Diploma in

Managing Quality in Higher Education

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PRODUCTIVITY

Since productivity has been extensively covered in Parts I, II and III of this text, this chapter will summarise the theory of productivity and ask the research question required to discuss needs:

Are productivity tools solving problems across the spectrum of global society?

PRODUCTIVITY THEORY

A goal of the quality movement from its beginning by Walter A. Shewhart in the 1930s has been *Doing Better with Less*. The title of Dr. W. Edwards Deming's first chapter in his classic 1986 book *Out of the Crisis* is *Chain Reaction: Quality, Productivity, Lower Costs, Capture the Market.* Productivity is the ratio of output to input where input consists of labour, material, capital and services and outputs are measurements of results in products or services. The set of factors influencing productivity has increased. Productivity increases in work and in life will be a critical path for future success anywhere on earth or as humans learn to live and work in space.

QUALITY NEEDS AND PRODUCTIVITY SOLUTIONS

As the 21st century begins, it is apparent that global problems exist and need breakthrough solutions. Achieving more with the same, or less, will be an essential part of those solutions.

The United States shocked the Third Reich and the world by its mass production of weapons in WWII. Henry Ford began converting his Ypsilanti, Michigan car production plant to make the B-24 Liberator bomber in 1941. By 1942, an assembled B-24, composed of 1.2 million parts was exiting his plant every hour. By 1945, 9,000 B-24 bombers, 650 per month, half of the total the U.S. produced, had been assembled in the Ford Motor Company plant. It's a reasonable assumption that the Allies could have lost WWII without that one breakthrough productivity achievement. Multiplying similar achievements at plants across the nation brought victory to the Allies.

After WWII, the world evolved into three economic zones: a) advanced, industrialised countries (which includes all of the former First World countries; b) emerging market economies (rapidly expanding economies of China, Russia, India, South Africa, Argentina, Mexico, South Korea, Indonesia; and c) lesser-developed countries mostly in Africa and also in Asia and Latin America. Productivity is related to the level of development of a nation. Wars and military forces have complicated linkages to productivity. As illustrated above, productivity has been the reason for winning wars. World military expenditures in 2015 reached $1.62 trillion (2.6% of world GDP) and had increased annually since 2001 (www.globalissues.org). But wars are also devastating individuals, populations and societies and halt economic and social progress by diverting and consuming resources.

The need for Quality Sciences and for national and international leadership is to change the application of productivity to a higher percentage of constructive goals. That's a historic dilemma that the research of Quality Scientists has only recently begun to be focused.

WHERE TO FOCUS?

Dr. Neville Marzwell, one of the world's leading scientists and scholars in space, energy, robotics and their potential for future human progress presented in October 2008 at the NASA Ames Research Center:

The solution is mass production, robotics and smarter people and machines. The United States is behind several nations in automated mass production. The U.S. will never compete internationally with human labour.[244]

What can smarter people, smarter machines and robotics achieve in the 21st century? One just has to look at one of history's top needs – ENERGY. Energy resources continue to consume huge costs and resources and provoke conflicts and wars. Wars kill life, pollute the planet and divert resources and leadership attention that should be devoted to solving long-term humankind needs. Earth's energy needs are projected to fall short of demand by 2050 without breakthrough solutions (see James M. "Mike" Snead – www.mikesnead.net). *The Law of Space Abundance*, formulated by the leadership of Kepler Space Institute in 2009, states: "*Space offers abundant resources to meet human needs."* The feasibility of a Spaced Based Solar System for Earth's needs has been proven theoretically and demonstrated successfully.

What Henry Ford did with manual labour in his B-24 plant in Michigan during WWII is now beginning to be done by robotics. Science and technology already has the knowledge and the means to apply smarter people, smarter machines and robotics to solve Earth's problems. The answer to our research question of "Are productivity tools solving problems across the spectrum of global society?" is, in 2017, "It's beginning to do so." Educators around the globe have the challenge to motivate their students to understand what is now possible and to be a part of future science, technology and leadership that convert dreams and ideas into reality.

TOTAL PRODUCTIVITY PERFORMANCE (TFP), ACCELERATION AND PERSONAL PRODUCTIVITY

So far, the focus has been on labor productivity. Long term national economic performance results from Total Factor Productivity (TFP) which is a measure of a broad set of variables including labor, public policy, increases in labor standards, quality of education, technology increases and ability to quantify those variables.

There are two more productivity variables that are recent additions. The first is the exponential increase of the rate of business transactions since Bill Gates and Microsoft invented a computer operating system that by 1990 enabled computers to electronically talk to each other. Bill Gates became a billionaire and global business transactions began occurring at the speed of light via the Internet.

The next technology paradigm shift occurred at the beginning of the 21st millennium. MySpace and Facebook were launched in 2003 and 2004, respectively. The social network era began. By the publication of this text in 2017, social networking has exponentially increased and was credited with facilitating major national and international happenings – even revolutions. Social networks have changed societies in the decade of their existence. The 21st century youth generations will be dramatically different than those in the 20th century. Ideas and images can now reach millions of people instantly. The mega leap in personal communications has yet to be measured as the newest productivity factor.

The challenge for educators will be to understand, then to guide 21st century students to be leaders on paths to productive and constructive futures for humankind.