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Review

Workforce agility in operations management

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HIGHLIGHTS

- The workforce agility literature is reviewed from the operations management (OM) perspective.
- Disparate workforce agility theories and approaches are identified and classified.
- A framework for characterizing workforce agility is formed.
- Connections between workforce agility and relevant practices in OM are clarified.
- Research opportunities for advancing the use of workforce agility are identified.

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ABSTRACT

Workforce agility, the management of labor and personnel capacity and capability for organizations facing unpredictable change is a complex and diffuse area of research that has seen steady contributions in recent decades. Its complexity has to an extent naturally led researchers to focus relatively narrowly on specific aspects of the larger strategic problem. In this paper, we review and classify the literature associated with workforce agility in order to form a foundation for advancing the research and implementation of workforce agility in operations management (OM). We describe a framework for characterizing workforce agility from an OM perspective. The framework shows an agile workforce simultaneously possesses multiple interdependent capabilities benefiting organizations operating in highly uncertain environments. This paper further identifies approaches that the literature has proposed for attaining workforce agility. We analyze mechanisms for enabling workforce agility based on attribute measures used in agility research. Some OM practices are related to workforce agility and have been intensively researched in OM, including workforce flexibility and dynamic workforce planning. While they are potential contributors to workforce agility, gaps are observed between these OM practices and the workforce agility literature. Accordingly, we highlight research opportunities in OM for furthering knowledge regarding workforce agility.

Contents

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1. Background

Rapid, abrupt, and non-stationary change is a common reality facing many industrial and service organizations. These dynamic environments strain traditional approaches for risk management, bringing with it greater challenges for fulfilling organizational goals. Under the pressure of growing market competition, enterprises are expressing growing interest in *agility* strategies that promote sustainable profitability in rapidly changing and shifting environments.

A lack of agility has been reported as a major reason that many traditional manufacturing solutions could not outpace the increasing rate of change since the 1990's. In 1991 researchers at the Iacocca Institute, Lehigh University, initiated a discussion of agility for manufacturing and published a two-volume report entitled *21st Century Manufacturing Enterprise Strategy* [1]. The report contends that the agile manufacturing paradigm is necessary for the United States to resume its leading role in manufacturing. The report remains influential, and serves as a reference to academics, industrial practitioners, and government entities. Following the report, others have sought to modify or redefine agility. For instance, agility is defined as the ability to 'quickly change a broad range of operating characteristics', 'take advantage of unanticipated market opportunities, and respond to unexpected competitive threats'; that is, 'efficiency in change' or the ability to 'adapt proficiently in a continuous changing, unpredictable business environment' [2–4]. Agility is highlighted by features of change-embracing and growth-orientation [5]. It encompasses a set of competitive bases (e.g., speed, flexibility, innovation, adaptability, proactivity, quality, productivity, profitability, customization, and knowledge) [6–19], obtained through 'the integration of reconfigurable resources and best practices in a knowledge-rich environment to provide customer-driven products and services in a fast changing market environment' [9]. Thus, agility and leanness have potentially different focuses [20–26]. The former works for companies facing high variety and largely unpredictable market environments where demand (in terms of product types and volumes) is not easily matched by supply. Leanness often works for low variety and more predictable environments where companies' internal control of cost and time is a dominating competence [27,28]. Combining agility with leanness may be needed for some circumstances [29]. Agility is perhaps broader than flexibility [28,30–34]. Flexibility is planned responses to anticipated contingencies whereas agility involves re-configuration to proactively capture emerging opportunities and to address unanticipated issues. Agility research is also emerging in areas other than manufacturing, including supply chain management (e.g., [26,27,35,36]), human resource management (HRM) (e.g., [37–40]), human factors and ergonomics (e.g., [41–43]), psychological and behavioral studies (e.g., [44–46]), information science and technology (e.g., [34,47,48]), and knowledge management (e.g., [49,50]). As there are no fully agile organizations, research on defining and exploring the concept of agility is ongoing (e.g., [51–55]).

In this review, one important aspect of agility, namely *workforce agility*, is examined from an operations management (OM) perspective. Although the literature in OM has been focused more intensely on *workforce flexibility* for handling stationary uncertainties in business processes and operations, we approach our examination of the literature through the perspective lens of agility. The agility literature inherently involves external and non-stationary sources of uncertainty. Most commonly this would include structural shifts in the marketplace, notably including the creation or elimination of product classes. For example, the fundamental market shift from feature-phones to smart-phones, was not one of uncertain yet stationary demand, but rather of a less predictable step-change in the underlying market, wherein agile organizations would be better positioned to shift towards the new market opportunities. We remark that mutually exclusivity between flexibility and agility is not possible, given their intrinsic interconnections. We distinguish between these based on the underlying motivations and intentions with respect to the sources of uncertainty. Later in this review, we will analyze differences and connections between workforce flexibility and workforce agility, to connect specific aspects of workforce flexibility that may form useful bases for improving workforce agility.

2. Research needs for workforce agility

The agility literature is in general consensus that an *agile workforce* is an essential facet of an organization's overall agility (e.g., [2,5,6,8,13,14,23,24,30,43,51,52,56]). Yet the research on workforce agility needs to go well beyond the current status in order to produce deeper and broader impacts on enterprise. We describe several identifiable needs below.

First, the acceleration of market and organization dynamics has permanently changed workforce requirements [36,37,40,42,45,49,52,57]. Now, having the right number of workers with the right knowledge and skills at the right time doing the right things in the right manner is a moving target that needs to be managed well with easy, fast, and cost-effective transitions [38,39,43]. The acquisition of workforce knowledge and skills can be costly and time-consuming. Any change of these, particularly under dynamic conditions, requires careful planning