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Service Spotlights

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Fair Allocation in Financial Disputes Between Public–Private Partnership Stakeholders Using Game Theory (p. 1)

Changes in financial estimates of public-private partnerships (PPP) are inevitable because of the long-term nature of such contracts and because of a variety of internal and external factors. During contract renegotiation, it seems clear that excess benefit/cost should be divided among primary stakeholders, including government, private sector, and end users in the form of annual subsidies, contract extension, and toll adjustment, respectively. Although allocation of excess benefit/cost is an important factor in PPP projects, few standard approaches consider this issue and rarely involve all three stakeholders, often evaluating only a limited number of possible solutions. In applying a PPP approach, governments usually provide various financial guarantees to encourage private sector investment, with minimum revenue or least present value of revenue often the main indicator of financial guarantee. To achieve fair allocation of excess benefit/cost, the authors investigate sharing mechanisms based on cooperative game concepts, including core, nucleolus, and Shapley value, and find that these mechanisms can improve renegotiation regulations in PPP contracts and help decision makers manage renegotiations with better structure and oversight.

Service-Dominant Logic and Performance-Based Contracting: A Systems Thinking Perspective (p. 12)

This paper extends recent theoretical advances by merging Service Dominant Logic (S-D Logic) and Performance-Based Contracting (PBC). S-D Logic is a conceptual frame of reference that defines supply chain knowledge and skill as fundamental building blocks of strategic benefit. Co-creation of value between actors and beneficiaries is central to S-D Logic and is measured through performance outcomes. PBC is a transformational departure from traditional supply chain strategies that focuses on delivering performance rather than goods and services. PBC has found increasing use in large-scale complex systems where the post-production costs exceed production costs, such as defense, transportation, and healthcare. The authors use Systems Theory and the Boardman Soft Systems Methodology to develop a Systemigram that corresponds to the 11 foundational premises of S-D Logic in the context of PBC. They also verify the use of Systemigrams as an instrument for systems thinking, moving S-D Logic from an abstract framework to a more actionable framework. This paper provides managers and researchers with systematic insight into how investment into knowledge, skills, and the co-creation of value can drive improved life-cycle affordability in the context of PBC.

Lean Service Innovation (p. 25)

How can we identify core customer value with business potential at the early stages of an innovation process? How can we achieve an in-depth understanding of customer value for new or potential customers? How can we discover and use latent customer needs in innovation? These are just some examples of frequent challenges encountered by companies looking to innovate. In this conceptual article, the authors propose a model of lean service innovation that offers a method for addressing such question through implementing service-dominant logic in practice. The model shows how a new service can be iteratively developed through several improvement rounds into a final service, with each round increasing the company's understanding of customer value. The article focuses on managing the entire service innovation process rather than on various methods of involving customers during the process. Lean service innovation enables deep customer understanding, and involves learning and refining of ideas, co-creation, experimenting, and rapid prototyping with customers and other stakeholders. In the end, the authors offer a managerial framework for application of service-dominant logic in the management of innovation processes.

Stochastic Optimization Models for Workforce Planning, Operations and Risk Management (p. 40)

In this paper, the authors propose and analyze a unified framework for decision making under uncertainty that supports financial planning, operations management, and risk management for workforce applications. In this

framework, enterprise workforce management is conducted at the granularity of cohorts of individuals with similar attributes of interest. A time inhomogeneous Markov chain is developed to model the evolution of these cohorts over time. Stochastic control problems based on versions of the controlled Markov chain are formulated to maximize profit under a set of workforce decisions. Extensive data analysis and innovative computational approaches enable solutions to these stochastic control problems for large-scale systems, with real-world business case studies demonstrating the use of this unified decision support capability for large-scale enterprises.

**Assessing the Value of an Information System for Developing Predictive Analytics:
The Case of Forecasting School-Level Demand in Taiwan** (p. 58)

Analytics is important for education planning. Deploying forecasting analytics requires management information systems (MIS) that collect the needed data and deliver the forecasts to stakeholders. A critical question is whether the data collected by a system is adequate for producing the analytics needed for effective decision making. In this article, the authors describe the case of a new education MIS in Taiwan, where the population of preschool children in different school districts is constantly changing. These changes challenge school resource planning, especially in terms of teacher hiring. The Bureaus of Education in charge of resource allocation are in need of accurate school-level one- to five-year-ahead forecasts of the number of incoming first grade classrooms. The Ministry of Education therefore launched the K-9 student data management system (k9sdms) that allows schools to directly update data on existing and prospective students. The authors evaluate whether using this system supports the goal of generating one- to five-year-ahead forecasts, thereby assessing the value of the MIS for its intended use. Using data through 2014, the authors develop a forecasting model for the number of first grade classrooms at each school in Taiwan in 2015–2019. The quality of forecasts shows that k9sdms can produce valuable results, thereby achieving its purpose.

Service Design for Value Networks: Enabling Value Cocreation Interactions in Healthcare (p. 76)

In complex service environments like healthcare, wellbeing can only be achieved through the joint efforts of professional healthcare and patient networks. This paper presents Service Design for Value Networks (SD4VN), a method for designing services as enablers of value cocreating interactions among network actors. SD4VN develops a process and set of models to understand the interrelated activities, interactions, and goals of network actors and to design services to support the different actors in reaching their goals through balanced centrality. This paper also presents an application of SD4VN to design the Portuguese National Electronic Health Record (EHR) service, involving interviews and participatory design sessions with over 170 participants at different service design stages. This application shows the importance of understanding the experience of different healthcare network actors (citizens, doctors, nurses, and pharmacists), but also understanding how the actors interact and the potential goal conflicts that may arise. This case application also shows how the SD4VN process and models can support collaborative design of the EHR service with a focus on supporting healthcare actor interactions and managing goal conflicts to create a balanced solution. Overall, the health case application also shows how SD4VN can support wider adoption of the service and improve the health service system.

Commentary—Cultivating T-Shaped Professionals in The Era of Digital Transformation (p. 98)

With the rapid growth of urban populations and use of smart phones, the new millennium ushers in an age of unprecedented levels of collaborative and competitive local and global relations, constantly reshaped by advances in science, public policy, technology platforms, and open practices. The dynamic nature of these open innovation-oriented relationships is not sufficiently incorporated into and addressed by conventional education systems. Today's digital talents are still primarily siloed in functions/disciplines that evolved to meet the needs of an earlier era. The current rewards/incentives are also focused along these lines. Consequently, traditional academics are encouraged to delve deeper within their areas of specialization rather than reaching out to colleagues in other disciplines to develop transdisciplinary research agendas. The new digital millennium will require new types of professionals and work practices as well as new types of citizens and social practices. To help people be successful in this dynamic environment of rapidly changing smart service systems, should the education systems of the future encourage hyper-specialization, hyper-flexibility, or something else? In this commentary, the case is made for an education system that encourages the development of T-shaped digital professionals and citizens – future-ready innovators, who uniquely combine specialization (critical thinking and problem-solving depth) and flexibility (empathy, breadth of knowledge, skills, experience, and complex-communication abilities), and also use smart machines as assistants. This combination of capabilities in people allows for rapid formation of high performance teams working in open innovation environments to build smarter service systems.