mance higher than societies with other predominant religious cultures (Coccia, 2014). These results may be due to fruitful relation between specific religions, culture and higher education institutions of countries that support high human capital. In addition, a higher religious/ethnic fractionalization in advanced society, ceteris paribus, has a positive effect on technological outputs. This appears to be particularly true among richer and more democratic countries with competitive markets, which are mainly located in the European and North-American geo-economic areas (Coccia, 2014). However, these findings are tentative and there is need for much more detailed research into the relations between religion, culture and innovation patterns of nations.

□ *Democratization*

Democracy can be seen as a set of practices and principles that institutionalize and protect freedom (Modelski and Perry, 2002; Norris, 2008). Barro (1999, p. 160) points out that "increases in various measures of the standard of living forecast a gradual rise in democracy". Acemouglu et al. (2008) analyse the relationship between income per capita and democracy and argue that political and economic development paths are interwoven. Coccia (2010) shows that democratization is an antecedent process to technological and economic change. In particular, democratization seems to be a main driving force for technological change: most free countries, measured with liberal, participatory, and constitutional democracy indices, have a level of technological outputs higher than less free and more autocratic countries. As a matter of fact, it seems that "democracy richness" generates a higher circulation of infor-mation and appropriate higher education systems that, in advanced countries, support high human capital for fruitful patterns of technological innovation, wellbeing and wealth of na-tions over the long run (Coccia, 2010).

□ *High population and demographic change*

Population growth plays a main role for patterns of technological innovation (Coccia, 2014a). Kuznets (1960) claims that: "high population spurs technological change because it increases the number of potential inventors" (as quoted by Kremer, 1993, p. 685). In particular, Kuznets (1960, p. 328) states: "Population growth . . .produces an absolutely larger number of genius-es, talented men, and generally gifted contributors to new knowledge whose native ability would be permitted to mature to effective levels when they join the labor force". Jones states that: " 'More people means more Isaac Newtons and therefore more ideas' " (as quoted by Strulik, 2005, p. 130). Kuznets (1960) and Simon (1977) also argue that high populations have a higher probability to create potential inventors because larger populations have propor-tionally more individuals with new ideas. Moreover, many inventions and innovations are demand-driven by large population, and as a consequence high population and an active de-mographic change can play a vital role for supporting patterns of technological innovation in advanced national systems of innovation (cf. Boserup, 1981, p. 5ff; Coccia, 2014a). Some studies also show that an optimal level of technological performance in advanced nations is due to positive growth rates of population that are lower than 1% (percentage of annual popu-lation growth rates), whereas innovative performances are negatively affected both by nega-tive and/or very high growth rates of population because of quadratic effects of the inverted-U shape curve of the relation innovative outputs/population growth (cf. Coccia, 2014a, pp. 57-59). This result confirms the study by Strulik (2005, p. 129) that: "long-run growth is compat-ible with a stable population".

□ *Relevant problem*

GPTs are naturally directed to solve critical problems to achieve competitive advantages of leading nations (Coccia, 2015) or organizations in certain environments (Atuahene-Gima and Wei, 2011). Usher (1954) explained the evolution of new technology by using the theoretical framework of the Gestalt psychology. Usher's theory of cumulative synthesis is based on four concepts (see Basalla, 1988, p. 23): 1) Perception of the problem: an incomplete pattern in need of resolution is recognized; 2) Setting stage: assimilation of data related to the problem; 3) Act