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# Introduction to the field of creative enterprise

Aard J. Groen [b], Steven T. Walsh [a,*]

[a] Anderson Schools of Management, University of New Mexico, Albuquerque, NM, USA
[b] Nikos, Netherlands Institute for Knowledge Entrepreneurship, University of Twente, Enschede, The Netherlands

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ABSTRACT

The problems facing the 21st century world are creating opportunities that challenge the traditional manner in which enterprises create value. The number of newer and traditional industries undergoing radical change is unprecedented. These industries are being affected by the interconnectivity of the global problems as well as the emerging technology (such as nanotechnology) based innovations being developed to meet their challenge. Novel forms of business, creative enterprises, are being generated to meet this opportunity. Yet academic and practitioner understanding of how to best assist these enterprises is limited. If one compares the plethora of scientific knowledge being generated by any one of the emerging technologies to that of those authors providing managerial acumen in any form there is a great disparity. Here, the authors help define the field of creative enterprise based on emerging technologies like nanotechnology and provide a basis for further study. The authors provide some initial knowledge of the new roles required of technology entrepreneurs, researchers and other innovation professionals. Further they provide or extend management tools and new business models required by these creative enterprises.



More types of creative enterprises are initiating innovations aimed at solving some aspects of the five major challenges facing the world today (healthcare, water, energy, environment and food) [4,43]. These problems are critical, compelling, fundamental and specific to our time. These new creative enterprises are finding new ways to use emerging and often disruptive technologies like nanotechnology [22], microtechnology [26] and mobility [14] to embrace these challenges. In order to meet the needs of these highly constrained opportunities creative enterprises often base their solutions on emerging technologies like nanotechnologies in combination with more established technologies. Creative enterprises are developing novel innovations for emerging markets [29,38]. The innovations are fueled by new sets of drivers [2]. However, they also face new sets of constraints. We develop this special issue to examine the state of this embryonic but rapidly growing field.

The special issue has responded to the need for developing a knowledge base to assist creative enterprises who base their search for competitive advantage on emerging and often disruptive technologies like mobility and nanotechnology. Corporate sustainability [7] for example, is important to creative enterprise but these enterprises must translate corporate responsibility to meet the needs of global sustainability. Similarly many of today's researchers focus on topics that are tangential to these problems such as renewable energy management [40]. We provide both an academic and a practitioner introduction [44] in order to offer two different perspectives concerning Creative enterprises based on emerging technologies. The number of emerging industries and traditional industries undergoing radical change due to emerging technologies is unprecedented [1] and models used to foresee new markets are just now being developed [15].

Today regardless of organizational size or whether it is a commercial, governmental [30] or non-profit enterprise, the resources and competences required to solve critical problems are often beyond the scope of any one firm. Many embrace innovation in networks, alliance management, open innovation or other constructs which might be necessary to develop emerging technology based products but are not simple to manage [12,13,27,28,32,35]. Technology entrepreneurs, government

* Corresponding author.
*E-mail addresses:* a.j.groen@utwente.nl (A.J. Groen), Swalsh91@comcast.net (S.T. Walsh).

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policy makers, large firms, researchers, innovators are finding traditional business models and tools lacking. Firms large and small are finding that many of their traditional management and manufacturing constructs are no longer effective [6,25,42].

The understanding of associated new business models required to carry the promise of emerging technology based creative enterprises is lagging behind the advance of technical knowledge in any one of today's emerging technologies. Table 1 illustrates how the research in managing creative enterprises, including creative enterprise models, managing emerging or disruptive technologies and managing global problems are clearly trailing the scientific investigation of nanotechnology, which is only one of the identified emerging technologies. Further it shows that there is a need to ensure that this gap does not continue to enlarge. The challenge to this creative process and some initial findings such as the development of new types of professionals (T Professionals) [5], new business models, and the role of drivers are presented in the special issue.

Yet these global problems and the promise of new emerging technologies like nanotechnology, computational sciences and microsystems [8] to solve them have created opportunities for both social and physical science researchers. Many view these emerging technologies like nanotechnology to be the harbingers of a new Schumpeterian cycle [24,39,45]. This promise has caused many regions of the world to heavily invest in for example nanotechnology with an eye toward their commercial promise [19,30,41]. The resources and competencies required [23,33,42] are forcing the development of more creative enterprise business models [21]. Further these emerging technologies are generating heightened social expectations or hype which must be managed [9,17]. Still creative enterprises trying to realize this promise often experience a great deal of social wariness. Many innovations cannot be commercialized in a traditional form. For example most managerial constructs focused on the technology strategy interface do so by providing innovations which are traditional "Silo" or single root technology based. Creative enterprises often are composed of innovations developed from multiple root technologies. Firms with multiple root technology based innovations are finding it difficult to obtain maximum benefits from many traditional managerial constructs such as technological roadmapping. Further, getting financed is a matter of mobilizing network resources, especially the role of third persons supporting the valuation of these complex and new type of businesses [16] where entrepreneurial reputation is important.

It is also important to more directly discuss the new constraints that these firms face like the "Precautionary Principle" [36]. The Precautionary Principal is championed by the European Union and demands that the provider of new solutions be much more responsible for their product than ever before. Further today's society is more knowledgeable and more concerned about outcomes of innovations. Society and customers alike are demanding that an innovation which solves one of the five major world problems either globally or locally cannot negatively affect any other in order to be accepted as an optimal solution [4].

The special issue authors provide great contributions to this academic field by displaying their insights on creative enterprises. They tackle the issue of new problems that are created by solving existing problems through the use of traditional technologies. They discuss the issue of generating optimal solutions in today's more highly constrained solution space environment. They see the perils as well the benefits to be gained through the use of multiple root technology sets. They provide insights from large firm commercial development as well as the knowledge generated by technological entrepreneurs. They all aligned to the vision of former Swedish Prime Minister Goran Presson as we paraphrase here: "I am not afraid of using *new technologies* but I am deeply afraid of the continued use of *traditional technologies* and the problems they bring to our world" [31]. He further stated that we have no choice but to find new solution pathways and generate new forms of enterprises to commercialize them. The authors here provide considerable additions to the field in terms of new problem identification, the interdependent nature of world problems and the use of convergent emerging technologies to base new innovations.

Tierney et al. [37] provides a discussion on the nature of the 21st century world problems. The authors focus on the major world problem of health care. An investigation on how creative enterprises will have to use nanotechnology and other multi root technology based innovations is addressed. They have developed a third generational technology roadmap for industries, creative enterprises and creative regional clusters. The use of a technology readiness level or assessment approach is taken instead of the

**Table 1**
Summary of the number of papers on the subject of creative enterprise management versus management articles on the subject.