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## A Cultural Science (*Kulturrewissenschaft*) Manifesto

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**Abstract.** We propose that a general analytic framework for cultural science can be constructed as a generalization of the generic micro meso macro framework proposed by Dopfer and Potts (2008). This paper outlines this argument along with some implications for the creative industries research agenda.

### 1 Introduction

The domains of systematic inquiry into cultural phenomena that are addressed by cultural studies, media studies, and the arts and humanities broadly considered are widely appreciated as legitimate domains of intellectual inquiry that are of considerable philosophic interest and practical value. They constitute a core component of the knowledge base of society and are, collectively, one of the pillars of higher education. Yet they are equally understood as not science.

The significance of this point is simply that over the past several hundred years, domains of study that *are science* have systematically come to displace and dominate those that are *not science*. The study of cultural phenomena is no exception to this general principle and evolutionary growth of knowledge trajectory. In the past few decades, physical and biological sciences have made increasing inroads into the study of cultural phenomena. This is good, because it is part of the growth of knowledge. But it is also troubling with respect to the potential loss of accumulated bodies of knowledge and fine-grained understanding that are being displaced due to methodological incommensurability and intransitivity. That is what is occurring now.

The question is: what to do about this? The extreme options are: (1) to fight a rear-guard defensive war (as in the post-modernist approach); or (2) to surrender completely. Both of these approaches are common. Yet, a ‘third way’ is to seek a new kind of cultural science – a *Novum Cultura Scientias* or *Kulturrewissenschaft* – that seeks to integrate the methods and models of science, which are its core aspect, with the methods and models of cultural studies, including its detailed empirical investigations and conceptions of individual motivations in the social context. This third way would thus seek to hybridize aspects of both domains into a new *cultural science*. This manifesto seeks to outline the basic principles of such a synthetic approach.

Our central argument is that this must, first of all, be an ontologically, analytically and theoretically an open systems evolutionary approach. And second, that this must be an approach that builds upon the empirical basis of extant cultural knowledge and analytical categories. The construction of a new cultural science thus requires an analytic re-construction from the ground up, as it were, in which analytic frameworks, theories models and empirical formulations are appropriately reconstituted.

First, it is important to be clear about the relation between the building blocks and methodologies of systematic inquiry. As such, we think it useful to begin with a review of the hierarchy of scientific abstractions (see Figure 1 below). In this view, ontological abstractions about the nature of reality are the foundation of all rational or systematic inquiry, scientific or otherwise. Ontological considerations about what exists then determine analytic statements about what matters, and so condition the space of theories and models. All models have theoretical underpinnings, all theories have analytic underpinnings, and all analysis has ontological underpinnings. Ontology determines analysis, analysis determines theory, and theory determines models. Any and all discussion of a cultural science must begin with this hierarchy.

Figure 1. **Hierarchy of Scientific Abstractions**

|          |
|----------|
| Models   |
| Theory   |
| Analysis |
| Ontology |

Several issues are involved. First, the importance of recognising that modelling considerations depend upon theory; that theory depends upon analysis; and that analysis depends upon ontology. Second, that this hierarchy of emergent orders of modes of knowledge has direct implications for current practise. One implication is that the gathering of data about the cultural domain is, in itself, scientifically meaningless unless connected to models, theory, analysis and ontology. Observational empiricism in itself is not science unless connected to theoretic and analytic explanations of such phenomena. A corollary implication is that theories without testable implications are not theories at all, but ideological preconceptions, and thus not science. What is science is not predefined from physical science extensions (i.e. the *naturalistic fallacy* in philosophy), but rather from ontological, analytical and theoretical foundations subject to rigorous epistemic criteria. Cultural science must begin from this foundation.

## 2 Ontology and Analytic Methodology

Modern science is the product of natural philosophy through the hybrid of rationalist (or logico-deductive) and inductive (empiricist) ways of knowing. Science is thus not just a body of (useful) knowledge, but, more importantly, is a method for discovery of new truths. Since Classical times, science has been organized according to empirical

domains of inquiry. At the base of this is inquiry into the natural world, constituting the physical sciences. At the next level is inquiry into the world of life, which constitutes the biological sciences. Yet during the 20<sup>th</sup> century, this distinction has become increasingly blurred (e.g. biochemistry, artificial life), resulting in new classification schema associated with, for example, the sciences of the artificial, information and computation sciences, and the sciences of complexity. Yet in all such schemes, the social sciences and humanities are considered apart, such that they are viewed principally as the study of human life and interaction, and which is further presumed not to be principally governed by the laws governing natural science. Yet this does exclude application of the methods and models of the natural and biological sciences to human and social phenomena. Indeed, this approach – from equilibrium theory in economics to complexity theory in sociology – has been the dominant analytic foundation in social science. What, then, is cultural science?

The central point is that cultural science is not physical or biological science. Physical and biological sciences concern the study of the rules of matter-energy and their emergent forms of organization. Cultural science addresses the study of ideas (or rules) originated by the human mind and adopted and retained (often stabilized as institutions) for human use. Humans are evolved biological organisms and live in a physical world, but this aspect is not the domain of cultural science. Rather, it is what Karl Popper called ‘world 3’: the domain of human ideas and artefacts that exist because of human creativity, rationality and endeavour. This is the domain of cultural science.

Figure 2. **Ontological Orders**

|                   |
|-------------------|
| Cultural Domain   |
| Biological Domain |
| Physical Domain   |

The domain of cultural science may be decomposed into classes of ideas, rules or knowledge. One such distinction is between economic cultural rules (i.e. knowledge relating to economic operations) and non-economic cultural rules. In this sense, economics is a branch of cultural science, not a natural science.

The biological foundation of the ‘cultural agent’ is as a rule-maker and rule-user (Dopfer 2004). This implies that the carrier of cultural evolution is the human mind and its capabilities to originate, adopt and retain ideas as knowledge for operational use. That ideas and knowledge may be embedded in physical form (as artefacts) does not render the cultural domain ultimately physicalist, for it is the human mind that is the carrier of cultural evolution. Further, cultural evolution is not biological evolution, but proceeds on a time scale and via mechanisms emergent to the cultural domain (see Ziman 2001).

This emergent ordering of scientific domains can also be formulated in terms of an emergent hierarchy of what Foster (2005) calls ‘orders of complexity’ (See appendix A attached). First order complexity is the ‘imposed energy’ case, which is descriptive of non-adaptive structures or patterns such as Bernard cells, turbulence that facilitate

the dissipation of energy. Second order complexity is the case of ‘imposed knowledge and acquired energy’ in which selection imposed structures of information that permit control over the acquisition of energy. This is the type of complexity in biological life. Third order complexity (acquired knowledge) occurs when the organism interacts with the environment through constructed mental models. This type of complexity emerges in the social and cultural domain. Yet cultural systems are more complex still, as these mental models then interact. Fourth order complexity arises with interacting knowledge, which is the level of complexity of cultural science and economic science. It is for this reason that models of complexity appropriate to physical and biological systems (first and second order complexity, associated with non-linear dynamics and replicator dynamics, for example) may yet be too simple for the study of cultural or economic complexity. This suggests limits to the extent that models and theories can be analogously transposed between levels (e.g. techniques from statistical physics) on the basis of similarities in patterns of interactions or similarities in statistical distributions of outcomes. In the absence of a general theory to describe when such analogical transfers are viable and when they are not, caution is warranted.

A fundamental issue remains the extent to which knowledge of a lower level can illuminate a higher level. There has been a considerable effort to explain cultural phenomena (e.g. behaviour in markets or other aspects of human interaction, such as trust, aggression, etc) in terms of evolved biological instincts or neuro-anatomy (as in evolutionary psychology and neuroeconomics). This reductionist approach is certainly legitimate, but is ultimately limited to analysis of tendencies and broad preferences and parametric considerations (for example, cognitive processing). Yet it does not address the emergent elements that constitute cultural rules.

In sum, cultural science is not physical or biological science and cannot be reduced to them. Correspondingly, the models and theories that have been successful in these domains may not be appropriate to cultural science. Note this does not exclude the possibility that they might be applicable (for example, equilibrium modelling or replicator equations) but simply emphasises that they need not necessarily be applicable at all. Cultural science will thus require its own ontological foundations. We suggest that this can be conceptualized in terms of an overarching analytic language appropriate to all aspects of cultural analysis.

### 3 Analytic Language

Disciplines and studies cannot communicate with each other in their own languages because they are based about theory and models. To communicate, they require analytic language. We shall propose here a framework of analytic language that may be applied across cultural science. This approach is based about recognising abstract categories and concepts across each. Specifically, this points away from the notion of cultural science as an extension of any one analytic domain: e.g. an economic, historical, statistical physics or a post-modern approach. Instead, we seek to identify general analytic concepts common to all concerns about which theories and models are constructed and with respect to which empirical analysis proceeds.

Clear analytic conceptions help shape an empirical research program. Specifically, they help it avoid the unscientific extremes of data collection without theory (e.g. building endless databases for their own sake, as an empirical fetishism), or of rejection of empirical analysis in favour of a semantic approach to theory construction in which anecdote substitutes for empirical analysis (e.g. postmodernism).

The analytic foundation of cultural science is based about the notion that it is ultimately a study of human knowledge, its creation, stabilization, use, and ultimately its evolution. Unlike the evolutionary epistemology approach (Popper 1972), in which knowledge is treated as subject to evolutionary processes (also memetics), our approach seeks to first generalize the nature of knowledge in terms of what we call the *bimodal ontology* and the *generic-operant* distinction.

The cultural ‘world’ is made of ideas, or, in analytic language, of rules. Each idea or rule has one or many actualizations, which are the matter-energy forms of the rule in space and time. This is the bimodal ontology, in the sense that the existences of the cultural world are bimodal in ideas and actualizations. This provides us with the rudiments of our first two building blocks: rules and populations. The cultural world is made of ideas (ontological term) – or rules (analytic term) or knowledge (theoretical term) – and each idea (rule or knowledge) has a population of actualizations. Collectively, this defines the *generic* level of analysis. The *operational* level of analysis then concerns the operations of rules with respect to an environment of resources (as in economics), people (as in social science) or meanings (as in the humanities).

| Domain      | Ontological term | Analytical term |
|-------------|------------------|-----------------|
| operational |                  | operation       |
| generic     | actualization    | population      |
|             | idea             | rule            |

We propose, then, four basic elements or analytic building-blocks for cultural science: Rules; populations; structure; and process.

*Rules* are the element of human knowledge that constitutes the cultural domain. All cultural analysis is ultimately analysis of rules in the form of human knowledge. But we also require the concept of *population* to reflect the simple fact that humans exist socially in the sense that the same rules (or ideas or knowledge) can be carried by many agents. This is the population of the rule. A further implication is that much of the knowledge carried by humans is knowledge about social coordination of shared ideas.

|             |   |
|-------------|---|
| rules       | because of human knowledge                |
| populations | because of social existence and knowledge |
| structure   | because of the nature of connected ideas  |
| process     | because of novelty and change             |

Structure and process are equally abstract and equally important building blocks. *Structure* matters because ideas (or rules or knowledge) are connected and derive their nature, significance, value and meaning from the particular structure of associations with other ideas. This is what renders the cultural world a world of (complex) systems. *Process* is a further universal building block because all ideas are created by human minds and thus exist in time as a process. In the individual agent, this is the process of the origination adoption and retention of an idea for use (a micro trajectory). At the level of the system, a process occurs as many agents adopt an idea to the point where the population stabilizes (as an institution, and thus part of the knowledge base).

We thus propose that these four concepts furnish an analytic language that is ontologically warranted and analytically sufficient to provide a foundation for the construction of a general framework for cultural science.

## 4 Generic Theory of Cultural Evolution

Dopfer and Potts (2008) have previously proposed this analytic foundation as the basis of a general theory of economic evolution. Yet the aspect that rendered this an economic theory was not its generic foundation (in terms of rules, populations, structure and process), but rather the circumscription of the rules being ‘economic rules’ which was defined in terms of their operational aspect as rules with respect to operations on resources. As such, a general model of cultural science can be obtained by simply relaxing this constraint, and allowing the framework to include all rules. Thus the general theory of economic evolution is a special case of a general theory of cultural evolution.

The implication, however, is that the same underlying generic analytic and theoretical structure of *micro meso macro* still pertains (see also Dopfer, Foster and Potts 2004). Cultural science should be theoretically organized according to a *static* framework of micro (the individual human and the rules they carry), meso (the rule and its population, as a meso unit), and macro (as the systems of meso units). The static framework deals with the coordination of rules at the micro level, in terms of the coordination of the many rules carried by each individual agent, and at the macro level in terms of the coordination of rule populations. All aspects of cultural statics can be conceptualized within this micro and macro structural framework.

|       |   |
|-------|---|
| macro | Systems of meso   |
| meso  | The rule and its population of carriers                     |
| micro | The human agent and the (many) rules carried for operations |

Cultural dynamics in turn is based about a meso process. This begins with the creative or originating act resulting in novelty in the form of a new idea. This is the first phase of a meso process, or *trajectory*. The second phase is the subsequent differential adoption of the rule by other agents. This is the phase of innovation, learning and experimentation. The third phase is the retention and stabilization of the knowledge. This occurs at the micro level through habituation and routinization, and at the macro

level through institutionalization. The result of this growth of knowledge process (trajectory) is a new cultural order. This results in structural change at the micro and macro level. Cultural evolution is thus an (historical) massively parallel sequence of such meso trajectories. This process is scale free in space and time.

|        |                             |
|--------|-----------------------------|
| meso 1 | Origination and novelty     |
| meso 2 | Adoption and innovation     |
| meso 3 | Retention and stabilization |

We thus argue that cultural science is an open systems evolutionary science of the growth of human knowledge. It addresses micro and macro complexity (structure) and dynamic processes (history). It is open in the sense that new ideas drive the system and is evolutionary in the sense that the growth of knowledge is an evolutionary process. It addresses *cultural statics* in respect of how ideas or knowledge are coordinated and *cultural dynamics* in the sense of the process of how they change. We propose that the generic micro meso macro framework can furnish an analytic framework for cultural science.

### **Example: *Verstehen* and the evolution of meaning**

An obvious criticism of this framework is that because it was originally constructed with respect to economic analysis and evolutionary analysis, that it remains an essentially evolutionary economic framework of the growth of knowledge rather than a more general cultural science approach. Specifically, this would render it incapable of analysis of uniquely cultural phenomena such as the production and consumption of ‘meaning’, in the humanities and cultural studies sense of the social or cultural construction of meaning. Yet consider it thus.

The human mind can understand in both a quantitative and a qualitative sense. It is not a purely rationalistic operation (i.e. a machine), nor is it purely intuitive or instinctual (i.e. an animal consciousness). The extremes of the logical/rational and emotional/intuitive spectrum do not accurately describe human knowledge or understanding. A cultural science approach to the nature of human understanding and meaning does not then seek to locate this in the individual mind in itself (as in psychology or economics), nor in abstract ‘macro’ notions of society or culture in themselves, but through a micro meso macro conception based about an evolutionary trajectory.

In the beginning is the idea. This is an original creative product of the human mind and enters the cultural space of other minds when an idea has been operationalized to the extent that it can be *communicated* (encoded, signalled, and decoded) to other minds. There are potentially infinite mechanisms by which this may occur. This is the micro aspect.

The meso phase is the process by which that communication process develops such that the idea is adopted and carried by a population of agents. The meaning and understanding of the idea is determined by this process, depending upon which agents adopt in which order and by the uses and experiences to which it is put and the

pathways of value created in this process. An idea or rule has no intrinsic meaning in the cultural domain except that to which it is put. It does of course have absolute physical and potentially biological meanings which are independent of this process, but these only condition cultural meaning through indirect feedback effects. These effects may be closely or entirely unrelated to the timescale of the evolution of cultural meaning. Eventually, as the adoption process completes, the meaning of a rule comes to stabilize (as an institution or unit of knowledge) and to attain a locked-in form that may pass into language or artefacts.

At the macro level, this meaning is then coordinated with respect to other meanings (other meso) as a system of understandings. Meaning is thus ‘socially constructed’ in the sense that it is locked in to the macro system. But this was the result of a meso trajectory (process) through which that meaning evolved. We may then speak of ‘culture’ as a macro system of evolved *verstehen*, but equally of culture as created by individual creative actions, and of this evolved meaning as a path-dependent process conditional upon historical exigencies, individual interpretations and social refractions.

## 5 Policy

Cultural science should underpin cultural policy. And just as cultural science is understood generally then to include economics, politics, geography, anthropology, humanities etc, so too should cultural policy be understood similarly broadly. By cultural policy we do not mean the domain of public arts, but rather the broad question of the role of public action via the mechanism of government in the cultural world.

The extension from the general generic theory of economic evolution to the theory of cultural evolution also applies: namely the cultural (economic) system is self-organizing in its operational dimension and requires no intervention. However, this is not a *laissez faire* model, for the domain of rules is broader than just operational rules, but also extends to the ideas or rules that constitute the cultural order – what Dopfer and Potts (2008) call 0<sup>th</sup> order *constitutional rules* – and also to rules for evolving rules in the sense of knowledge about knowledge – or 2<sup>nd</sup> order *mechanism rules*. These rules are appropriately subject to intervention and design. The domain of cultural policy as based on cultural science should only concerned with intervention into, or public origination of, constitutional and mechanism rules.

## 6 Research Program

What, then, does this imply for a research program for cultural science in general, and specifically from the perspective of the ARC centre of excellence in creative industries and innovation? The central point is that the study of culture should be regarded generally, not specifically. The many subfields within should be understood as aspects of a broader and potentially unified analysis – i.e. a cultural science. The basis for unification is that all are aspects of the growth of knowledge and the evolution of rules as the process-structure building blocks of the cultural order. The



sense in which this is special, in for example games media, economics or anthropology, should be of second order consideration to the sense in which all have in common the study of the coordination of structures of knowledge and the process of change in knowledge. The generic micro meso macro framework thus provides a unified analytic language and framework for such integration.

A research program of analysis of generic coordination and change would thus follow in terms of:

- Micro structure (coordination of rules in agents)
- Macro structure (coordination of systems of meso)
- Micro trajectories (the process of knowledge in agents)
- Meso trajectories (the process of knowledge in populations)
- Macro trajectories (the process of cultural evolution)

The CCI might then focus on aspects of each of these with respect to considerations of creativity, innovation, technological change, social coordination and the institutions connecting cultural production and consumption with broader political, economic, social considerations.

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