

Professionalization and Technology

Manuel Enrique Saavedra Martínez
(Pontifical Catholic University of Peru, Lima, Peru)

Abstract: The aim of this research is to determine the specific role of professionalization in a high technology context, which has an influence in the level of participation of the human factor, which until the last century was considered important in driving productivity and the return on corporate profit. With technology nowadays, firms may have increasing incomes.

The intent is to demonstrate that new technologies in Profession 3.0 are the reason for the new sociocultural way of workers. Likewise, the different elements found behind professional training are examined in analytical order.

The labor market is truly dynamic, and it is part of the mechanism of the expandable economic cycle, which homogeneously transforms the economy and the level of professionalization. However, the look of the latter in the corporate, social and political environment lacks emphasis on labor essays. This is because studies focus on measuring the number of workers and work hours, a comparison asymmetry that does not agree with the analysis of professions in the context of the digital era. Low profitability of professions makes job offers hardly attractive in the economic models.

In order to have the analytical support for the relation between technology and profession, we resort to the formalization of a theoretical framework, where the individual participation of a person with academic studies transcends the labor market as a group through professionalization. It is worth noting that the professional development model and its relation to technology span centuries, and it is used to solve the current and future labor market.

Key words: professionalization, artificial intelligence, labor market, education system, competences.

JEL codes: J

1. Introduction

Technology has entered the professional field and positioned itself through its logical tool, artificial intelligence. Such is the case that the behavior of professions that were static and owned science of knowledge are threatened today precisely due to the advance of the science that we helped evolve ourselves. This way, we have moved from enshrining academic specialization in *status quo* to an extensive model where our profession is persuaded by the use of algorithms as a group of rules applied to the need to solve specific problems with educational results. As a result of the latter and social relationships, the current context is created by maximizing technology, but not professionalization.

Manuel Saavedra, Master, Pontifical Catholic University of Peru; research areas: labor economics, economics of education, professionalization, technology and work; E-mail: msaavedra@pucp.edu.pe.

This document studies professionalization as one of the worrying aspects in the labor market which, due to the institutionalization of the era of accelerations¹, has witnessed how great improvements occur in the field of productivity. Technological development may vary in different nations according to the level of penetration, but it is moving so fast that it does not allow us to manage it: sooner or later no country or economic sector will be exempt. The current potential of technology related to the study subject, professionalization, is examined by searching for the historical connotation in the latter and the model on which the solutions are being given. It is evident that the economy is governed by the behavior of labor, but professions are susceptible to automation. This stance of discovering the historical instrument of professions tries to find the moment in which technology begins to have an impact and makes us reflect on the comparative phases that we state herein, such as: Profession 1.0, Profession 2.0, and Profession 3.0. Specializations were created by humans, and so was technology. We have to keep in mind that the immediate task of artificial intelligence is to assist us, not to substitute us; as Hariri (2015) maintains, “there is tremendous progress in IT intelligence, but progress in IT awareness has been non-existent.” This reflection from the historian has been confirmed to be transcendental for humans when opting for an acknowledgement or guidelines through specific policies which, until this century, are not in a common agenda.

This way, it is worth asking, should we keep immersed in the traditional way of thinking about professions, or should we take the development of digital economy into account? Without a doubt, we do not assume this questioning consciously because we observe the useful part of technology through the product or service of the competitive price. The challenge is to bring artificial intelligence to the labor market by increasing the prosperity levels of individuals: promote a culture of continuous learning, put an end to the idea that we are masters of our own careers, and/or explore interdisciplinarity.

2. Literature Review

While technology is the most appropriate option to optimize work time and provide good service in the field of corporate productivity; in the field of education, professionalization converges based on the academic model positioned by the educational institution. The presence of these evidences makes us redefine the paradigm where the vast majority of educational institutions let the vision of the academic governing body guide them without checking the demands of the labor market. In addition to this, we observe that the presence of technology no longer competes with products in the market, but with the availability of professionals themselves. In this sense, since the vertiginous trend of artificial intelligence has no end, it is imperative to reflect on the state of professions in the labor market. Thus, Boston Consulting Group, a consulting firm, determined in July 2020 that there are 1.3 billion people whose competences are misaligned with the work they perform. It is very likely that this number has increased due to the effect of Covid-19 and, as we already know, growth is a sequence of events or aspects of a situation that appear along the way until reaching its limit, but the technological element is not limited, unlike production factors (work and capital). We can expand on the comparative reflection with a land where fruit stops growing in a given cycle, thus requiring nutrients; however, climate change can also be detrimental for the field and its crops. By contrast, technology has no limit and constantly varies in our human activities.

Questioning and research around professionalization lack a deep study because daily aspects make us

¹ Term attributed to Will Steffen, a researcher from the Australian National University and the Stockholm Resilience Centre. The author maintains that technological, social and environmental matters have been accelerating and are connected, enabling the transformation of society.

reconfigure our reality and leave us little space to think about it. Nevertheless, considering the advance of technology and the almost non-existent evolution of professionalization, in this research it is important to historically classify the phases of professionalization in relation to technology: Profession 1.0, Profession 2.0, and Profession 3.0. Thus, according to Table 1, in the Profession 1 scenario one could survive in the face of any technological variation. In the 20s, an administrator had the possibility to join the labor market just by graduating from his academic studies. Conversely, the Profession 2.0 scenario in the 80s follows the same behavior pattern as the previous one, but it allows the administrator to reinvent himself with the technological advances, since in this phase new skills are learned by using software intensively, keeping the objectives of the specialization active. In these two stages, one could do outstanding work by only having empirical knowledge, complemented by learning new IT programs.

Table 1 Impact of Technology on the Stages of Professionalization

Level	Profession 1.0	Profession 2.0	Profession 3.0
Does it survive with technology?	YES	YES	YES
Does it reinvent with technology?	NO	YES	YES
Does it disappear with technology?	NO	NO	YES

In Profession 3.0, the administrator makes use of technology, where both software and hardware can be redesigned and reinvented with the further difficulty that it is detrimental to the specialization, given the presence of artificial intelligence. This administrator sees his profession endangered because the decisions made in his daily activities are processed by an algorithm that, with the amount of stored data, will be able to recognize how the annual plan was organized compared to previous years, propose how effective they are as an organization in the face of an increase in profits, and make decisions based on that. In the Profession 3.0 scenario, it is observed that it immediately escalated to the maximum job category. For example, in the year 2020, Deep Knowledge Ventures, a venture capital firm from Hong Kong, appointed an artificial intelligence to its board of directors where it would play the role of estimating the instruments of stock exchange in order to recommend potential actions. In this case, the program will validate the best decisions for financial investment and the successful return on investment. Profession 3.0 is a milestone in the fragmentation of human labor.

It is evident that artificial intelligence has positioned itself as a dominant force, and in this line of thought, Harari (2015) maintains that "...as time passes by, it becomes easier and easier to replace humans with IT algorithms, not only because algorithms are more and more intelligent, but also because humans professionalize." The reflection of the author promotes that, throughout human evolution, we have been specializing, and these predictable behavior patterns actually generate space for the promotion of programming skills that can be easily used by artificial intelligence.

The specific development of profession, from its classic viewpoints to the involvement of psychology, transcends due to the appearance of Fordism and Taylorism studies, completely focusing on the organization of production parameters. Based on this, professionalization is measured in companies through salary and, in practice, it has a direct relation to technology for productivity purposes. However, in terms of income, the relation is the other way around; that is to say that the greater the disruption, the lower (or fixed) the actual salaries are for professionals. Companies are expanding, but average salaries do not follow this trend. As shown in Figure 1, the monthly average income of Peruvians with higher education only grew 0.4% in a period of 10 years. This means that firms value professions depending on the level of the job: number of workers and work hours, putting aside the aspect of professional qualifications.

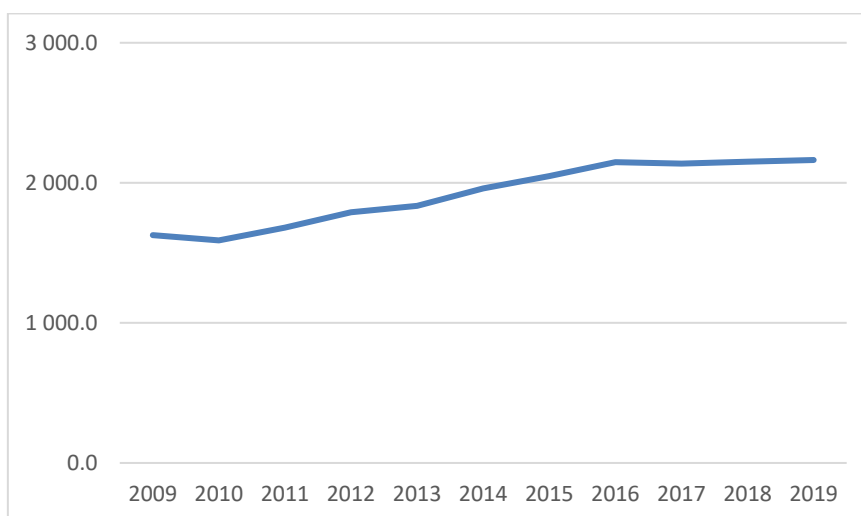


Figure 1 Peru: Monthly Average Income According To Higher Education (in PEN)

Source: National Institute of Statistics and Information.

Thus, professions, along with the salary structure, move into the background because the efficiency and productivity of the number of workers or work hours are maximized by technology. In this way, organizations do not seek to analyze professionalization, so it becomes important to include it in future economic models. Along the same line, with other comparative variables regarding salary and technology, Raworth (2018) notes that “in the United Kingdom, since 1980, GDP has grown much faster than the average salary of workers, while the salary gap has also increased, which in 2010 resulted in average workers earning 25% less than what they would have earned under other circumstances.” This author also notices that in western countries where worker productivity grew about 5% between 2009 and 2013, salaries only did so in 0.4%. The latter is similar to the value for Peru, even though we do not have advanced technology as countries with high income.

Although the way technology operates leads to an improvement of life standards, until Profession 2.0 the effects on labor were reconstructive since they allowed productivity based on the worker-technology pairing. In a sense, the model worked due to the fact that firms demanded workers with a high education level; therefore, the educational institutions balanced the system by shortening the gap.

Youngsters are supposed to become pre-professionals before joining the labor market, but the growing inequality appears in the report from the International Labor Organization (2020a) due to the technological advances, indicating that “paradoxically, despite being the first ones to enthusiastically adopt new technologies, youngsters also tend to worry about the possibility of their jobs being replaced by robots and artificial intelligence.” In spite of this reality, educational institutions only further training in competences related to personal interrelations, but no educational approach has been observed to perfect youngsters in the professional spectrum, for instance. The aforementioned expresses the perception of youngsters – especially centennials in 6 countries of the Latin American region — shown in Table 1, in which they place being a good professional with the technical aspects of the profession as second-to-last. It is evident that ethics is the intrinsic value that any worker needs to have in the DNA of his professional growth.

In this survey, it is clear that youngsters’ common thought has a usual clarity in the situational aspect faced by these nations due to the social circumstances, which can be easily developed from basic education and

complemented at home to minimize this thinking. Nevertheless, it is worrying that the future events involved in the profession for centennials do not have futures studies of professional exposure in technology yet and are part of the challenge of the technical training for the job.

Table 1 Habits, Perceptions and Expectations Regarding the Labor Market of Latin American Centennials Who Pursue Business Careers in Educational Institutions

	Argentina	Colombia	Ecuador	Mexico	Paraguay	Peru
Ethics	42%	69%	73%	71%	69%	75%
Ability to learn	79%	72%	66%	66%	61%	69%
Good relationship with others	68%	60%	52%	56%	62%	64%
Time management	49%	49%	39%	35%	38%	42%
Knowledge of the technical aspects of the profession	27%	25%	38%	35%	48%	33%
Hard work	36%	25%	31%	37%	23%	18%

A little valued  Very valued

Source: San Ignacio de Loyola Institute – Latin American centennials in the labor market, February 2021.

Consequently, it is important to reflect whether professions only need curricular adaptation to consider new skills or how to face the new Profession 3.0 scenario by way of constant updates. Another aspect extended in practice and expressed by Tirole (2016) is professionals' behavior while doing activities that imply repetitive tasks. The Nobel prizewinner in economy observes a growing tendency in decision-making with logical behavior; that is to say, previous decisions will always add compensatory value to current decisions. This is part of our culture when in the face of new information.

3. Theoretical Approach

The idea of work began with the Greeks and Romans who transferred labor to their servants. In Genesis 3.19, it reads, “by the sweat of your brow you will eat your food.” This changed with Lutheranism, and with Calvinism it focused on the middle class. Classical theory understands work as the value creator of goods (David Ricardo, thinker of the classical economics school). Afterwards, with Marx work is emphasized over the distinction between workforce (ability to generate value) and work itself (amount of value). This differentiation made Marx consider the dichotomy between capital and work. In this century, capital and work are complemented by the direct relation between worker and technology, where the former generates ideas and shares knowledge, and the latter enables the transformation of job levels. This makes the action of work extend to an action subsequent to the conception of academic education, and the latter determines how to catalogue a person in the labor market through profession.

Questioning and research around professionalization lack a deep study because daily aspects make us reconfigure our reality and leave us little space to think about it. Thus, we know that professionalization appeared in Plato's *Republic* (370 B.C.), “...rulers and the aversion of city defenders towards agriculture, trades and businesses...”, which approaches the organization of states from the perspective of having specialists who revolve around the institutional framework of nations. In this scenario, Rifkin (2009) specifies that Sumerians in Mesopotamia created the first society with professionals because “they had to create specialized jobs to build artifacts and organize cereal production, storage and distribution. The first specialized workforce in history consisted of architects, engineers, miners, metalworkers, accountants and others”. Later, the concept of professionalization

grew in 1776 with the book *The Wealth of Nations*, where Smith reveals the division of work and gives it an economic connotation, which is to date the model that offers “solutions” to technology-centered problems. Nevertheless, its complexity exposes two situations: on the one hand, the growing interdisciplinary nature developed in companies and, on the other hand, training situations from the academy.

The best definition of profession I have been able to find is the one from Evans (2019), a professor from the University of Manchester, who defines it as “a work practice that is coherent with the outlines agreed upon and commonly held for a specific profession or occupation, and from which both contribute to (and reflect on) the perceptions of the purpose of the profession or occupation...” Described as such, profession is determined by the approach of a person towards any activity linked to work, a qualitative situation that determines a trait in the person and through which a practice is implied.

Firms understand that the participation of the human factor through technology drives productivity. For this reason, today they pay special attention to restructuring the organizational system using dominant trends such as: forming interdisciplinary teams, reconfiguring training, providing uniform work spaces “without owner”, and demanding to work for a purpose. Therefore, this new arrangement of work relation in the automation scenario involves individuals’ rationality, where our traditional way of working changes to an invisible approach that we need to keep implicit when facing work challenges, such as the habit to have an analytic profile, identify challenges and generate ideas, be part of professional networks, among others. Along this line, Tegmark (2017) poses 3 basic assumptions to value professional careers: it requires people interaction, it provides ingenious solutions, and daily work is unpredictable. This way, the author states that the more positive responses are, the less likely to be absorbed by automation the profession will relatively be. Ergo, an inverse relation is observed: the higher the level of automation, the lower the level of participation of professions in companies will be.

In terms of quality of professionals, in the labor market the gap between workers with higher or lower education level is minimum, as highlighted by Friedman (2018), “the qualified part of each job requires more competence and it is rewarded, and the routine and repetitive part, which may be easily automated, will be paid minimum wage or assigned to a robot.” This context poses great challenges for professionals because they will have to nurture themselves with differentiating abilities due to how highly technical work relations become. For this reason, Table 2 highlights the challenges professionals must transcend based on three skills that they need to develop in order to compete with technology. Thus, one is adaptability in order to be ready to change the area of specialization three or more times during the labor stage; algorithms are programmed for decisive structures with a regular timeframe for practice and execution. Another one is resilience, since there will no longer be job security; therefore, the ability to reinvent oneself under any circumstance will be the most valuable asset. The last one is surprise, which translates to the intention to execute or present disruptive ideas or keep on studying, as many times as possible, to go along the speed of change.

Table 2 Skills To Minimize the Impact of Artificial Intelligence in Professional Jobs

	Human	Algorithm
Adaptability	1. Change area of specialization. 2. Strengthen collaborative and interdisciplinary culture.	1. It is designed per area. 2. It is replicated from a model or symbolic rule.
Resilience	1. Think that the job position is not forever. 2. Generate new data flowcharts that help estimate predictive models.	1. It is updated over a product or service. 2. It is based on accumulated data: structured or not.
Surprise	1. Present disruptive ideas. 2. Develop abstract learning: studies on future scenarios.	1. It is based on the programming of human ideas. 2. Machines are programmed by learning (human imitation).

In the current labor situation, intrapreneur² thinking needs to be taken into account as constantly designing solutions or products. More factors are very likely to be found as automation technology advances. However, this approximation seeks to focus on the tasks that are done individually in organizations, which can be compared to artificial intelligence due to the fact that the great number of professions is made up from a great number of activities and, thus, it may depend on the structural design of artificial intelligence, and not necessarily on academic education.

4. Conclusions

Historical context has shown that professionalization and technology have an interpretative model that has not provided us with effective solutions between labor supply and demand. This rate of convergence towards the expected level of companies becomes the individual strategy in the face of labor demand.

It can be noticed that the addition of automation to the production process tends to minimize professional presence. As previously stated, this invites us to redefine policies around the digital age as a means to not separate professionalization from technology. In this way, jobs could be requalified based on occupational structures already defined in automated systems.

The decisive strategy is to accompany the definition of professions along the way of hybrid specialties that irrationally appear to conventional professions. Educational training must then follow the trajectory of the technological trend on two aspects: on the supply side, to design the academic curriculum including topics based on what artificial intelligence cannot do in any discipline and, on the demand side, to not take the completion of a major for granted, but to participate in a complementary one. This does not escape the fact that professional skills must incorporate differentiating aspects such as working with people interactively, ingenuity to propose creativity, and discerning in unpredictable scenarios. In other words, we must not make the mistake of competing with a machine that has repetitive tasks configured to justify the continuity of our job.

In this way, technology and education, on the one hand, need to find an interaction pattern where the neutral aspect of digitization is the central issue. In this sense, for example, the most recent experience of the manifesto of the 2020 National Artificial Intelligence Strategy of the Government of Spain presents 6 strategic axes, one of them being an important aspect that scholars do not promote to date: the ethical and regulatory framework of individual protection. This experience helps strengthen the orientation to social stakeholders to keep the advancement of the digital age, hence the importance of replicating this type of initiatives to formalize an institutional policy on Profession 3.0.

It is reasonable to think that specialization unfolds in the labor market, which catalyzes the modulation of what we study, so it is expected from this side to obtain formal products that serve to establish a political need leading to its regular application. This does not avoid the competence that government regulators must have; their responsibility is to pay attention to the rhythm and set the tone, being careful not to block any emerging technology, but ensuring profession development.

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