actually function given the breadth of organizational circumstances that might arise. The following diagram outlines the progress so far and the residual components of a theory of benchmarking.

Holistic elements include internal states of affairs that constitute exemplary and anomalous practice, developmental teleological trajectories that motivate these states of affairs and the notion of improvement. In Figure 2, the teleological trajectory is resolved into two orthogonal components that may vary over time: (relative) orthodoxy and its opposite. It is reasonable to hold that an exemplar differentiates itself from an anomalar though some relationships that might be resolved into the Aristotelian and Peircean causal components of material, formal, efficient, final and chance.



**Figure 2.**  
A causal framework for  
a theory of benchmarking

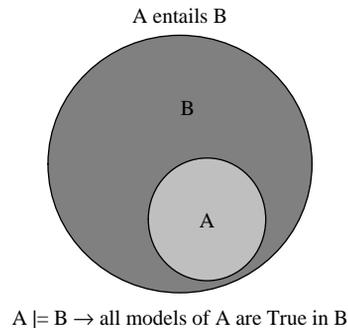
The material component reflects the modern notion of properties that the states of affairs require to function properly. The formal component reflects the nomology (rules or laws) that govern each state of affairs and the efficient component reflects the causal chains or processes that order resources (material and formal) in some productive fashion that is driven by purpose. Chance is a part of production. Statistical variation, as Juran (1950), Deming (1982) and others have reminded us, is inescapable and must be controlled. The final component is relative. If an exemplar is perceived as such, by an anomalar, it is because the effects of exemplary behaviour are attributed to some cause. The cause may be a more successful pursuit of its purpose underpinned by better execution of its processes, better rules or resources, or perhaps, even chance! In this sense, the exemplar is unorthodox in relation to the anomalar. But how might the relationships that effect improvement be determined?

### Property relationships

The concept of entailment refers to a type of concurrence between two sets of properties or relationships. These properties are often fixed, but they may also vary over time and location. In Figure 3, the exemplar B is entailed by anomalar A.

There is entailment between two sets of properties  $\{A\}$  and if all of the properties or models within  $\{A\}$  are the same as at least one of the properties or models of. Also stated:  $\{A\}$  is a proper subset of, written  $\{A\} \subset$ . These relationships or concurrences may assume many forms. They might be strictly logical, where the two sets are described by deterministic relationships between categorical properties, or fuzzy, where the relationships are described either by probabilities or dispositions (tendencies).

Logical entailment describes the unconditional truth of sets of categorical properties. If every property that constitutes a state of affairs A also constitutes at least



**Figure 3.**  
Entailment

one of the properties of state of affairs B then state of affairs A entails state of affairs B, written  $A \models B$ .

Fuzzy entailment includes dispositional and probabilistic property relationships.

Dispositional properties are manifestations of tendencies or propensities. There is robust philosophical debate about the ontological reality of such properties as some hold that an underlying essence or cause accounts for a disposition (Armstrong, 1969, Mackie, 1973) whereas others insist on their reality calling them qualifying properties (Weissman, 1965, Roxbee Cox, 1975). Fara (2006) and Rozeboom (1973) provide examples of each: “fragility, striving, responsibility, solubility, courage and agility” are dispositional properties whereas “massiveness and triangularity” appear to be categorical. A disposition may be defined as follows: F expresses a disposition if and only if there is an associated manifestation and conditions of manifestation such that, necessarily, a state of affairs is F only if the state of affairs would produce the manifestation if it were in the conditions of manifestation (Fara, 2006). For example, if “satisfaction” is a disposition and the conditions of manifestation are “loyal customers” then, necessarily, wherever there are “loyal customers” that state of affairs would be manifesting the disposition of “satisfaction”. Observance of exemplary manifestations towards some desirable dispositional characteristic may motivate the anomalar to benchmark against these conditions in order to improve – e.g. striving, resilient, responsible, successful, etc. The definition of dispositional entailment is similar to its logical precursor. If every disposition that constitutes a state of affairs A also constitutes at least one of the dispositions of state of affairs B then state of affairs A dispositionally entails state of affairs B. A symbol for dispositional entailment is  $\models$ , written  $A \models B$ .

Probabilistic properties exist on “a less than conclusive basis” (Hawthorne, 2004). The rules of entailment are unchanged, but the presence of properties within states of affairs is dependent upon probabilistic conditions defined by a set of statements or circumstances. For example, if F is a property subject to a conjunction of statements S, then the probability that F exists is  $r$  ( $0 < r \leq 1$ ); written  $P[F|S] = r$ . Where states of affairs A and B comprise probabilistic properties their entailment is dependent on the presence of those properties at the time of entailment. This is not unusual as it mirrors an everyday situation (e.g. queues) where the probability of the presence of transient resources in two different locations depends on statements describing their routing. In a benchmarking situation, the exemplar’s properties may sometimes be present, but at other times not and the effectiveness of such an exercise is probabilistic. The symbol denoting probabilistic entailment is  $\vdash$ , written  $A \vdash B$ .

### Nomological relationships

A general relationship that describes the rules or laws for two different states of affairs is necessary to determine whether an exemplar can be benchmarked successfully by an anomalar. Entailment describes the congruence of respective properties between anomalar and exemplar's states of affairs but the laws governing them may easily differ. People and energy are two examples of material resources (with their respective properties) common to many organizations, but their manner of deployment (formal cause) may be so different as to preclude useful comparison.

Supervenience describes a nomological or metaphysical covariation of one state of affairs upon another. In a supervenient relationship, the mechanics of the dependence of one state of affairs on another are immaterial, but the effects of the dependence are discernable.

Supervenience arose from the philosophy of mental characteristics where it was contended that they were dependent upon physical characteristics (Davidson, 1970/2001) such that changes in mental characteristics cannot occur without changes occurring in physical characteristics. This concept also encompasses dependencies of a broader type and it is within this context that they are pertinent to a theory of benchmarking. Cause presupposes a relationship between the antecedents of the effect and the effect itself. There is supervenience of the cause on the effect. In benchmarking the effect is discerned to be "exemplariness" and the nomology governing the antecedents of this property is supervenience. If B is the exemplar and A the anomalar, then a symbol denoting a supervenience relationship is  $B \blacktriangleright A$ , i.e. B supervenes upon A. The practical meaning of which is that, given the same circumstances, an observer discerning changes in the exemplar's behaviour would also discern changes in the anomalar's behaviour.

Mandik (2004) illustrates the application of supervenience to simple physical properties. Force is a function of mass and acceleration. The relata determining Force are {mass, acceleration} and the relata for acceleration are {position, time}. An object cannot change its acceleration without changing its position so we may say that the facts or properties about an object's acceleration supervene on facts or properties about an object's velocity and, similarly, facts or properties about an object's velocity supervene on facts or properties about its position. Supervening properties need not be the properties upon which they supervene. Although Force supervenes on position, it is not the same as position. There is also an entailment relationship in this example as position logically entails Force, but not the converse. Force is also a vector whereas position is a scalar. Again, if an exemplar adopted a management law of "rewarding success", it might under similar circumstances (e.g. new business) supervene on an anomalar that also obeyed the law of "rewarding success" – even though there might not be entailment of their respective relata.

In essence, what is being said is that for B to supervene on A, B's properties "covary" with A's properties (McLaughlin and Bennett, 2010, Sect. 3.7). This is pertinent for benchmarking as the objective is not slavish imitation of exemplary behaviour, but improvement by adopting exemplary laws governing the properties of anomalous states of affairs.

Supervenience is also the concept of indiscernability – namely, whatever the laws are, if indiscernability with respect to A also entails indiscernability with respect to B then B supervenes upon A. The extent of the domains over which indiscernability applies affects the strength of the supervenient relationship: a constrained domain

being potentially weaker than an unconstrained domain. Supervenience may also be expressed in terms of globality or time (Mandik, 2004; Mclaughlin and Bennett, 2010).

The distinction between weak and strong supervenience may be formally stated with reference to their effects on respective properties.

B weakly supervenes on A,  $B \blacktriangleright_w A$ , if and only if (iff), necessarily ( $\diamond$ ), for any property F in B, if anything  $x$  has F, then there is at least one property G in A such that  $x$  has G, and if anything  $y$  has G it also has F. This may be formally stated by Kim (1984, p. 158).

Weak supervenience:

$$\text{iff } \diamond \forall F \in B [Fx \rightarrow \exists G \in A (Gx \wedge \forall y (Gy \rightarrow Fy))] \quad (1)$$

Or for the strong case.

B strongly supervenes on A,  $B \blacktriangleright_s A$ , if and only if necessarily ( $\diamond$ ), for any property F in B, if anything  $x$  has F, then there is at least one property G in A such that  $x$  has G, and necessarily, if anything  $y$  has G it also has F. This may also be formally stated by Kim (1984, p. 158).

Strong supervenience:

$$\text{iff } \diamond \forall F \in B [Fx \rightarrow \exists G \in A (Gx \wedge \diamond \forall y (Gy \rightarrow Fy))] \quad (2)$$

The difference between strong and weak supervenience lies in the extent to which properties are shared. It is possible that not all of the properties shared by  $x$  and  $y$  in A are also shared in B. If for some F in B,  $x$  has F but  $y$  does not, then weak supervenience prevails.

### Combining property and nomological relationships in benchmarking

Entailment and supervenience relationships may now be summarised in a causal context and related to benchmarking opportunities. Let  $\{A\}$  refer to the set of categorical properties (categorical relata) comprising the anomalar's state of affairs A and likewise for the exemplar B. The following table identifies the types of benchmarking improvement that might arise from the combinations of entailment and supervenience relationships that exist between them.

Perfect improvements are theoretically possible where there is complete alignment of purpose, properties and nomology. Chance and property subsets reduce improvements to the status of "potential improvements". Entailment of solely dispositional rather than categorical properties offers potential self-improvement with respect to a teleological exemplar – as might be found in ISO9000 or the Baldrige Business Excellence System (NIST, 2007).

### Process and purpose relationships

*Why improve?*

Benchmarking is associated with purposeful organizational improvement, yet it cannot be said to represent a final cause. Purposeful improvement may be obtained without benchmarking and achieved in so many different ways. Improvements represent streams of activities or developing teleologies that are, as Peirce observes (1935b, VI.156), directed towards some more fundamental or explicit final purpose.

*The reason for improvement is survival!*

Survival is an inescapable final purpose of any organization. It is a *sine qua non* relatum in any organizational teleology since “its pursuit is continuous and its attainment never automatic” (Pfeffer, 1997). Peirce (1935b, VI.156) observed that processes behind this pursuit might not even be conscious of it and their trajectories might only involve physical possibilities rather than physical certainties. Perhaps “sustainability” is a synonym for the concept of the teleological trajectory of an organization towards its final purpose. If the final purpose, survival or existence, is axiomatic, how is it continuously pursued?

Pfeffer and Salancik (2003, p. 242) equate organizational survival with environmental dependence coupled with the ability to acquire and maintain resources. An effective organization “satisfies the demands of those in its environment from whom it requires support for its continued existence”. Of course there are numerous viable organizational competencies that contribute to satisfying these demands: legitimacy (Dowling and Pfeffer, 1975, Singh *et al.*, 1986), ability to learn (Levinthal, 1992) and innovation (Han *et al.*, 1998; Baumol, 2002; Cefis and Marsili, 2005) being examples. But howsoever these competencies are prioritised or deployed, they reduce to a contribution towards the continued satisfaction of demands of those from whom resources are acquired or by whom they are maintained so that the organization continues to exist. Benchmarking has the objective of recognising exemplary competencies, understanding them and gauging their merit so as to secure better teleological trajectories elsewhere. This suggests the following definition for the role of states of affairs:

States of affairs represent the status of organizational competencies at some point in time that can be gauged according to some consistent metric and establish the teleological trajectory or sustainability of an organization.

A benchmarking process must identify organizational competencies, gauge their value or impact according to some consistent metric (cardinal, real, monetary, etc.) and also establish how these competencies contribute to the sustainability of the exemplar organization. It also follows that an anomalar must do likewise – isolate internal competencies and gauge their value or impact on its own sustainability otherwise the objective of organizational improvement through benchmarking may fail due to mismatched causal relata. But a state of affairs also represents both efficient and final causal components.

Efficient causal components are those giving rise to observable organizational effects (such as better market share, lower defect rate, lower prices, better staff retention, etc.). Since these effects are observable and theoretically determinable between the exemplar and anomalar through entailment and supervenience relationships, the task of identifying their efficient causal relata is one of good process: this is made easier if the exemplar and anomalar co-operate.

Final causal relata might be difficult to establish – other than to the obvious degree of “survival”. Many different situations are plausible. Exemplars and anomalars might operate in a quiescent environment where their intentions and relationships with their marketplaces are openly transparent. In such cases it would be pragmatic to reduce benchmarking to the resolution of exemplary efficient causes. However, current sustainability might also be caused by a conscious pursuit of developmental teleologies where current states of affairs reflect intermediate competencies or objectives.

For example, an organization might consciously pursue an intermediate technology not for the sake of its perfection and consequential market gain, but for the sake of establishing a pool of resources (e.g. organizational learning) that might possibly do novel things at a later time. Another example may be found in tourism where the teleological trajectory of proprietors offering accommodation services might be more directed towards financial gains from real-estate than from the operational excellence of guest services. Including such exemplars in benchmarking processes may not be beneficial to the anomalar as both efficient and final causes reflect a transient state of affairs. Even if the exemplar's teleological trajectory was discerned, it might not be sustainable (failing to evince either entailment or supervenience relationships) within an anomalar's organization.

Whilst it might seem sufficient to simply benchmark one state of affairs against another, it is also necessary to consider the other two Peircean causal factors of time and chance. The teleological trajectory or sustainability of an organization must be quantified so that benchmarking can distinguish effective from ineffective effort.

Economic welfare measures satisfaction resulting from effort or resource utilisation. A mathematical statement of economic welfare may be derived from the following organizational factors: the timeframe ( $t$ ) over which resources are provided, the organization's aggregate consumption of resources (its production function)  $C(t)$  and an idealised utility function  $U(C(t))$  denoting utility or satisfaction arising from the consumption of resources by those depended upon for survival. If the initial point in time is  $\tau$ , the value of present versus future utility is represented by the exponential  $e^{-k(t-\tau)}$  where  $k$  reflects the level of knowledge or risk associated with future states of affairs (Stavins *et al.*, 2003; Arrow *et al.*, 2004).

Utility at some future time  $t_f$ , discounted to the initial point is  $U(C(t)) \cdot e^{-k(t_f-\tau)}$ . Thus, the total welfare,  $\mathbf{W}$ , of any state of affairs under consideration, or the overall organization, is the accumulated discounted utility, which should also be positive to be sustainable.

Welfare of a state of affairs (continuous):

$$W(t) = \int_{\tau}^{\infty} U(C(t)) \cdot e^{-k(t-\tau)} dt \geq 0 \quad (3)$$

In practical terms, welfare may be quantified from estimates or forecasts of future utility streams – i.e. discounted economic surpluses,  $\mathbf{S}$ , generated by the state of affairs under consideration.

For trading organizations economic surpluses are the periodic contribution to equity after all other consumption (e.g. labour, materials, services, capital and taxation expenditures) have been deducted from income. Organizations generating cumulative negative economic surpluses fail to satisfy the demands of their resource providers (investors, staff, customers, suppliers and the community) and ultimately cease to exist.

The discount factor in such cases is the prevailing risk adjusted market rate,  $\mathbf{r}$ , for the opportunity cost of resources (e.g. money). The Welfare,  $\mathbf{W}$ , generated (or projected) by economic surpluses,  $\mathbf{S}$ , over discrete (say, annual) periods of time, commencing at period  $\tau$  and finishing in period  $\mathbf{f}$  with an opportunity cost of resources  $\mathbf{r}$ , is given by the discrete summation.

Welfare of a state of affairs (discrete):

$$W(t_f) = \sum_{j=\tau}^f S_j \cdot (1+r)^{-(j-\tau)} \geq 0 \quad (4)$$

Equation (4) is also the basis of economic value added (EVA<sup>®</sup>) (Stewart, 1991) where annual economic surpluses are compared with resources deployed to evince satisfaction (utility) and the present value of forecasted economic surpluses reflect cumulative welfare or market value. Economic surplus has been used in the establishment of financial yield benchmarks for the NZ Tourism Sector to establish performance and improvement criteria (Moriarty, 2007).

Transient negative utility creates intergenerational inequity that imposes compensatory burdens in future time periods to preserve the present value of resource consumption. Over-consumption of resources at some period might also preclude the attainment of utility in future periods if there was “an expectation of continuous resource availability” (Stavins *et al.*, 2003). If organizations or their states of affairs are to be sustainable, welfare must be positive and monotonic increasing.

Sustainability conditions:

$$\frac{dW(t)}{dt} \geq 0 \text{ or } (\forall j \in [\tau, f], S_{j+1} - S_j \geq 0) \quad (5)$$

Welfare criteria for the sustainability of an organization may be specified but do not carry many guarantees as to their attainment. However, they do establish important caveats for organizations and benchmarking. There is neither a unique nor optimal consumption path associated with conditions for sustainability. Future consumption trajectories might not even be efficient. Future consumption can only be forecast and there is no guarantee that either the conditions for sustainability will be met in future periods or that utility will be as high as in prior periods (Arrow *et al.*, 2004, p. 150). It is conceivable that there may be no sustainable trajectory for the organization if exhaustible resources are essential to production and consumption. Peircean Causation also warns that a snapshot of an exemplar’s state of affairs in the absence of knowledge of its teleological trajectory (not all of which might be known or knowable) may be unreliable. In comparison, the efficient causes establishing observable elements within an exemplar’s states of affairs might be obtainable with greater reliability and offer better opportunity for improved anomalar welfare. Even so, an anomalar seeking to implement improvement strategies based on exemplary efficient cause should still reflect on their compatibility with its own teleological trajectory.

### Approach to a theory of benchmarking

The next step is to combine theories of causation, generalised property and relationship rules, a definition of states of affairs, an axiom of organizational purpose and definition of welfare to describe the essence of benchmarking.

This theory of benchmarking rests on the axiom that “survival” is a sine qua non of organizational ontology. The series of requirements in Table I identify conditions for the establishment of causal relationships between an anomalar and an exemplar’s state of affairs.

One state of affairs cannot be held superior to another without some relevant metric. Welfare is the gauge used to establish the status of a state of affairs. Most organizations will use some monetary utility metric since it reflects satisfaction for supply and maintenance of resources necessary for survival.

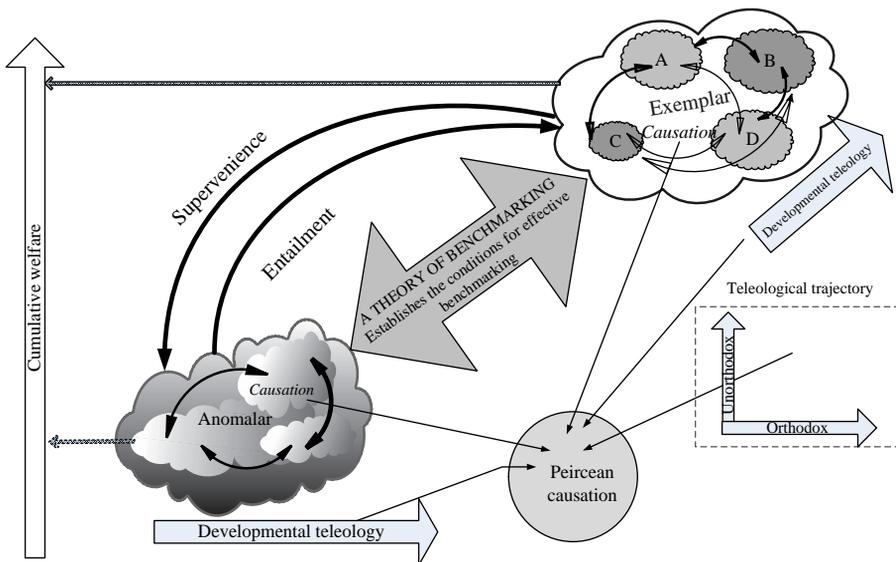
It is also necessary to demonstrate that benchmarking contributes to a superior state of affairs that is consistent with the organizational purpose of survival. Peirce's framework embodying efficient, chance and final causal relata provides explanation for the basis of states of affairs and constitutes the causal engine that is central to benchmarking: transferring power or welfare via the exemplar's causal engine to the anomalar.

Distinction must be made between a benchmarking process and benchmarking improvement. A benchmarking process is effective if it identifies the potential for improvement. An effective benchmarking improvement increases anomalar welfare as a result.

The earlier framework in Figure 4 can now be re-stated with welfare, supervenience and entailment relationships empowering the causal improvement engine that is called benchmarking.

| Benchmark improvement opportunity   | Aristotelian efficient cause                                 | Peircean probabilistic efficient cause                      | Peircean teleological final cause   |
|-------------------------------------|--|---|---|
| Perfect improvements                | $\{A\} = \{B\}$<br>$A \models B, B \triangleright_s A$       | $\{A\} = \{B\}$<br>$A \vdash B, B \triangleright_s A$       | $\{A\} = \{B\}$<br>$A \models B, B \triangleright_s A$                    |
| Potential improvements              | $\{A\} \subset \{B\}$<br>$A \models B, B \triangleright_w A$ | $\{A\} \subset \{B\}$<br>$A \vdash B, B \triangleright_w A$ | $\{A\} \subset \{B\}$<br>$A \models B, B \triangleright_w A$              |
| Potential teleological improvements | -  | -   | $\{A\} \neq \{B\}$<br>$A \models B, B \triangleright_{s \text{ or } w} A$ |

**Table I.**  
Supervenience and entailment relationships in benchmarking



**Figure 4.**  
Framework for a theory of benchmarking

There is a general caveat. Cognisance of, or exposure to, exemplary organizational practices of any kind may stimulate an observer to perceive possibilities other than those supported by evident nomological relationships. Stimulation of this sort is better called “serendipity” rather than benchmarking. It is rational to acknowledge this phenomenon as an example of developmental teleology but not rational to expect it to be a priori effective.

**The theory of benchmarking**

This Theory of Benchmarking rests on one axiom and five logical conditions, Benchmarking Theory zero through five (BT0:BT5), that address the causal nature of relationships between exemplar and anomalar states of affairs to obtain effective an effective benchmarking process and an effective benchmarking improvement (Table II).

The third, fourth and fifth logical conditions are represented as a single conjunction since a benchmarking process may be either perfectly or potentially or only teleologically effective. Each of these conditions, BT0, BT1, BT2, BT3-BT5, will now be defended, warranted and qualified in Table III.

In summary, conditions that confer prior effectiveness of a benchmarking process do not necessarily confer prior attainment of a benchmarking improvement because a supervenient relationship is a statement of a nomological relationship rather than equivalence. Improvement in the absence of perfect nomological equivalence is based on the feasibility of transferring the status of exemplary relata into an anomalar’s state of affairs. The effect of this transfer, where it is feasible in respect of a state of affairs’ material and formal cause, may still deny improvement if efficient or final causal criteria cannot be obtained. For example, it is easy to conceive an anomalar being unable to transfer exemplary relata because of underlying resource capacity constraints or philosophical aversion. In some cases an acceptable benchmarking outcome might only be a limited degree of improvement such as may arise from small changes in organizational purpose or the removal of one of many efficient causal constraints.

Wherever an effective benchmarking process is obtained, there is every reason to anticipate either a tangible improvement or a set of possible policies (efficient causal

| Condition  | Description  |
|--|--|
| BT0: primal axiom  | “To survive” is a sine qua non of organizational ontology  |
| BT1: causal engine   | Effective benchmarking processes necessarily entail Peircean Causation (I.e. Rules, Properties, Purpose and Chance determine both exemplar and anomalar states of affairs)   |
| BT2: effective improvement   | Any effective benchmarking improvement necessarily requires an increase in anomalar welfare via the transformation of exemplary relata into feasible anomalar relata   |
| (BT3 ∨ BT4 ∨ BT5): effective process                               | An exemplary state of affairs is necessarily supervenient upon an anomalous state of affairs and an anomalous state of affairs necessarily entails (perfectly BT3, partially BT4 or dispositionally BT5) an exemplary state of affairs |
| The necessary and sufficient conditions for effective benchmarking | Necessary: $BT1 \wedge BT2 \wedge (BT3 \vee BT4 \vee BT5)$<br>Sufficient: $BT1 \wedge BT2 \wedge BT3$  |

**Table II.**  
The theory of benchmarking

**Notes:**  $\wedge$ , refers to logical conjunction (AND);  $\vee$ , refers to logical disjunction (OR)

*Primal axiom: BT0*

|            |   |
|------------|---|
| BT0        | To “survive” is a sine qua non of organizational ontology   |
| Warrant    | Actions that diminish welfare reduce dependent satisfactions, diminish the efficacy of resources and threaten survival –, i.e. contravene the Primal Axiom  |
| Defence    | “To survive”, an organization evinces “continued ability (positive cumulative welfare) to satisfy that or those upon which or whom there is dependence for the supply and maintenance of its resources” |
| Qualifiers | There are none  |

*Benchmarking’s causal engine: BT1*

|            |  |
|------------|--|
| BT1        | Effective benchmarking processes necessarily entail Peircean Causation (i.e. rules, properties, purpose and chance determine both exemplar and anomalar states of affairs)   |
| Warrants   | The purpose of effective benchmarking process is to obtain an improvement in an anomalar’s state of affairs – a final cause. The anomalar’s purpose for improvement is to increase its ability to survive: – axiom, final cause. An effective benchmarking process evinces the existence of antecedents that instantiate improvement – efficient cause. Effective benchmarking processes necessarily entail efficient and final cause. The conjunction of efficient cause and final cause, subject to (Peircean) chance, necessarily entail Peircean Causation. Effective benchmarking processes necessarily entail Peircean Causation |
| Defence    | Epistemology of benchmarking offers no purpose to the practice other than as a mechanism for organizational improvement – a final cause. A state of affairs that does not stand in need of improvement either dominates other observable and relevant states of affairs, or it does not. The determining process as to whether or not it dominates other observable and relevant states of affairs is the practice of benchmarking – efficient cause   |
| Qualifiers | Benchmarking is a purposeful process   |

*Effectiveness of the benchmarking improvement: BT2*

|            |  |
|------------|--|
| BT2        | Any effective benchmarking improvement necessarily requires an increase in anomalar welfare via the transformation of exemplary relata into feasible anomalar relata   |
| Warrants   | Adoption of exemplary relata within an anomalar’s state of affairs effects change, but not necessarily improvement. Such changes that, say, improve the magnitudes of any relata but fail to increase anomalar welfare contradict the primal axiom and are ineffective   |
| Defence    | Effective benchmarking reflects both change and welfare improvement. With the exception of a perfectly effective benchmarking process, conditions for effective benchmarking processes identify only potential opportunities as exemplary supervenience and entailment reflect a degree of encompassment rather than imitation of the exemplar’s behaviour. Benchmarking becomes ineffective if the anomalar’s state of affairs do not confer an increase in welfare when furnished with exemplary relata. Consistent with BT1, benchmarking improvements may arise from efficient causal relata (of a tactical nature, such as operational processes) or final causal relata (of a strategic nature, such as organizational direction) where their application preserves organizational consistency with the primal axiom |
| Qualifiers | There are none   |

*Effectiveness of the benchmarking process: BT3, BT4 and BT5*

|     |   |
|-----|---|
|     | There are three conditions that obtain an effective benchmarking process, depending on the type of entailment and whether the anomalar’s relata are an inclusive, proper or empty subset of the exemplar’s relata   |
| BT3 | A perfectly effective benchmarking process necessarily requires an exemplary state of affairs to be strongly supervenient upon an anomalous state of affairs and necessarily requires the anomalous state of affairs to logically entail the exemplary state of affairs |

(continued)

**Table III.**  
Defence of the theory  
of benchmarking

|            |  |
|------------|--|
| Warrants   | Perfectly effective benchmarking entails identical nomological behaviour between the exemplar and anomalar states of affairs identical properties of their respective relata. Strong supervenience entails mutual nomological behaviour over all mutually relevant states of their common relata. An anomalar's state of affairs entailing an exemplar's state of affairs under nomological identity predicates variances in the state of any exemplary relata necessarily predicates equal variances in the state of their respective anomalar relata subject to Peircean chance. Adoption of the exemplar's relata by the anomalar obtains a state of affairs identical to that of the exemplar. Perfect equality between exemplar and anomalar states of affairs is a sufficient condition for improvement if BT1 and BT2 are also obtained |
| Defence    | Perfectly effective benchmarking is an expression of Humean-Mill efficient causation; the unconditional antecedents of the effects of the exemplar are transferred to the anomalar. However, Peircean Causation admits chance – that might with infinite frequency differentiate “identical” states of affairs infinitesimally – hence the requirement for BT1 to also be obtained for sufficiency   |
| Qualifiers | Nomological supervenience in perfectly effective benchmarking is subject to independence with respect to time and organizational teleology. Consequently, exemplary states of affairs obtained by singular causation, probabilistic causation or final causation do not entail the unconditional antecedents of efficient causation and are excluded from a statement that “B is a perfectly effective exemplar for A”. Peircean chance is elemental and can usually be controlled, e.g. six sigma methods   |
| BT4        | A potentially effective benchmarking process necessarily requires an exemplary state of affairs to be supervenient upon an anomalous state of affairs and requires a proper subset of an anomalous state of affairs to entail an exemplary state of affairs  |
| Warrants   | Effective benchmarking entails nomological behaviour between the exemplar and anomalar states of affairs as well as the properties of their respective relata. Weak supervenience entails mutual nomological behaviour over some relevant states of their common relata. A subset of an anomalar's state of affairs entailing an exemplar state of affairs under weak supervenience predicates that variance in the state of at least one exemplary relatum necessarily predicates variance in the state of at least one anomalar relatum. Adoption of the state of at least one exemplary relatum by the anomalar might obtain an improved state of affairs   |
| Defence    | Effective benchmarking is founded on Peircean Causation; a less restrictive and more encompassing causal theory than Humean-Mill causation. Peircean Causation admits teleological and chance causal phenomena in association with efficient causal relationships. Effective benchmarking arises from any supervenience of the exemplar on the anomalar that might obtain improvement based on either efficient or final cause   |
| Qualifiers | Whilst it is necessary for the exemplar to supervene upon anomalar states of affairs it is not sufficient condition for improvement. A subset of anomalar relata entailing exemplar relata is not a sufficient condition for improvement   |
| BT5        | A potentially effective teleological benchmarking process necessarily requires an exemplar's state of affairs to be supervenient upon an anomalar's state of affairs and requires a proper subset of an anomalous state of affairs to dispositionally entail an exemplary state of affairs   |
| Warrants   | Supervenience in the absence of logical or probabilistic entailment of relata necessarily entails common organizational dispositions. Solely dispositional relata cannot be formal, material or efficient causal relata they may only be final causal relata   |

Table III.

(continued)

|            |   |
|------------|---|
| Defence    | Dispositional entailment of causal relata only describes shared manifestations. Just as the manifestation of “opacity” applies equally to chalk and gold – each different and un-substitutable, the manifestations of “success, adaptability, resilience, satisfaction or leadership” also apply to organizations where the antecedents of such behaviours may be quite different and un-substitutable. Solely dispositionally entailed relata under a supervenient relationship between exemplar and anomalar cannot be efficient causal relata as they are the manifestations of efficient causal relata evincing some sake or purpose. Dispositionally entailed relata cannot be Aristotelian material causal relata if they are different and un-substitutable. Differentiation between formal and final causal relata lies in distinction between laws that describe the nature of relata and the nature of their purpose. Where two relata only share dispositional properties but the laws describing their nature differ, they can only be the relata of some final cause. An organizational chain of final causes represents its teleological trajectory |
| Qualifiers | A supervenient and dispositionally entailed relationship between exemplar and anomalar states of affairs is a necessary but insufficient condition for improvement  |

Table III.

or teleological) that might obtain improvement. However, where an effective benchmarking process is precluded by these theoretical conditions, there is no reason to anticipate improvement.

The provisional definition of benchmarking offered earlier by Moriarty and Smallman (2009) may now be revisited in the light of these theoretical constructs by including the necessity of transforming feasible exemplary relata:

Benchmarking is an exemplar-driven teleological process operating within an organization with the objective of intentionally changing an anomalar’s existing state of affairs into a superior state of affairs via transformation of causal and feasible exemplary relata.

Extending the definition through the influence of BT2 and the disjunction of BT3, BT4 and BT5 ( $BT3 \vee BT4 \vee BT5$ ), provides a statement that not only defines what benchmarking is, but also how it is to be achieved. The causal component is BT1 and the feasibility component is  $BT2 \wedge (BT3 \vee BT4 \vee BT5)$  and their conjunction obtains the necessary conditions for effective benchmarking. Finally, there is also a sufficient condition that arises from the perfect adoption of an exemplar, as might arise where an internal process is perfectly duplicated to increase production. In this case alone, is sufficient that  $(BT1 \wedge BT2 \wedge BT3)$  are obtained for effective benchmarking:

Necessary conditions :

$$BT1 \wedge BT2 \wedge (BT3 \wedge BT4 \wedge BT5) \tag{6}$$

Sufficient conditions :

$$BT1 \wedge BT2 \wedge BT3.$$

The influence of the primal axiom also promotes continuous improvement, in this case via an effective benchmarking exercise (process plus increased welfare over time). Superiority is implicit in BT2: improvement in welfare is the only effective improvement recognised by this definition. Any other improvement, such as might be observed in changes to magnitudes of important organizational relata, are only effective if they also improve organizational welfare.

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**Applying the theory**

Although many validating processes have been applied to this Theory of Benchmarking, the following examples highlight the core objective outlined in the introduction.

Applying the Theory to the exemplary benchmarking process of Anand and Kodali (2008). Their conclusion that two kinds of benchmarking exist, internal and external, is not supported by this theory. Only a single form of benchmarking is supported. What is supported is that a significant administrative load associated with external benchmarking appears to differentiate that form from internal benchmarking, although they are both theoretically identical. It is not difficult to cite examples where internal benchmarking also has high administrative overhead, such as where a large organization lacks coherency and so-called “internal exemplars” are teleologically dissonant either from internal anomalous or espoused organizational teleology.

The emphasis Anand and Kodali place on experienced practitioners is, from this Theory’s perspective, suggestive of a more successful approximation of theoretical criteria than alternatives. Experienced practitioners are more likely to address one fundamental theoretical principle, that of understanding the states of affairs of the anomalous before looking elsewhere. In doing so, they address the rules, properties and purpose of current states of affairs and make it more likely that these are feasibly related to the exemplar.

The conclusions of Deros *et al.* (2006) in their study of automotive sector SMEs are also explained by this Theory. The relative simplicity of SMEs confers greater benchmarking success from praxis-based frameworks than that commonly achieved with larger organizations is consistent with this Theory. Deros *et al.*’s chosen SMEs had common relations (e.g. similar critical success factors), common relationships (similar processes) and an uncomplicated teleology (cash-flow driven survival) which better approximated this Theory’s underlying principles. Moreover, Deros *et al.*’s observation that such factors also underpin successful internal or external benchmarking practices further evinces this Theory’s conclusion that there is a single form of benchmarking rather than a complex hierarchy (Kyrö, 2003): elsewhere criticised by Moriarty and Smallman (2009) as violations of Occam’s Razor (multiplying entities without simplification). A further conclusion of both Deros *et al.* (2006) and Collins *et al.* (2006) was the impossibility of benchmarking for “best practice” in contrast with “better practice”. This Theory concurs with these observations in that improvement is at best (in the presence of logical entailment and strong supervenience) identical to that of the exemplar, but in all other cases is only potentially better than current anomalous practice. This is contrary to the historical attribution of benchmarking being about best practice; the reality is that it is a tool for better practice.

Pfeffer and Sutton (2006) questioned whether benchmarking could support evidence-based management and advanced four empirical questions for its efficacy: the relationship between the exemplar’s success and its practices, the similarities between the exemplar’s and anomalous’s practices, whether the implementation of a so-called exemplary practice enhances performance and finally, whether the adoption of an exemplary practice had downsides for the anomalous? This Theory identifies criteria that address these questions. The causal nature of exemplary success and its appropriateness to the anomalous is one of supervenience and similarities between their respective practices reflect entailment. Pfeffer and Sutton’s first two questions are included within

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two of this Theory's necessary conditions (BT1 and BT3 v BT4 v BT5). Their third question, the causal nature of performance enhancement (improvement), is the theoretical condition of welfare enhancement, BT2. And finally, the downside of implementing what appears to be an otherwise good idea is contained within BT1: an anomalar must first determine the causal nature of its own state of affairs before expecting improvement elsewhere.

### Conclusions

A critical analysis of this Theory is, according to Popper (1987, 1996) the answer to the question: what are the implications of this Theory: are they acceptable to us?

The implications of this Theory confirm well documented observations that self-knowledge is a prerequisite for effective benchmarking and further defines the basis of this knowledge: anomalous states of affairs must first be understood in terms of their properties, rules, statistical variations (chance), welfare and teleology before exemplars are engaged in the benchmarking process.

There is only one form of benchmarking: distinctions between internal and external benchmarking are concluded to be administrative rather than theoretical thus confirming earlier citation of the essentiality of internal benchmarking.

A key implication of this Theory is the reduction to general statements of logical necessity and sufficiency the multiplicity of historical benchmarking forms, frameworks and generational models. In practice, logical sufficiency is most likely attained in simple, rule-based, purposeful situations such as those encountered by many SMEs (particularly where cash-flows are tenuous and production is relatively simple) or within or between organizations where identical processes are encompassed by common cultures and constancy of purpose. Logical necessity formally tests all other benchmarking situations to establish whether the rules, properties, purpose and chance relata defining relationships within and between anomalar and exemplar states of affairs reflect feasibility and, if transferred to the anomalar, would improve its sustainability.

Historical benchmarking frameworks are concluded to be approximations of this Theory's necessary and sufficient conditions. The deployment of analytical techniques such as DEA, AHP, PCA, CFA, etc. reflect appropriate nomological approaches that attempt to discern the causal engine (supervenience, entailment and chance) identified by this Theory.

In benchmarking terms, an appropriate exemplar for benchmarking theory is causation. This Theory presents effective benchmarking as the transfer of welfare between two causal engines whose *locus* is immaterial. What is material is the ability to resolve their respective causal relata via formal rules for supervenience, entailment and welfare determination.

Other criticisms of benchmarking, that it is naturally an a posteriori organizational practice and that slavish adoption of exemplary practices engenders uncompetitive homogeneity, are not specifically addressed by this Theory. However, this Theory provides the ability to resolve benchmarking opportunities rationally and without the uncertainties implicit in historical approaches. Reliable and speedy benchmarking should abet rather than abate competition.

Other phenomena may also be explained by this Theory.

Business excellence systems: the Malcolm Baldrige business excellence system and ISO9000 are held to be examples of dispositional benchmarking. Their non-proscriptive approaches make them teleological exemplars which supervene upon any organization entailing their dispositional relata (e.g. Leadership, Knowledge, Processes, Planning, Results, etc). But to be effective, they must also improve anomalar welfare.

Strategic Intent: the necessity of “strategic intent” within some current benchmarking frameworks has been identified as a teleological relatum implicit in the Theory’s necessary conditions.

Stakeholder consultation: inclusion of stakeholder voices is a feature of some benchmarking frameworks and is identified as adherence to the primal axiom of this Theory.

There are also two ongoing areas for further application of this Theory: a formal practitioner process and scenario planning. Construction of a multi-stage framework by applying the theoretical postulates BT0 through BT5 to anomalar and exemplar states of affairs in the style of historical benchmarking frameworks may assist practitioners, particularly SMEs, who prefer processual approaches. Peircean Causation also provides insight into another teleological practice: scenario planning. Peirce’s concept of a developmental teleology driven by efficient causes appears to reflect the nature of scenario planning where future possibilities are presented as supervening worlds on organizational behaviours forms the thread of this research opportunity.

In conclusion the acceptability of this Theory rests on its contribution to a new epistemology that challenges and, potentially, displaces the extant praxis-driven forms and frameworks of organizational benchmarking.

#### Note

1. PDCA: an acronym for the plan, do, check, act approach to quality improvement.

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**612**

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