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On a possible limit to economic progress

ABSTRACT. Economic output is shown to be related to population (N) and natural resources (R) by a simple power law. On the basis of the exponents for N and R , called, respectively, the “ingenuity index” (n) and the “technology index” (r), the regions of the world fall into three clusters: high n and high r (Western and Eastern Europe, South America, Australia, New Zealand, the USA and Canada); high n and low r (the USA, the Middle East); and low n and low r (Asia, Africa). Even the highest values (of n) barely exceed unity, however. n was found to be well-correlated with other independently obtained exponents characteristic of human ingenuity, such as those governing the number of telephone lines, patents, and the diversity of occupations. The analysis of r reveals that there are two kinds of capital: natural resources and technology, especially information technology. However, endogenous productivity-depressing factors appear to impose intrinsic limits on what ingenuity and technology can achieve.

Nanotechnology Perceptions **9** (2013) 71–81

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