Affinities between multi-agent systems and service-dominant logic: Interactionist implications for business marketing practice

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ABSTRACT

The contrasting marketing principles of service-dominant (S-D) logic and goods-dominant (G-D) logic are examined in this article from the perspective of current research themes in the information science community. The conclusion is reached that much of the *distributed multi-agent* literature is complementary to the issues being explored concerning S-D logic, and that some multi-agent research may therefore be pertinent to the business marketing community. This article discusses the modelling approach of *interactionism* as an underlying principle of both S-D logic and multi-agent systems technology. The two domain technologies are compared, and implications for business marketing practice proposed.

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1. Introduction

The current discussions in the field of marketing studies concerning service-dominant (S-D) logic, as outlined by the evolutionary work of Vargo, and Lusch (2004a,b, 2006, 2008a,b) have attracted the attention of the information science community. This interest stems from the belief that the underlying issues in the S-D logic dialogue have close affinities with current debates taking place within Information Science, and indeed, over a number of years across a wide spectrum of Western culture. Recent changes in viewing business interactions from a goods-focused to service-focused (or process-driven) perspective have been reflected in information and communication technology (ICT) research and practice through innovations such as Software-as-a-Service (SaaS), Service-Oriented Architectures (SOA), social media, service science, and multi-agent systems. We believe that the problematic nature of 'information' that underlies some of the discussions in Information Science are also crucial to the understanding of markets and economies, and that these issues are also being uncovered in the current S-D logic dialogue. Our aim in this paper is two-fold: (a) to discuss complementary directions and practice across the two disciplines, and (b) to propose implications for business marketing derived from a particular research focus within Information Science that we believe has a strong synergy with the S-D logic community.

2. Service-dominant logic and goods-dominant logic

Recently, Vargo, and Lusch (2008a,b) have outlined and refined their view of S-D logic in the field of marketing and how it contrasts with G-D logic. The term 'logic' is used broadly and evidently refers essentially to a foundational terminology and discourse paradigm by means of which ideas and models are presented, rather than to a rigorous formulation in logic. Vargo and Lusch use the term G-D logic to signify a traditional way of viewing economic transactions, founded on the idea from classical micro-economic theory that economic activity fundamentally concerns the production and distribution of 'goods,' which are tangible units of output. Goods under this logic are seen to have an inherent or embedded value, and the goal of an efficient economic organisation or entity is to maximise profit (value) from their production and distribution. From the traditional G-D logic perspective, services are understood to be a special case, an intangible type of good. Services then are merely helpful in the provision of goods, but they are somewhat slippery and difficult to *commodify* when compared to 'real' goods. From the G-D logic perspective, services help make goods more accessible and usable, but they are not the most important entities.

The contrasting service-dominant (S-D) logic places *service* at the centre of the stage: it is service, rather than goods, that is understood to be the basis of economic exchange. Moreover, service under S-D logic encapsulates the notion of an ongoing, mutually beneficial interaction between participants where value is co-created over time (Vargo, & Akaka, 2009). This is independent of whether or not a

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specific interaction is undertaken in business-to-business (B2B), business-to-consumer (B2C), or related contexts. In Information Science terminology, we would say that a service according to S-D logic is a *first-class* entity, and thus *not* defined as a derivative of goods.

In the world-view of S-D logic, economic activity is entirely about service provision, and goods are merely *service appliances* in the exchange of service for service, but they are not a primary requirement for service (Vargo, & Lusch, 2008a,b).

Two special terms critical to the S-D logic discourse on how value is constructed through service are *operand* and *operant resources*. Operand resources are essentially passive objects on which actions are performed, while operant resources are employed to act on the operand resources (Constantin, & Lusch, 1994) to co-create value. As the following discussion will attempt to demonstrate, operant resources closely resemble *intelligent agents* in multi-agents systems modelling.

We remark here that although the S-D/G-D logic discussion has emerged in the academic literature of marketing, the issues raised extend beyond the boundaries of that discipline and represent not only a re-examination of the fundamental basis of economic activity, but also identify a basic dichotomy that extends across modelling generally.

3. Modelling the world

More than two millennia ago Aristotle rationalised earlier notions of physical causation into four fundamental causes: *material, formal, efficient,* and *final.* By the 17th century, though, successes in mathematical representation led to a streamlining of Aristotle's four causes into two ways of reckoning:

- Identifying fundamental forces. This entailed an assumption that there were (sometimes implicit) causal agents exerting these forces, and thus the focus emphasised the importance of the efficient cause relative to the others.
- Improved mathematical modelling led to an increasing reliance on the representation and manipulations of formal expressions, i.e. on Aristotle's formal cause.

However, because of the difficulty of characterising the signal metaphor of the efficient cause, i.e. the human agent, there was a growing tendency to eliminate any aspects of anthropomorphism from science. And this tendency was backed up by the predictive success of mathematically-based formalisms, which led to a growing preference for formal-cause-based theories over causal-agent-based theories. In fact, Bertrand Russell even argued that the very notion of *causality* was essentially anthropomorphic and should be dropped from scientific discourse (Russell, 1913). So the notion of the causal agent, the efficient cause, receded from formal scientific descriptions, and *objective* science came to be dominated by just the formal cause.

By the 20th century the scientific community had gradually oriented themselves around a set of beliefs, which we will call 'objectivism,' although there are many other terms in use, such as *modernism*. Fundamental to objectivism is the conviction that there is an objective, external world 'out there,' which is independent of any observer, and its basic tenets are detailed in the left-hand column of Table 1.

Despite the success and widespread acceptance of objectivism, though, there has been a growing critical awareness that this approach is subject to limitations. This has given rise to an alternative modeling framework that has taken shape over the last century, which we call 'interactionism,' although it could also be called *phenomenological* or e*xperientialist*. With interactionism, the perceiver's basic *interaction* with the world is primary (*i.e.* fundamental), and its tenets are detailed in the right-hand column of Table 1.

This philosophical divide between the objectivist and interactionist viewpoints has appeared in many fields besides philosophy.

Table 1
Basic tenets of objectivism and interactionism.

Objectivism	Interactionism
• Sensory information is obtained from objectively independent entities, 'the given.'	• Everyday world of embodied human experience is the starting point, 'the given.'
• The most basic phenomena/entities are the elementary particles of physics.	• Scientific results are to be understood within the context of the interaction environment, of which the observer is a part.
• Scientific results are independent of the investigator and the human cultural context.	• Understanding is achieved by iterating through the hermeneutic circle (Ricoeur, 1988).
• All science understanding is fundamentally a set of linguistic statements.	• Model categories are a result of the interactions of an embodied observer.
• Science is cumulative and understood to be part of a single, integrated logical scheme.	• Scientific models are always context-dependent.

For example in the field of linguistics, George Lakoff (1987) has criticised objectivism and come to the conclusion that some commonly used objectivist concepts need to be completely *abandoned* by linguists for progress to be made in the field. In marketing, Varey (2008) has recently critiqued the 'conduit' model of communication and has supported what is essentially an interactionist approach. It is our view that as an overall paradigm in the domain of marketing, the goods-dominant (G-D) logic is fundamentally objectivist, while the service-dominant (S-D) logic is fundamentally interactionist. Crucial testimony supporting this assertion is this statement by Vargo, and Lusch (2008a) that value creation is "phenomenological and experiential in nature." This lies at the heart of interactionism, and we take this to be an overriding principle of S-D logic thought.

4. Objectivism (G-D logic) in Information Science

As with other academic disciplines, the traditionally dominant view in computer information science has been that of objectivism. From this standpoint it is deemed always possible to construct objective information about the world that is independent of any observer. In this connection there have been efforts to construct objective *ontologies,* which are explicit, formal specifications of terms and concepts that describe a specific domain (Gruber, 1993; Calero, Ruiz, & Piattini, 2006). By extension, objectivists implicitly believe that it would be theoretically possible to construct a formal ontology of the entire world. In any case, it has been assumed possible to build up large sets of objective knowledge, and then construct reasoning engines to trawl through this knowledge and exhibit intelligent decision making. The traditional symbolic artificial intelligence (AI) community has for many years been working on techniques based on this proposition.

As part of this enterprise, and probably the most clear-cut exhibition of the objectivist predilection, has been in an area of information science known as C*omputationalism*. Computationalism is a form of objectivism that asserts that human cognition, itself, is a form of computation, i.e. that the human brain is simply a computer. Thus Computationalism asserts that cognition is mechanical and that information is digitally encoded data that has objective meaning and can be encoded by mechanical (that is, logical) formulations.

5. Interactionism (S-D logic) in Information Science

The interactionist perspective in information science adopts a more cautious view about what is the nature of the informational world. The key point from the interactionist perspective is that each person constructs models of his (or her) environment based on the interactions in which he (or she) participates. In order to interact effectively with others, it is, of course, desirable that individual