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Editorial for Dynamics of Innovation and Competitive Strategy in Transportation Research

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Editorial

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While innovation has been noted to be essential to sustained competitive advantage in many industry sectors, academic and practitioner research of innovation in transportation has been minimal. Yet, transportation provides a unique context in which innovation and its positive impacts on the organisation, industry and the nation as a whole is examined. The idea of this special issue was born out of the author's research into the types of innovation developed and implemented by all cargo airlines in the USA throughout air transportation history and the resultant impacts to both the firm and the industry (see Tinoco and Johnson, 2010). With this research effort, it became clear that studying innovation in transportation would be a worthy endeavour, as the advantages it brings with successful implementation are significant and critical for positive sustainable performance.

Thompson (1965) referred to innovation as "the generation, acceptance, and implementation of new ideas, processes, products, and services (p.2)." Since this time, the answer to "what is innovation?" has evolved and taken multiple forms – some simplified, some more complex. Researchers and political entities have diverged on the innovation concept and definition, taking different paths, one path attempting to broaden it to include success factors (European Commission, 1995) and restrictions to organisational settings (Pierce and Delbecq, 1977), while another path simplifying it, defining innovation merely as the commercialisation of an invention (Porter, 1990; Ahuja and Lampert, 2001).

It is essential that we, as academicians, researchers and practitioners, understand that today innovation is composed of multiple dimensions, ranging from product and production process innovations to marketing and organisational innovations.

Even within an innovation dimension, multiple types abound. For example, product innovations have been categorised into continuous or discontinuous (Robertson, 1967); radical or incremental, market breakthroughs or technological breakthroughs (Chandy and Tellis, 1998); competence enhancing vs. destroying (Tushman and Anderson, 1986), broad or localised (Kenny, 2003); architectural and modular innovations (Henderson and Clark, 1990); sustaining or disruptive (Christensen, 1997); architectural, and market niche, regular or revolutionary (Abernathy and Clark, 1985).

Process innovations have also been further detailed and broadened. They now include not only production processes, but also administrative and organisational processes (Troy et al., 2001; Johannessen et al., 2001) and those processes used to sell, distribute, or service products (Robert, 1993; Damanpour and Gopalakrishnan, 2001). Lastly, innovation has also been categorised into technical and administrative or organisational (Daft and Becker, 1978; Damanpour, 1991, 1996). Technical innovations are those that “pertain to products, services, and the technology used to produce products or render services (Damanpour 1996, p.698).” Organisational innovation is innovation involving “organisational structure, administrative processes, and human resources; they are indirectly related to the basic work activities of an organisation (Damanpour, 1996, p.698).”

As industries age, innovations developed and implemented within organisations change in type and frequency (Utterback and Abernathy, 1975; Utterback, 1994). Innovation in manufacturing industries begins with radical product innovations, followed by production process innovations and incremental product improvements. Service industries follow a reverse innovation life cycle, beginning with adoption of Information Technology (IT) for development of process innovations. As the service industry ages, the generation of new service (product) innovations follows (Barras, 1986, 1990).

Beyond product and production process innovations, there is still minimal research as when other types of innovation occur within the industry life cycle (cf. Tinoco, 2010). In transportation, research in the various types of innovation and when they occur in the life cycle is imperative to organisational and industry learning and sustained performance, yet it has gone largely ignored by academics, especially in many of the service-oriented transportation industries.

Furthermore, there is an enormous gap in research with respect to the less ‘visible’ innovations mentioned earlier, e.g., administrative and organisational innovations that focus on organisational structure, administrative processes and human resources, and technical innovations that pertain to the technology used to produce products and render services. With the current attention on climate change, innovation in sustainability has also begun to gain momentum. All of the aforementioned less ‘visible’ types of innovations often provide advantages, as they challenge competitors to discover and uncover a rare and valuable innovation that is not easily imitated or substituted.

Innovation is influenced by multiple entities, including organisation, industry and nation. In this special issue, Ian Douglas discusses competitive advantage at the organisational level analysing relatively new dual business models that support product (service) innovations in terms of long-haul services and premium cabins for value-based airlines. Despite the theoretical advantages, many value-based airlines struggle to turn these services into adequate revenue-generating programmes. However, Douglas clearly outlines the exceptions where several carriers have recently implemented a dual model strategy successfully. A question that remains is how critical are the characteristics of a home country nation and the travel destination country in terms of economy,

demographics, policy, etc., to the success of an innovative dual business model in air travel services.

The authors Anke Arnaud and Michael J. Williams provide an overview of innovation for sustainability in transportation and propose whether organisations, industries and nations are doing enough to develop and implement these types of innovation that so critically impact the world and our environment. Early in 2010 at the global summit on climate change, the largest economies pledged to reduce emissions and governments promised to spend approximately \$521B on their efforts in sustainability, including the necessary and innovative green technologies. Several months following this agreement, only 16% of the funds had been spent (Harvey, 2010). Clearly, there is significant room for improvement.

The authors Bart Wiegmans and Harry Geerlings take a micro-perspective of sustainability innovations by examining the issue in terms of deep-sea ports and the environmental problems, opportunities available and the success potential. They also ask the critical questions: What is the true goal of sustainability innovation and who or what is the recipient(s) of its success? Is it the business, the port, the country or the world?

The paper by Tamilla Curtis and Irina Swenson examines the link between government policy, competitive strategy at the national and organisational levels, and product innovation within the Russian aviation industry. They clearly argue the case that the future of Russia's economic health is partially dependent on the global success of its aviation sector (among other key industries) and its host of new products and services, innovative process technologies, specialised skills and brand reputation.

As can be seen, strong national influences on innovation are threaded throughout these aforementioned papers. With respect to level of innovative activity, nation differs according to 'structure of production', i.e., raw-material-based production vs. knowledge-intensive production, as well as R&D expenditures on each (Duckworth, 1967) and government regulations (Murray, 1976; Capon et al., 1992). They also differ in terms of levels of technological development, organisational structure and characteristics, and in natural resources (Porter, 1990). In national systems, the country's economic composition and the technical and education infrastructure also influence the levels of innovation (Edquist, 1997; Porter, 1990; Caccamo, 1998). Differences in national innovation levels may be a result of societal systems, i.e., capitalist societies engage in more innovation in the quest for competitive advantage while socialists innovate as a result of state demand (Murray, 1976).

While the theme of innovation ties each of the papers together, the stand-out issue in each of these papers is that innovation is a challenging, never-ending process of success and failure, of competitive advantage and of competitive disadvantage, of learning, unlearning, and relearning, and is a result of multiple influential factors at all levels. Innovation is a risk, and it can be a risk for all involved stakeholders: the individual, the firm, the industry, the nation and the world. Yet, without innovation, we do not move forward and this is nowhere more true than in the transportation sector. I hope that this issue will benefit academia, practitioners and policy-makers in their innovation efforts and increase interchange and exchange of innovative ideas, at all levels and all dimensions of innovation.

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