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Digital Reskilling and Upskilling, Unprecedented Scale, Impact and Best Practices

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Introduction

Well justified high expectations regarding digital technologies' adoption and impact, have proven to be difficult to fulfil in most countries and sectors, as a set of not-so-obvious limiting factors have been cancelling out the main and well-established incentives. Chief among limiting factors is the scarcity of digitally skilled human capital.

Large-scale Digital Skilling emerges as the core requirement for digital advancement and as the necessary condition for the creation of new jobs of a similar magnitude than the ones being rendered obsolete.

This paper establishes the need for Digital Skilling at an unprecedented scale and defines its two varieties; reskilling and upskilling. It also assesses the level of readiness of economic agents, and presents the main required changes in corporate priorities, and public administrations' roles and capabilities, along with the need to establish a cooperative approach. Additionally, it presents some of the guiding principles that arise from the best practices of digitally advanced countries and leading corporations.

Disincentives to Digital Transformation

Expectations regarding digital technologies adoption since their large-scale emergence in 2018, have been persistently optimistic, as analysts and researchers identified three sets of adoption facilitators: first, the fast-advancing technological maturity, and range of applications provided by these technologies. Second, the low technology acquisition costs and minimal fixed capital investments required, thanks to cloud computing. Finally, the gamut of advanced capabilities provided and the benefits generated, have been tested, refined and proved with large-scale successful implementations in the advanced manufacturing sector.

These optimistic expectations have proven stubbornly difficult to fulfil in all other sectors and most countries, due to a set of initially underrated disincentives:

1. First of all, the fact that the bulk of benefits and new capabilities provided by digital technologies are generated when processes are modified to leverage them, which results in a delayed positive business case.

2. Secondly, the advantages of advanced and cost-efficient services offered through cloud computing, such as Information and Communication Technologies infrastructure (IaaS, Infrastructure as a Service), and applications which provide advanced capabilities (SaaS, Software as a Service), are offset by the lack of trust regarding data governance and ownership of the enterprises using them.

This lack of trust becomes acute when IaaS and SaaS services are offered through a specific enterprise platform, and other enterprises have to interface and provide transactional data to that platform, in order to conduct business.

3. Thirdly, without changes in corporate culture regarding risk-taking and professional rewards, there is a generalized lack of career incentives for managers and technicians in most countries to undertake potentially risky new technology adoption initiatives.

4. Finally, and most importantly, the advancement towards Digital Transformation relies on initially affordable but complex technologies that require human capital with updated technological and managerial digital skills. For many corporations and organizations, the incentive of low digital technology acquisition costs is being offset by the scarcity and high cost of the skilled personnel required to: make digital technologies' adoption decisions, efficiently deploy them, and undertake the changes in operational processes necessary to generate benefits.

The article [State of Digital Maturity-2018-2023, Evolution, Stages and Barriers](#) provides a more detailed and updated analysis of the main barriers and disincentive for the advancement of corporate, sector and country digital maturity.

The articles [Digital Advancement - Knowledge Transfer & Skilling](#) and [Digital Advancement – Strategic Platform Management and Ecosystem Participation](#) include further analysis on actions and incentives to overcome digital barriers and facilitate corporate sector and national digital maturity.

Digital Skilling, Scale and Impact

23% of the Labour Force Worldwide Will Require Digital Skilling by 2027.

The main reason why personnel with up-to-date digital skills is scarce and expensive, and the main limiting factor for the Digital Transformation advancement at corporate, national and sector level, is the sheer quantity of required digitally skilled personnel. Surveys and forecasts conducted by the World Economic Forum in 2023 for the 45 countries that generate 88% of the worldwide GDP indicate that this required amount is 23% of the overall labour force across 2023-2027. This is a higher number than the previous analysis of 2020, which estimated 13,5% over five years (WEF, 2020).

These unprecedented numbers arise from the fact that both, technological and managerial digital skills are required to facilitate the transformation of processes for a broad range of corporate activities, including planning, operations, logistics, inventory management, manufacturing, sales and customer management. Additionally, new digital capabilities also enable new product and service development, as well as go-to-market and business models.

Net Effect of Digital Transformation on Job Displacement and Creation.

The development of new digital skills at this scale is not only a necessary requirement to advance towards Digital Transformation, but it is also a social issue, as digital technologies accelerate job displacement through the automation and replacement of human tasks and are already leading to the obsolescence of entire job categories, while also generating new professions (LinkedIn Economic Graph, 2023). Therefore, without a vast increase of digitally skilled individuals, unemployment will grow, and an unbalanced and outdated labour marketplace will appear.

Studies conducted around 2020 agreed that job destruction due to the adoption of new digital technologies would be large and generalized across all sectors, amounting to 14% of the world's jobs over 15 years (OECD). Additionally, it was estimated that only 2% of the labour displaced would be able to transition to another job by their own means (BCG & WEF). Updated 2023 studies indicate that this job destruction has accelerated to an estimated 12,3% in just over five years (WEF, 2023).

Forecasts also concur that the creation of new jobs will be of similar magnitude. In 2020 it was estimated that the net effect would be almost neutral across all countries and sectors, but only if efforts are undertaken

to provide the rapid acquisition of new digital skills (reskilling) and the actualization to brand new roles (upskilling) for a large number of employees (WEF, 2020). Most recent forecasts indicate a tilt towards job destruction, with an estimated job creation of 10,25%, which results in a net decrease of 2% of the current employment by 2027 (WEF, 2023).

Differences between Reskilling and Upskilling

Digital professional skill building can be divided into, reskilling and upskilling depending on the objective, the scope of the updated skills and the length of training required to achieve them.

Reskilling is the professional training for personnel, management and technologists to improve and expand their skills, in order to adjust to the changes generated by digital technologies in their current role and position. The objective is to bolster employees' performance and facilitate job maintenance and employability. Reskilling applies to roles still in demand, that have been significantly modified by digital technologies. It applies, depending on the country, to a minimum of 65% and a maximum of 81% of the labour population impacted by digital advancement. The time required to undertake it ranges from less than three months up to a year.

Upskilling is the professional training addressed to allow employees to switch from present roles and responsibilities that are becoming obsolete, to new roles in high demand. Upskilling results in learning fresh skills and adequately performing in brand-new positions generated by the adoption of digital technologies. It applies to a minimum of 19% and a maximum of 35% of the labour population impacted by digital advancement. The time required for a successful upskilling transition ranges from one to two years.

Large Scale Digital Skilling, Country Differences in Readiness

The economic, social and competitive needs to provide reskilling and upskilling at an unprecedented scale, find corporations, sector associations, employees and public administrations at different levels of readiness depending upon the level of digital competitiveness of their countries.

According to well-established, and extensive international digital competitiveness analysis, as describes in the article [Digitally Advanced Countries, Typology and Learnings](#) there is a group of digitally advanced countries that consistently rank in the top eight positions: 1. USA, 2. The Netherlands, 3. Singapore, 4. Denmark, 5. Switzerland, 6. Republic of Korea, 7. Sweden and 8. Finland (IMD 2021, 2022, 2023, Tufts University 2020, EU 2022, 2023).

These leading countries have been getting ready for the generalized adoption of new digital technologies, starting to adjust, as early as 2017, their basic and tertiary education, professional skilling capabilities, R&D, legal frame, infrastructure, adoption and usage of new digital technologies by consumers, corporations and public administration. Additionally, their business cultures and compensation systems have evolved to promote risk-taking and cooperation.

The second group are countries ranking 9th to 15th. It comprises countries that despite having significant digital capabilities, each still have a specific set of limiting factors. In this heterogeneous group, ranking positions change annually depending on how successfully they address their specific limitations. They include countries steadily improving their ranking like Taiwan, (16th in 2018 and 9th in 2023), and those that continue improving enough to maintain their position like Canada (11th) UAE (12th) and Israel (13th). Additionally, there are countries not able to improve enough their limiting factors resulting in a decrease in their digital competitiveness, like Norway (6th in 2018 and 14th in 2023) and Hong Kong (2nd in 2021 and 10th in 2023).

A third group that presently ranks in the 16th to 20th position is composed of countries catching up and steadily improving their digital competitiveness like; Belgium, (23rd to 15th), Iceland (21st to 17th), Estonia, (25th to 18th) and China (23rd to 19th 2023). The UK presents a stark contrast with a decline from 10th in 2018 to 20th in 2023.

The rest of the countries have well-entrenched limiting factors and bottlenecks, limited digital capabilities and insufficient Digital Skilling, not generalized enough to significantly increase their overall digital competitiveness. Digital Transformation is uneven and mostly limited to a few sectors and large corporations.

Our research and analysis indicate that despite their position in the ranking, the gap between them and the

leading countries regarding readiness to improve human capital digital skills and to advance their overall Digital Maturity is indeed growing. For more details, please check the articles dedicated to national digital competitiveness.

Corporate, Labour and Public Administration Readiness

The need to provide reskilling and upskilling at an unprecedented scale finds corporations, sector associations, employees and public administrations of most countries not fully prepared. The traditional corporate approaches to address skill gaps, like the influx of young recently educated personnel, hiring from other corporations, the limited training of their existing workforce, and self-directed individual skilling, all are insufficient to provide the required number of digitally skilled personnel.

Presently, all leading consulting firms consistently advise corporations to re-evaluate their cost-benefit calculations for corporate-funded employee skilling and also advocate for corporations to finance long-term upskilling instead of firing personnel with outdated skills. It is revealing, that leading consulting firms with a long history of profit-oriented advice, that even spearheaded the corporate re-engineering wave of the 1990s, are now consistently advocating for long-term training for employees, and advising against layoffs.

Despite significantly increasing the corporate resources dedicated to Digital Skilling, all surveys and projections indicate that corporations big or small, will not be able to completely address the new skilling challenges just by themselves. Even large corporations will manage to internally reskill and upskill only an estimated range of 40% to 45% of the employees required.

Regarding employees, despite that Digital Skilling provides them with the skills needed to maintain and even advance in their careers, they face this new challenge with reservations, after decades of increasing efficiency demands and job insecurity. Based on recent history, a large part of employees perceive reskilling and upskilling as an additional effort, to at best maintain present labour conditions.

Lack of preparation, limited resources and little internal skilling culture drive corporations and sector associations to turn to public administrations for solutions.

Administrations in most countries are facing these demands, equipped with professional education systems historically oriented to young students' training, and limited interest and capabilities for the adult professional education of already employed personnel. Additionally, most public administrations have experienced decades of pressure to limit their field of action.

On the other hand, digital reskilling and upskilling initiatives of the most digitally advanced countries except the USA (IMD 2022, 2023), build on a strong role of the public administration, working in close cooperation with corporations and associations, and providing multiple incentives to corporations and employees, to achieve Digital Skilling objectives. This strong role is also advocated by analysts and researchers regardless of their political orientation. Additionally, detailed positive business cases for public investment in Digital Skilling have been developed, which consider the opportunity costs of welfare, and missed opportunities for taxation without including costs harder to quantify, such as the effect of job displacement on families and health, and overall social instability (BCG & WEF).

Digital Reskilling and Upskilling, Best Practices and Guiding Principles

Direct research on corporate and public Digital Transformation and Digital Skilling best practices reveals a set of successful guiding principles. The following is a brief description of some of them, that are further developed with corporate and public Best Practices in the article [State of Digital Maturity-2018-2023, Evolution, Stages and Barriers](#).

1. Multi-stakeholder Collaborative Skilling Efforts Lead by the Administration

The changes, planning and resources that large-scale reskilling and upskilling entails, exceed the capabilities of corporations, associations, unions, employees, and academia. Best practices from the most digitally advanced countries indicate that successful large-scale skilling is often the result of a multi-stakeholder cooperative approach, led and financed in good part by public administrations. This active role of public administrations is particularly well suited in countries with business cultures defined by limited collaboration.

2. Strategic Workforce Planning and Skills Mapping

A core challenge that corporations and public administration face when developing reskilling and upskilling programs is to have a clear understanding of what skills and jobs, and in which quantity will be needed in the future. Countries with strong professional educational systems like Germany, Sweden and Finland have been analysing labour market demands and forecasting labour supply needs for a nearly exhaustive number of jobs since the 1950s. Their analysis is organized around sectors and also involves the mapping of decreasing and increasing skills and their learning transition path. Furthermore, since the early 2010s, digitally advanced countries like Denmark, Finland or the Netherlands have applied that experience to specific digital strategic workforce planning and digital skills mapping.

Corporations, sector organizations and administrations in countries with little or no experience in strategic workforce planning can obtain national, sector and sub-sector analysis from a handful of specialized companies, and from leading platform-based learning providers specialized in large-scale reskilling and upskilling. For more information, please check the dedicated article about this topic.

3. Evolve and Leverage National Professional Education and Tertiary Education Systems

Existing national professional education systems, even if only oriented towards young students, can be expanded and their capabilities and infrastructure leveraged, to provide reskilling and upskilling for adults already employed, even for highly qualified jobs. Additionally, adult professional education can be intertwined with the tertiary educational system, to provide professionally and technically oriented education and short-term degrees. This expansion is at the core of the cutting-edge Digital Skilling capabilities of most digitally advanced countries. Specific examples include Denmark's adult vocational training system, (AMU), which offers 3,000 programs organized around 130 work areas, and Finland's tertiary educational system which includes 23 technical universities, and just 12 research-oriented ones.

4. Leverage Platform-Based Learning

Large corporate Digital Skilling efforts without major public administration significant involvement started in 2018 with AT&T's pioneering program, which successfully reskilled and upskilled 100.000 employees. The program achieved that 81% of the company's digital technology

jobs were filled internally, increased the newly skilled employees' career promotions likelihood by 70%, and reduced labour turnover by 60%. This successful experience paved the way and incentivized other leading corporations, to undertake similar efforts.

Near all these programs, followed, a well-defined set of principles, and implementation methodology that have been improved over time. Principles include a revised concept of leadership and hierarchy, rewarding trial and error and risk-taking, transparency, consensus and labour involvement, plus centralized program management and the high importance of strategic workforce planning and skills mapping.

The implementation methodology's main characteristic is the reliance on customized platform-based learning solutions, that provide customized content, and sophisticated program and career management capabilities at low cost.

Direct research indicates that currently, the threshold for a fully functional solution is 200-500 individuals, and that setting up the program is just a small fraction of the main cost, which is the salaries of employees being paid while training. The relatively small scale threshold allows not only the use of platform-based learning by a single large corporation, but also by a coalition of corporations of any size, by sectorial organizations and by consortia of corporations, associations and public agencies. They can do it either as the main skilling delivery mechanism or as a complement to academic and adult professional education.

Conclusions

Digital Skilling of management and labour, to provide the new skills and roles required for the advancement of Digital Transformation, is also a necessary mechanism to avoid massive unemployment and to ensure that the whole population enjoys the benefits of new digital technologies. The scale and complexity of providing the adaptive skills to confront the structural changes that Digital Transformation generates is unprecedented, and should not be downplayed.

Failing to provide these skills in a specific country or sector will slow down its Digital Transformation, resulting in massive unemployment, as local corporations and the overall economy will lose competitiveness. This loss of competitiveness will reduce exports as local products and services will become outdated and more expensive, while imports from digitally advanced countries will rise. In the long term, there will be an increasing risk that local companies will be progressively substituted by those from more advanced and competitive countries. The digital gap between advanced countries with society-wide reskilling and upskilling capabilities, and the rest has widened in the last 4 years.

Policymakers, corporations, associations, public administration and academia should be aware of these risks, and assess, the numerous and well-established experiences and best practices, to potentially adjust and apply them to their sectors and countries.

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