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TECHNOLOGY, EMPLOYMENT & HUMAN WELFARE

Abstract: For more than a century futurists have envisioned a rapidly approaching era in which technology replaces human labor and makes human beings a redundant, unnecessary economic resource, resulting in rising levels of unemployment, impoverishment, and social alienation. While previous predictions in the 1890 s and 1990 s proved to be premature and exaggerated, there is mounting concern that the rapid development of robotics and artificial intelligence taking place now will profoundly impact the global demand for labor and new job creation over the next two decades. Coming at a time when socialism and state responsibility for social welfare are receding, this prospect poses serious challenges to the welfare and stability of democratic society in the 21st century. This paper examines the *historical relationship between technology, employment and human welfare* and its impact on producers, consumers, capitalists and workers. It explores the political, legal, social, economic and cultural implications of accelerated technological innovation and adaptation. It considers political, legal and economic options for regulating the development, dissemination, adoption and impact of job-eliminating technologies in an increasingly unified global economy, including tax policies on capital and labor intensive production, regulation of the working week, and guaranteed minimum income programs. It also explores various dimensions of a comprehensive human-capital intensive development social strategy for higher education and skills development.

INTRODUCTION

The world is moving at lightning speed and continuously restructuring its very foundation in mid-flight. The increasing speed is most readily perceived in the field of technological innovation in telecommunications, nanotechnology, biotechnology, robotics and artificial intelligence. Organizational innovation is taking place with similar rapidity, giving rise to new institutions, systems and processes that dramatically alter the way human beings communicate, interact, trade, learn, govern and live with one another. Civilization and culture constitute deeper layers of society which evolve much more slowly than technology and organization on the surface. They are founded on ideas, value, institutions, attitudes and ways of life

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Table 1. Socio-Economic Indicators 1800 Vs. 2012

2012	1800
Population 7 billion	Population 1 billion
49% urban population	3% urban population
Life expectancy 67 years	Life expectancy 29 years
Mechanized & automated	Manual labour
Society-based (70% services)	Land-based (agriculture)
2-10% in OECD countries	85% employed in agriculture
World trade 27%	World trade 3% of global GDP

that are deeply entrenched and resist rapid alteration. The radical acceleration of evolutionary technological and organizational change has generated a serious mismatch resulting in tensions, upheavals and unresolved problems. The recent global financial crisis, the Eurozone crisis, the flood of refugees into Europe, Brexit, rising levels of inequality, political extremism and social unrest are symptoms of civilizational and cultural stress at deeper levels. Rising levels of unemployment and increasing pessimism about the future of work are a consequence.

The stress arising from rapid and radical social evolution is nothing new. Only this time the rate of change and geographic reach is greater than ever before. The 20th century was marked by radical transformation of society and work as depicted in Table I. The explosive growth of population, rapid urbanization, extension of life expectancy, the shift from agricultural to industrialization, the shift from manual to mechanized and automated labor, and rapid expansion of international competition arising from the growth of world trade generated considerable turmoil, uncertainty and insecurity.

The rapid shift to mechanized farm machinery in the USA led to widespread fear in the 1890 s that machines would eliminate human labor and generate perpetually high levels of unemployment. The development of mass production in the early 20th century led to a huge expansion of manufacturing and absorbed the surplus labor from agriculture.

The end of the Cold War, collapse of the Soviet Bloc and reunification of Germany were followed by similar pessimistic predictions about the end of work itself, as computerization and robotics displaced workers from manufacturing and service sector jobs. The unexpected emergence of the World Wide Web led to the

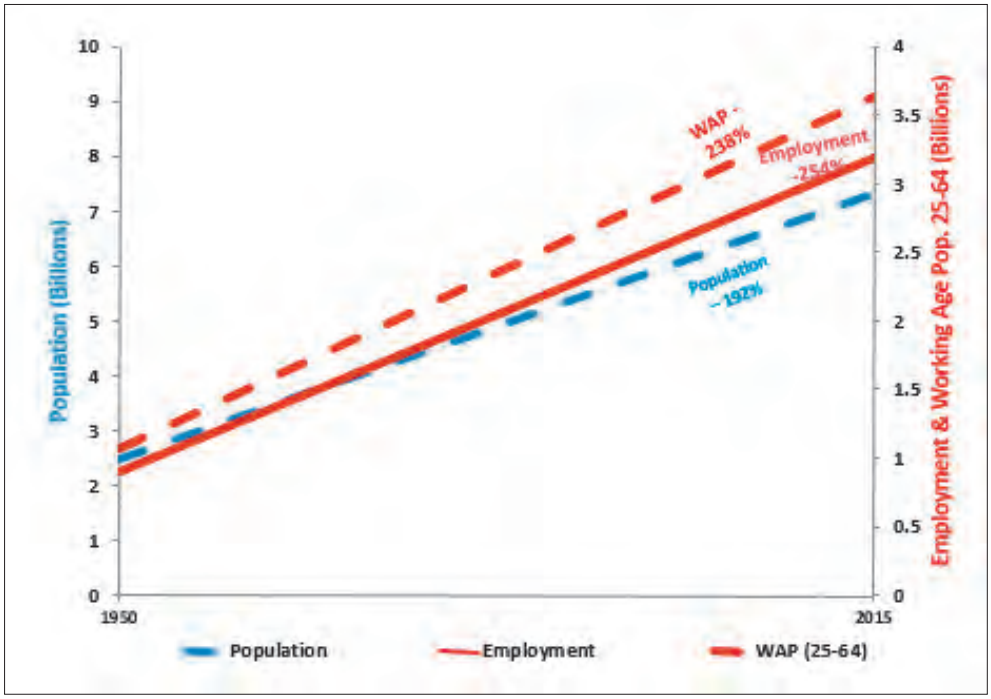

Figure 1. Growth of Population and Employment 1950–2015

founding of whole new industries and a new boom in higher end service sector employment in telecommunications, biotechnology and computing. By the end of the 1990 s, unemployment rates had fallen dramatically in OECD countries and the concerns about unemployment subsided.

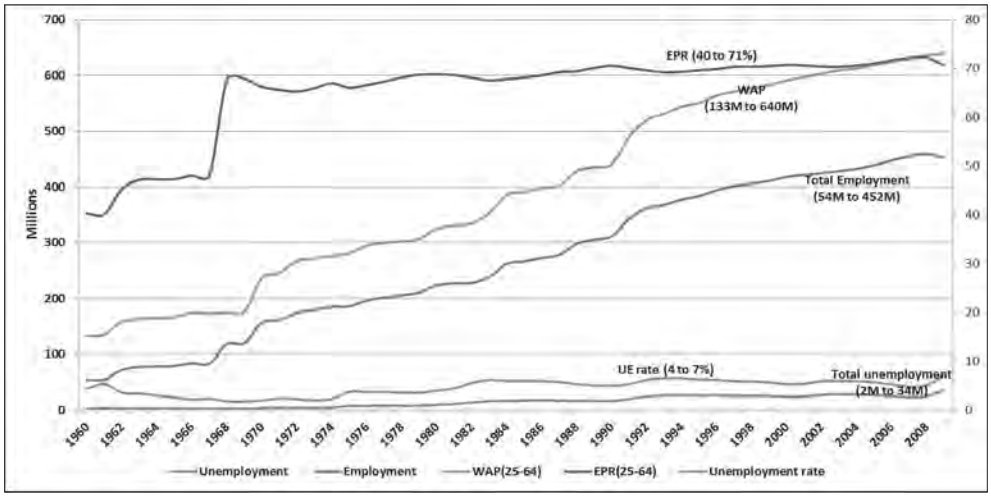

Figure 2 Employment Indicators for OECD countries 1960–2009

The second half of the 20th century experienced unprecedented rates of population growth, technological adaptation and world trade. Yet the statistical evidence does not support the view that we are headed toward a future of ever-increasing unemployment. Figure 1 shows that between 1950 and 2015, world population rose by 192% and working age population rose by 238%, while total global employment rose by 254%.

Figure 2 shows that the average unemployment rate from 1960 to 2009 in OECD countries remained relatively stable in spite of major economic and social upheavals and rising levels of instability.

FOURTH INDUSTRIAL REVOLUTION

Once again following the 2008 global financial crisis fears of permanently rising levels of unemployment have become widespread. The world economy is still in the wake of the 2008 crisis and unemployment rates, especially among youth, remain high in many of OECD members. But this time many researchers foresee perpetually higher unemployment as a result of advances in fields such as artificial intelligence, machine learning, robotics, 3-D printing, automation, computerization, nanotechnology, genetics, biotechnology and smart systems. [1] Nine out of ten workers today are in occupations that existed 100 years ago, and just 5 percent of the jobs generated between 1993 and 2013 came from „high tech" sectors like computing, software, and telecommunications. According to research by Frey and Osborne of Oxford University, 70% of jobs will be automated by the end of the century, 47% in the next two decades and 60% of the best jobs in the next ten years haven't been invented yet. They predict that in the next 10–20 years, 58% of financial advisors will be replaced by robots and AI. [2] A recent report from the Foundation of Young Australians said that between 60–70% of our students are being educated in jobs that won't exist by the time they graduate. It is also projected that 87% of highly creative workers are at low or no risk of automation, compared with 40% of jobs in the UK workforce as a whole. According to a 2016 report by World Economic Forum the 15 largest economies in the world, excluding China, will experience a net loss of 5.1 million jobs between 2015 and 2020.[3] Another study projects that 47% of jobs globally will be automated by 2035 and 70% by 2100.[4]

These disconcerting predictions are offset by counter trends in population and skill shortages. According to McKinsey, the global labor force will decline by 33% between 2010 and 2030, due to slower and negative population growth and rising levels of enrollment in higher education. As a consequence, McKinsey predicts a skill shortage of 85 million college graduates and 95 million low level workers by 2020.[5]

Historical experience compels us to regard these projections with a grain of salt, because past predictions have proven to be so far wide of the mark. Social evolution is a multi-dimensional, multi-pronged and multi-layered movement that encompasses political, economic, social, demographic, education, technological and ecological factors. Social science today lacks sufficient knowledge of the evolutionary process, the interactions and interdependencies between its components and the consequences of rapid globalization to predict outcomes with authority. Nev-

ertheless, uncertainty regarding the outcome does not justify complacency or unpreparedness. Rather it compels us to accelerate efforts to develop a cohesive and comprehensive understanding of global social dynamics and to explore the possible policy instruments available to mitigate the temporary or long term impacts of radical social transformation.

THE DOUBLE-EDGED SWORD OF TECHNOLOGY

Employment is only one of the factors that is impacted by technology. Regardless of the prognosis for employment in coming years, rapid technological advances raise a deeper issue of immense importance to the future of human civilization. As the historical record makes evident, technology is a double-edged sword. It has the capacity to increase food production, prolong life expectancy, meet basic needs, raise living standards, disseminate information, improve the quantity and quality of education, and provide comforts and convenience far beyond the luxury enjoyed even by kings in earlier centuries.

At the very same time, technology poses increasingly serious, unprecedented and in some cases existential threats to humanity. The monstrous destructive impact of intentional or accidental nuclear war terrorized several generations after WWII and still persists. New forms of technology are being prepared to weaponize outer space and cyberspace place weapons of mass destruction in the hands of small minorities. Pollution has contaminated the soil, water and air. Desertification and climate instability resulting from unbridled application of technology have spurred massive migrations and threatened the food supplies of countless millions.

Technologists will hasten to remind us that it is not technology per se but the use to which it is put that determines whether it is benign or life-threatening. That is certainly true. But it is also true that modern society and economy have elevated technological advancement to the level of a religion — a religion that threatens to supplant the value and freedom of human beings with the value and domination of the machine. The ethical mindset of modern science has accorded a supreme status to mechanism and extends in many fields near unbridled freedom for its indiscriminate development and application, regardless of the social consequences. No matter how powerful and useful it may be when applied with intelligence and discrimination, technology and mechanistic forms of social organization are incapable of solving the fundamental problems confronting humanity today. Faith in the all-powerful beneficence of technology constitutes a mental form of barbarism that threatens to undermine the greatest achievements of world civilization and culture. Technology, like money, is only an instrument for human progress, and it only has value to the extent it actually serves to promote human welfare and well-being.

The World Academy of Art & Science was founded in 1960 by eminent scientists — a number of whom had been associated with development of nuclear weapons — concerned with the social consequences and policy implications of science and technology. Science and scientists cannot afford to turn a blind eye to the con-

sequences of their discoveries and inventions. It is not sufficient to blame either political leaders or business for misuse and abuse of knowledge. Countless millions of scientists work in government and commercial research labs and universities whose research is funded by them. The scientific community needs to accept consciousness responsibility for the consequences of its work and impose regulations on itself or subject scientific work to close scrutiny and regulation by civil society.

IMPACT OF OTHER FACTORS ON UNEMPLOYMENT

Apart from technology, many other factors contribute to the recent rise in employment. Most notable of these is the increasing financialization of the world economy. Today global financial assets exceed $250 trillion, which is more than three times total world GDP. It is estimated that less than 20% of this capital is engaged in supporting the activities of the real economy. A large portion of it is employed in speculative investments that draw funds away from investments that create jobs and meet human needs, reducing employment opportunities and worker earnings growth, while increasing uncertainty, instability and economic inequality. International financial markets have become a global casino, an unregulated Wild West where money moves with lightning speed around the world in search of higher speculate rates of return. It has been estimated that the world needs to invest roughly $4 trillion a year in order to fulfill the UN's Sustainable Development Goals and to mitigate the threat of climate change. [6] Global regulation of international financial markets and taxation of speculative financial transactions can spur massive investments in the real economy, job creation and ecological sustainability.

The reign of neoliberal, free market economic policies has been another major contributing factor to rising levels of income inequality and unemployment. Low tax rates on capital gains and high taxes on labor, overseas corporate tax havens, increasing permissiveness of mergers and acquisitions that limit competition and destroy viable businesses, exorbitant rewards for managerial short-termism, unnecessary and unjustifiable extension of patent and copyright protection at the expense of competition and consumers, weakening of legislation protecting organized labor and social security nets are just a few of the policy shifts that weakened growth of the real economy, job growth, worker incomes and job security.[7]

At the root of the financial crisis, economic slowdown, rising inequality and unemployment lies a discredited body of economic thought founded on a Newtonian, mechanistic, fragmented world view based on universal principles divorced from human needs, aspirations and values. The world needs a new paradigm in economic thought appropriate to human beings in the 21st century. That thought must be founded on the central role and value of human beings, rather than on the all-powerful, all-important contribution of technology, money and unregulated markets.[8]

In sum a broad spectrum of economic, political and social factors impact directly or indirectly on the rates of job creation, including rates of economic growth, international trade, new technology development and dissemination, rates of population growth and life expectancy, the relative shift from agriculture to manufac-

turing and services, the level of education and skills in the workforce, the policy bias favoring capital-intensive and energy-intensive investments, the diversion of money from investment in the real economy to speculation, the extent of legal protection for patents and copyrights, and countless other factors.

Among these, two deserve special attention — economic inequality and social power. As Thomas Piketty has documented, rates of income and wealth inequality are at their highest level globally since before the Great Crash. Rising inequality results in lower levels of consumption, lower economic demand, lower rates of investment in the real economy and more money invested in speculation. Money is power and economic inequality is one expression of how power is distributed in society. Extreme concentration of wealth has a powerful influence on politics. An inordinate share of the power of democratic governance is directed for the benefit of business and the wealthy. In recent decades, many democracies have come to behave more like plutocracies and oligarchies. A wide distribution of power in all forms is the surest safeguard for individual freedom, innovation, increasing prosperity and continuous employment growth.

CONVENTIONAL STRATEGIES

The toolbox of conventional strategies for containing unemployment has been exhaustively utilized over the past seven years and has proven largely ineffective. Mainstream macroeconomics argues for measures to increase the rate of economic growth and leave job creation to the market. But the trillions of dollars of stimulus funds injected into the market by quantitative easing has done far more to boost asset prices on financial and real estate markets, than it has to promote investment in the real economy and job creation. The call for lower tariff barriers and freer trade, so long at the top of the policy agenda, has finally created a backlash of resentment and opposition from the working and middle class in Europe and North America, precipitating the Brexit movement in UK and increasing dissatisfaction with EU membership elsewhere. The contrary option of raising tariff barriers to reduce competition is gaining ground after two decades of support for free trade. The call of unions for shorter working days and weeks and earlier retirement, so successful in early decades, finds little political backing in these days of tough international competition.

HUMAN-CENTERED APPROACH

Rising levels of unemployment are not inevitable. Alternative theory and policies can be drawn upon to mitigate the disruptive impact of technological innovation and promote more steady, stable and socially beneficial patterns of economic development and job creation. This calls for a fundamental shift to a human-centered approach. Instead of promoting more and more capital-technology-energy-intensive investment, it calls for higher levels of investment in human capital, welfare and well-being. Investment in education and training not only eliminates skill shortages and raises productivity. It also raises the aspirations and releases the en-

ergy of people to produce and accomplish more. It is a catalyst for human energy, which is the real driver of development.

A human-centered approach is founded on the following basic premises:

— Human-capital is our most productive, creative, precious and perishable resource.

— Employment is an essential requirement for economic security, social stability and psychological well-being.

— In a market economy, employment is the economic equivalent of the right to vote in democracy.

— Government that has the power to regulate all aspects of social existence, must necessarily accept the responsibility to ensure full employment.

— The right to employment is not a privilege. It must be recognized as a fundamental human right and guaranteed by adoption of policies that accord greater importance to human well-being than mindless, ecologically unsustainable growth.

The idea that employment is a fundamental human right is neither new nor far-fetched. During the early 1940 s US President Roosevelt planned as soon as the war ended to introduce a bill of economic right which included the right to employment, but he died before he could do so. The US Employment Act of 1946 acknowledged the responsibility of government for employment generation. Articles 23 and 24 of the Universal Declaration of Human Rights (1948) and the ILO Declaration of Fundamental Principles and Rights at Work (1998) both affirm the right to work and protection against unemployment. The International Bill of Human Rights (1960 s) also affirms civil, political, economic and social rights.

A human-centered policy framework can be evolved that promotes full employment at both the national and the global levels. It must be founded on the primacy of human-dignity, economic security, welfare and well-being, not markets, money, technology or growth for their own sake. It must introduce policies to redirect financial resources from speculation into the real economy, including massive investment in human and social capital. It should be founded on a value-based, human-centered theoretical framework that promotes a true democratization of social power. Employment is not a matter to be left to the whims and fancy of unregulated markets. It is a matter of human choice. We have the power to create full employment, if only we decide to do so.

THE ALTERNATIVE

Full employment is not the only viable option for humanity nor in the long term is it necessarily the best. Over the past few centuries, society has progressed enormously in its capacity to meet human needs. World economic product has multiplied more than 80-fold since 1800. In spite of a more than seven-fold growth of population, real per capita income has growth 12-fold. The fundamental role of technology is to elevate the living standards and quality of life of every human being. Technological advances are also based on the cumulative achievements of global society at-large dating back millennia. The latest digital technologies are founded on the invention of the Hindu numerals, zero and the decimal point by In-

dian mathematicians more than 15 centuries ago. A fair and equitable distribution of the gains from technological innovation can reduce and eventually eliminate the compulsion of work. That requires an evolution of our political and legal system and social values commensurate with our technological advancement. This should naturally and inevitably lead to progressively shorter working hours and working weeks and proportionately more time for education, self-development, culture and leisure.

The policy framework to support this alternative is already well known. It is based on the principle of providing every citizen a minimum guaranteed income independent of the work they do. The earliest known implementation of this idea can be traced back to Abu Bakr, the first Muslim Caliph in the 6th century AD. Similar programs were advocated down through the ages by Thomas Paine, Napoleon Bonaparte, Bertrand Russell, Martin Luther King, and economists Milton Friedman, Paul Samuelson, James Tobin and John Kenneth Galbraith. Napoleon argued that man is entitled by birthright to a share of the Earth's produce sufficient to fill the needs of his existence. Russell believed that a certain small income, sufficient for necessities, should be secured for all, whether they work or not, and that a larger income should be given to those who are willing to engage in some work which the community recognizes as useful. Friedman advocated a minimum guaranteed income via a „negative income tax." In 1968, James Tobin, Paul Samuelson, John Kenneth Galbraith and another 1,200 economists signed a document calling for the US Congress to introduce in that year a system of income guarantees and supplements. In 1973, Daniel Patrick Moynihan wrote *The Politics of a Guaranteed Income*, in which he advocated the guaranteed minimum income and discussed Richard Nixon's Guaranteed Annual Income proposal. In 1994 classical liberal Friedrich Hayek wrote that he has always been in favor of a minimum income for every person in the country.

The idea resurfaced this year when Switzerland considered but rejected a proposal to introduce a minimum income program in a national referendum. Finland is also drawing up plans for a similar basic income program. Studies show that basic income programs can reduce inequality, raise consumption, ensure human security, promote welfare and enhance well-being. The real barriers are conceptual rather than economic. New theory is needed to provide the intellectual underpinnings for a new approach to human well-being.

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