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Sustainable manufacturing – An overview and a conceptual framework for continuous transformation and competitiveness

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ABSTRACT

Sustainable manufacturing is advancing amidst the changing context and emerging paradigms. Business success and longterm sustainability today depends upon transforming continuously, and maintaining competitiveness through building context specific capabilities. To address these needs, this research presented a comprehensive overview of sustainable manufacturing, in first part, contributed by numerous aspects in the field. The second part proposes a conceptual framework comprising three interconnected elements: 'Ideal', 'Strategy', 'Architecture'. The ideal is best depicted as an exploration and choice context. Synthesis of stakeholders' desires and systematic discovery of opportunities, in context of larger containing systems, manifestes into desired attributes and characteristics of products, technology and enterprise system that are to be approached continuously. The strategy element is a match and transformation context. Strategic planning, focussed on continuous identification and building of capabilities, evolves into a broader concept of the business which enhances the firm's capacity to adapt to changing contexts and meet its proposed ends. The architecture is a function and execution context at the operational level. It combines capabilities, organization and operational structure, and value creation processes to perfom desired function in context of an agreed upon business concept. A systemic and potentially viable approach, embedded with specific capabilities to integrate sustainability into the core of a manufacturing business, is thus proposed which sets this research work apart. Contextual interrogation gives it a new way of constructing the big picture of the issue, i.e. sustainable manufacturing. This simplistic scheme is supplemented and guided by multi-aspect research in sustainable manufacturing, circular economy, capabilities, strategy and transformation, and systems thinking. The proposed framework is expected to fulfill the key needs of enterprises in sustainable manufacturing business, i.e. to transform and maintain competitiveness in a fast paced environment.

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