

1163-A0-1701

Geoffrey West*. *Universal laws of life, growth and death in organisms, cities, and companies.*

Why do all companies and people die whereas cities keep growing and the pace of life continues to accelerate? Why do we stop growing, sleep 8 hours a day and live of the order of 100 years? And how are these related to innovation, wealth creation, social networks, urbanisation and global sustainability? Global urbanisation has emerged as the source of the greatest challenge the planet has faced since humans became social. Cities are simultaneously the hubs of innovation, engines of wealth creation and centers of power, but are also the prime source of crime, pollution, disease, climate change and the consumption of energy and resources. Despite this dual role and the threat to global sustainability, there is no integrated, quantitative, predictive, scientific framework for understanding their dynamics, growth and organization. Ideas for developing such a theory, inspired by a network-based framework for understanding diverse properties of organisms (such as growth, metabolism, cancer, sleep, aging, death, and ecosystems) will be discussed and extended to companies. Despite their extraordinary complexity and diversity, many characteristics of cities and companies, including wages, patents, assets, sales, diversity, crime, police, disease, pollution, and infrastructure, scale systematically and predictably with size suggesting that universal principles that transcend history, geography and culture underlie their dynamics and structure. This has dramatic implications for growth, development and long-term global sustainability: left unchecked, innovation and wealth creation that fuel socio-economic systems potentially sow the seeds for collapse. (Received November 9, 2020)