Steering HR growth

With professionals in technical fields developing strategies for innovation, new business development and globalisation opportunities for their employers, they must also focus on tectonic shift taking place in the nature of their jobs and requirements expected in the 21st century economy. This article provides tools and techniques to make these professionals more relevant and valuable in the workplace.

Technical professional, i.e. scientists, engineers, or managers with an interest in physical sciences and their use, constitute the back bone of any industrial society. They are generally described as STEM (science, technology, engineering, and mathematics) professionals, where the word “technology” is often thought to imply IT. While these professionals are engaged in developing strategies for innovation, new business development and globalisation opportunities for their employers, they rarely focus on the changing landscape, the tectonic shift taking place in the nature of their jobs and requirements expected in the 21st century economy. It is imperative to draw the attention of STEM professionals to the challenges posed by this evolving landscape. These professionals can make themselves relevant and valuable in a way that it is also rewarding to them, at a time when the work of every kind is also being replaced from a human centered activity to a system driven standards and operating procedures.

Work as a source of income: How is it changing?

Let us begin with a broad overview or description of the landscape in the workplace. The traditional organisation is generally a pyramid, with fewer people at the top while there are many workers at the lower layers of the pyramid. The workers are generally classified as blue collar, white collar, middle management and senior managers. Historically, there were opportunities for mobility across these layers as the workers learned new skills. Such mobility within organisations has also been a source of economic and social upward mobility enjoyed by these workers. Today, the workplace has become stratified into four, new, well identifiable layers as illustrated in Figure 1. Advancements in information...
technology (IT) and global capitalism (under the broad umbrella of globalisation) are the forces driving such stratification. The investors, professional workers, information workers and the physical labour constitute these four strata of work force.

The separation of the investors as an isolated layer is now widely recognised and this separation is also pointed out as a possible source of increasing income inequality. Many economists would suggest that there are two sources of income: non-wage income and the income through wages & salaries. The investor class consists of non-wage income earners while the other three strata of workers fall into the category where salaries and wages are their primary source of income. Many economists also point out that the income inequality seen today in the US is the result of the rise in non-wage income over the years, while the wage earner’s income has been nearly constant and without much increase. To address this income inequality, the wage earning professionals have to re-think the nature of their work and the education required in this new scenario.

Professional Effectiveness (PE – Score)

The work of most professionals falls into one of the three categories identified as professional work, information work and physical labour (A, B and C respectively) in Figure 1. Much of the migration of work from the developed countries in the early stages of globalisation has targeted low skilled physical labour work and their de-localisation to lower cost countries. Jobs with high content of information work can be seen in call centers, on-line tech support workers, those who write codes or implement and administer software support solutions for a variety of applications. This was the second wave of work category that was outsourced, off-shored or brought on-shore under temporary visa from lower cost and readily available work force from abroad. The third and final category of wage earning work is described as the work that results in identifiable new products (leading to new sources of revenue), new processes required to conceive and realise such new products, as well as applications/use of these products (which in turn leads to additional revenue for the product supplier). Every wage earner obtains the wage as a reward for their effort resulting from these three streams of stratified work. Ultimately, every wage earner is judged by an efficiency factor or Professional Effectiveness or PE – Score:

\[
PE \text{ Score} = \frac{A}{A + B + C}
\]

Binary economy

One can readily note that there are two approaches for increasing the PE Score: first, increase the numerator or the “professional” output per worker (higher levels of A) or second, decrease the denominator, by decreasing the role or effort of the worker in B and C categories of work. Indeed these two modes of increasing worker productivity have been at play for the past four decades. This effect can be described as Binary economy. In this Binary economy, we see two approaches through which professionals can contribute to the economy and thus, earn their wages:

- **Economy 1**: Professionals create and implement new solutions better than anyone else across the globe. They are also richly rewarded (and hence, can afford the highest standard of living anywhere in the world). These top professionals improve sector productivity by using advanced technology based on physical sciences as well as digital tools/applications. Sometimes they also establish new sectors that may provide jobs for a relatively small number of top professionals (locally) or create a larger number of low-skilled jobs elsewhere (globally).

- **Economy 2**: Professionals contribute to the execution of solutions that are already well established. Such effort is required to replicate the known solutions in ever increasing larger quantities. In this mode, there is a constant and unending effort to de-skill and de-localise all jobs, leading to tasks that can be automated or accomplished through larger numbers of low-skill, low-wage workers from low-cost regions across the globe. Professionals engaged in these jobs find a constant downward slide in their wages and rewards.
(tending toward the lowest sustainable wages across the globe).

Both these modes of economic activities increase the PE Score, but clearly only one of these two (Economy 1) is favourable for high wages and rewards for the professionals and their academic and industry/sector specific know-how.

Rapid developments in IT enable both these modes of economic activities as noted in Figure 2. Integration of knowledge available from across the globe is an essential element of Economy 1. The power of internet and search engines and social networking for such knowledge integration is well known. Standardisation, de-skilling of tasks and de-localisation (key elements of Economy 2), are also enabled by Digital Technology (DT). The success of companies like Walmart, FedEx, Amazon, etc and their prowess in the application of IT tools are the examples here. Worldwide most of the so-called manufacturing sector has been focused on the Replication Solutions pertaining to Economy 2. However, in the recent years, there is a shift with many new small or startup companies and also entrepreneurial ventures inside large companies to garner the power of Economy 1 for new solutions in every professional area.

Transformational skills

The above discussion leads us to the conclusion that the future of professionals in any field can lead to jobs with large content of professional’s skills and their
reward is not a broad array of job opportunities but a narrow sub-set. The work force in this sub-set is characterised by their ability to identify (discover/invent) new opportunities, develop them into useful end results and also deploy/exploit them in an effective manner. These are the professionals endowed with Transformational Skills (TS) to identify, create, implement, and validate the impact of new solutions based on physical sciences. These transformational skills also enable the professionals to develop alliances within the company and the industry, and then aggregate resources available across the globe. The ability to integrate knowledge from all available resources will transform technical professionals into the global intellect, enabling them to deploy their intellectual capital, just as investors benefit from global resources through global capitalism. The transformational skills can be listed as shown Figure 3, with a brief description of these skills as below:

<table>
<thead>
<tr>
<th>Transformational skills</th>
<th>Discovery/Define</th>
<th>Develop</th>
<th>Deploy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop a Common Language</td>
<td>System Approach for Knowledge Integration</td>
<td>Emphasis on Science and Mobile Diagnostics</td>
<td>Build Ecosystem for Core Technology Platforms</td>
</tr>
<tr>
<td>End-to-End Innovation</td>
<td>Emotional Intelligence for New Solutions</td>
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**Knowledge integration**

- **3-D view of the core capabilities:** Core capabilities are the transformation engines for any solution. They come from the technical professional as an individual, through a collection of such core capabilities across many professionals who work in the team, and finally they are exploited as the core capabilities of the company, enterprise, or industry.

- **Ability to build ecosystem based on identified core technology platforms:** Ability to build technology molecules based on physical processes and their integration leading to core technology platforms; constantly connecting the dots in the domain specific space (through physical processes) and domain neutral space (through service processes) to see the big picture instead of the pixel. Here the stress is on ecosystem development that leverages resources and opportunities across the globe; ability to constantly focus on the solution (as a whole). The ecosystem belongs to everyone. No one can claim ownership of it. Yet, it nurtures and rewards everyone who contributes and participates in it.

**Exploiting new solutions & achieving maximum impact**

- **End-to-end innovation:** E-to-E innovation = Idea X Use X Impact. Here the focus is on constantly expanding the role from discovery to development to launch, leading to maximum of identifiable impact.
- **Emotional intelligence for new solutions:** Fostering solutions that benefit others, which in turn benefit the self. While close collaboration
with customers are often encouraged for co-creation of value, build the company from outside, etc. these outcomes require emotional intelligence as the starting point for the technical professionals.

Conclusion

Education, training and effective use of professionals with transformational skills is also the role of the investors/employers, management, academia, and national policy makers. Their collaboration and engagement are necessary for a number of reasons. There is an urgent need for society as a whole to drive the growth in Economy 1 in order to mitigate the adverse effects of the growth limited to low-wage jobs in Economy 2 and the resultant downward slide of the middle class. It is also needed as the growth engine for the Economy 2 of tomorrow, essential for the long-term economic vitality and for full employment in the nation as a whole. To expand the opportunities in Economy 1 (create and implement technically advanced new solutions), society must shift gears. Today, executives in Economy 2 (intent on replicating known solutions and constantly driven to reduce cost, de-skill, outsource, and automate) are likely to sideline anyone with “big ideas” for physical technology intensive new solutions. None of the big ideas — technical, engineering, and scientific solutions — that enabled the industrialised nations would have progressed if market-driven economics were the sole criteria at the starting gate. The 21st century Binary Economy does not give the same degree of freedom and latitude for unlimited funding for new initiatives. What is necessary is a better balancing of the two modes of the economy between society’s desire to be on the cutting edge (and thus, create Economy 1 jobs for a larger number of skilled technical professionals) and the need to relentlessly leverage growth opportunities in Economy 2 (presented by replicating more of the same worldwide). On the education front, in addition to teaching technical disciplines and training students on today’s industry sectors/systems, there should be emphasis on education for transformational skills. Finally, in order for technical professionals to gain the most from their jobs and to align with the limited few Economy 1 opportunities, they need to seek out and acquire structured education and knowledge on the transformational skills, as it is in their own best interest. ☐

The article is based on a recent book by the authors of this article - Thriving in the 21st Century Economy: Transformational Skills for Technical Professionals

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