Mathematical Modeling and Quantitative Analysis of Entrepreneurship from Evolutionary Genetic Perspective

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Abstract: The importance of entrepreneurship has been embossed within global economic crisis, and entrepreneurship has been regarded as a critical factor for firms to survive and grow. But one of the biggest problems is that entrepreneurship has various definitions by researchers, while there is no structured theory covering the whole entrepreneurship changing frequently. To overcome that problem, this study proposes an interdisciplinary definition of entrepreneurship from its evolutionary genetic aspects. This research newly defines entrepreneurship as the 'initiator' that controls the firm's entrepreneurial reaction propensity (e-DNA: entrepreneurial DNA), which is the combinations of firm's entrepreneurial attributes (e-Base: entrepreneurial Base), to react optimally to environmental changes. Clarifying fitness factor as the determinant of firm's survival and success, the proposed mathematical model quantifies entrepreneurship, and provide firms with diagnosis and prescription numerically. The new evolutionary genetic perspective of entrepreneurship with the science-based approach is expected to provide the future direction of education and research field, and practically contribute to policy makers and practitioners. The empirical analysis shows that the fitness of reaction by entrepreneurship can be the most important factor of firm's survival and success. This research might lead relevant further studies on various topics such as developing the Enterprise-Genome-Map project, and applying entrepreneurship to specify the firm's entrepreneurial characteristics. This study proposes a new paradigm that the evolution of firms can be achieved either by developing entrepreneurship or changing internal factors of them. The innovative algorithm proposed in this research further provides firms with timely solutions and decision indices which enable the firms to enhance their capabilities.

Keywords: Entrepreneurship, Evolutionary Genetic Perspective, Entrepreneurial Characteristic Attributes, Environmental Reaction Propensity, Entrepreneurial Base, Entrepreneurial DNA, Mathematical Model, Quantitative Analysis, Fitness Factor