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Degrees, Skills, and the Architecture of Human Capital: Reconceptualising India's Path to Inclusive Economic Development

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Abstract – This article proposes a common analytical approach to the understanding of the role of human capital formation in economic development of a large economy with a young population like India, with global implications. The manuscript takes a different approach from the binary framework where formal degrees and vocational skills are often pitted against one another that is often analytically misleading, and suggests that a tightly coupled degrees-plus-skills model, where credentialed education, applied skills, and lifelong learning are all complementary inputs, is developmentally optimal. Based on the concepts of human capital theory, signalling theory, the capability approach and endogenous growth models, the article builds a conceptual framework which differentiates the basic, signal, productive and adaptive roles of education and places skills within. It then critically reviews empirical evidence on the returns to education, employability gaps and skill mismatches in each country before moving to eight chapters of in-depth analysis on the practical applications, societal impact, social benefit, governmental use, public-sector development, policy relevance, implementation considerations and future opportunities. The analysis shows that the demographic dividend can only materialise as a sustained one if the educational system is coherent, with a connection between curricula, certification, labour market signals, and continuous reskilling, rather than on a particular expansion of any one educational modality. This article concludes that the real policy issue is not choice of degrees vs. skills but engineering the alignment, portability, and equity of an integrated human capital system.

Keywords: Human capital, Skills development, Higher education, Demographic dividend, Employability, Lifelong learning, Inclusive growth, Education policy, India, Endogenous growth.

1. INTRODUCTION

Amongst the most enduring ideas of the social sciences is the notion that economic development hinges on the quality of the people of the nation this idea has yet to be sufficiently specified in policy practice. This conflict is most significant in a large youthful economy, where, not only is the impact of successful human capital formation larger, but also the impact of failing to do so is larger. India is a veritable example of this condition as the median age is much lower than the global average and millions of new entrants are added each year to the labour market. Much of the nation's development path over the coming decades will depend on whether it will be able to transform a large and growing working-age population into a productive, adaptable and learning population. Economists have long referred to this potential as a demographic dividend, but this is not a dividend that simply falls from the sky it is dependent on the institutional capacity to provide people with the capability to be productive to the economy and rewarded for it.

In India and other similar economies, the prevailing discourse on this challenge has been one in which a conflict between two different logics has been perceived. On the other hand, there is the prestige and signalling of the university degree for a long time regarded as the key for employment and social mobility. The pragmatic value of skills, vocational training and job-ready competencies with high promise of employability and closer match to employer needs looms on the other side. This article argues that the degrees-skills relationship is a category error. Skills and degrees are not competing products with a limited budget, but complementary parts of a whole, with each serving a purpose which the other cannot fill. Qualifications without work-based skills leads to underemployment and credentials without education leads to brittle workers who are unable to evolve with changing technologies and tasks. It is then not a question of which to select but how to combine the two into a complete, fair and ever-evolving system.

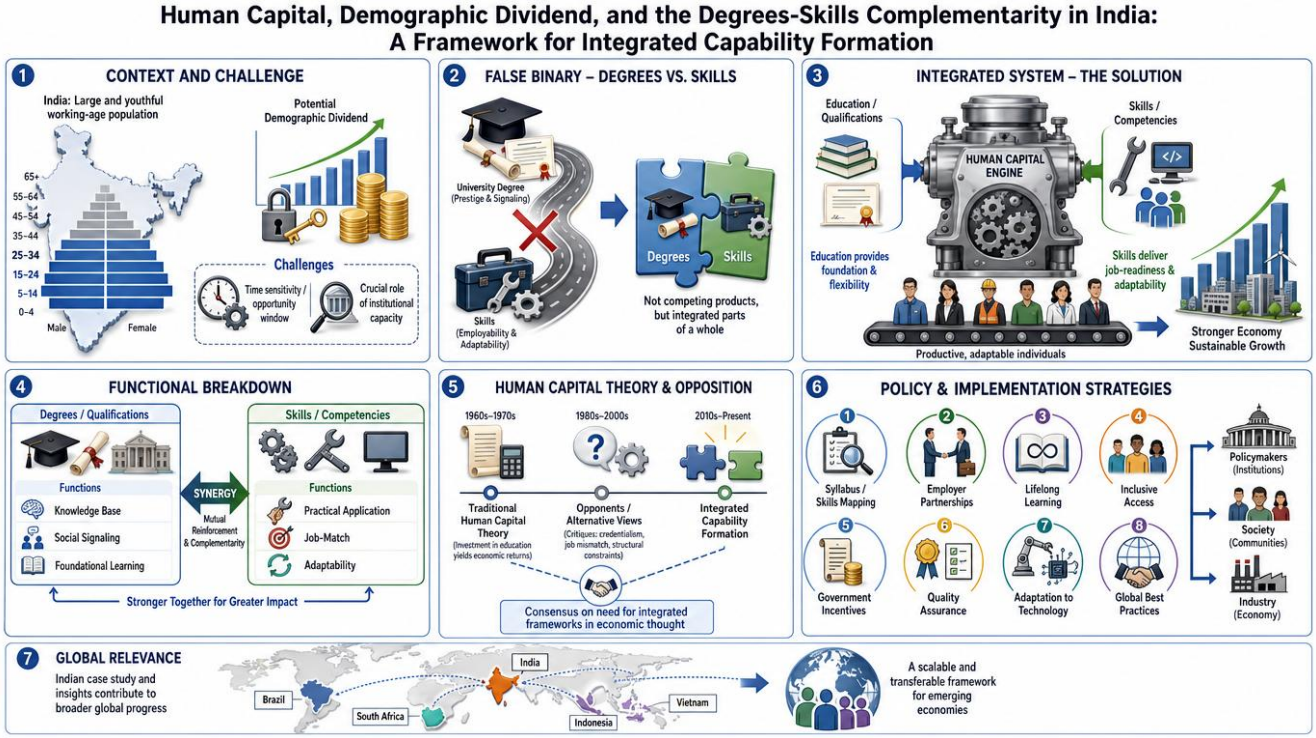

Fig -1: A Framework for Integrated Capability Formation

There are three contributions of this article.

First, it provides a conceptual breakdown of the functions of education and skills that provides a way to break down the false binary and understand why complementarity not substitution is the right analytical starting point.

Second, it places this argument in the context of a critical review of the human capital theory and its key opponents, showing that the most prominent trends of economic and developmental thought agree on the significance of integrated capability formation, despite differing views on how.

Third, it creates eight chapters on analytical aspects of innovation that bring the framework into the societal, governmental and policy areas, focusing on implementation aspects and future avenues.

The argument is made throughout to a global audience and although the Indian case serves as an empirical anchor, it is in spirit designed to be transportable to other large emerging economies with similar demographic and structural characteristics.

2. LITERATURE REVIEW

In the mid-20th century the intellectual basis of the human capital view was laid with the seminal work of Schultz (1961) and Becker (1964) who rethought the cost of education, training, and health and redefined it as an investment with measurable returns, not consumption. This reframing was revolutionary in that it inserted the creation of human capabilities into the analytical framework of investment theory and thus enabled economists to calculate returns to schooling and to consider education policy as an issue of capital allocation. In the 40 years since Mincer's (1974) seminal paper on the relationship between wages and years of schooling and experience, the empirical workhorse for subsequent decades of research has been the earnings function. As summarised in the review papers by Psacharopoulos and Patrinos (2018), the average private returns to an additional year of education have generally been found to be in the range of eight to ten percent per year of school globally.

However, the belief in the importance of human capital was not taken for granted. The idea, put forward by Spence (1973), was that education may increase wages more as an indicator of otherwise unobserved ability to employers than as an increase in productivity. The screening hypothesis suggests that much of the wage returns to degrees are due to sorting and not skill formation. This is by no means a theoretical distinction, but rather one that is relevant to the main thrust of this article. So, if degrees are mainly signals, the developmental value of degrees is less than what human capital theory suggests and the argument for direct skill investment becomes stronger. The current evidence presented by Lange and Topel (2006) indicates that both mechanisms are likely to be active at the same time: education demonstrates as well as creates capability, and the relative contribution of the two mechanisms is context, field and labour-market-structure dependent.

A third tradition is to rethink the whole debate in the light of the capability approach, as pioneered by Sen (1999) and Nussbaum (2011). Here education isn't just seen as a means of increasing incomes, but rather as an element of human freedom and the basis for the substantive capacities that enable people to live lives they can have reason to value. This is a key lens in an inclusive development analysis as it does not fall into the trap of thinking of human capital in purely productivity terms. It demands that the opportunity to education as well as the education's ability to be functioning should be measures of development. The capability framework also highlights the importance of skills going beyond the market price the skills to communicate, reason and adapt, add to the agency of people throughout their lives.

Endogenous growth theory provided a further twist to the macroeconomic literature. As Romer (1990) and Lucas (1988) have shown, the accumulation of physical capital is subject to diminishing returns, but long-run growth can be sustained by human capital and the knowledge that it can create. In these models the human stock can have an impact on the output level, but also on the rate of technological progress, because educated people are more likely to innovate and to take up new technologies. This was further strengthened by the Schumpeterian growth model of Aghion and Howitt (1992) that related education to creative destruction of a society. The policy implication is important: human capital investment creates externalities which are not sufficiently valued by private agents, making it important to have public action.

But the empirical record intruded on the sunny picture. Expansion of schooling is associated with growth in many developing economies and the relationship between the two is not very strong, as summarized in Pritchett's (2001) provocative paper, where has all the education gone. This puzzle catalyzed a turn from quantity to quality in the development literature. As the authors Hanushek and Woessmann (2008, 2015) have successfully argued, the developmental returns depend not only on the number of years spent in school, but also on what is learned during those years, which is measured by cognitive skills via international assessments. This discovery is critical to the current article as it directly contradicts any policy that places degree attainment as an end goal.

In the wake of these macro debates, there was a large literature on skill mismatch, overeducation and employability in the field of labour economics. McGuinness, Pouliakas, and Redmond (2018) review studies in both advanced and emerging economies that show a high prevalence of horizontal and vertical mismatch, that is an imbalanced relationship between the credentials and competencies of workers and the requirements of jobs. Recurrent Employability surveys undertaken in the Indian context have found that a significant proportion of engineering graduates, and all who have a degree, are not found to be prepared for the jobs that are available, revealing a disconnect between credentialing and capability formation. Autor's (2015) seminal piece on labour-market polarisation and the changing task content of jobs also provided evidence of the reshaping of the demand for skills, with a fall in routine middle-skills jobs and a growing demand for higher-order analytical skills and the non-routine interpersonal skills. This skills first approach to human resource practice is an institutional response in line with these pressures, and is documented in recent literature on competency-based hiring.

As a whole, this literature exhibits a surprising underlying unity despite the apparent disunity. While there is a disagreement between human capital theorists and signalling theorists, capability scholars and growth economists on mechanisms, none agrees with the statement that degrees and skills are substitutes that can be traded off. The productive content of education is stressed in the human capital and growth traditions, as is the danger of credentials without content (signalling tradition), and the broad and equitable development of human powers (capability approach), and the cost of the mismatch between education and the changing nature of work (mismatch literature). The synthesis which this article seeks is thus not a simple reconciliation, but a reading in the direction of where the weight of evidence already leads.

3. THEORETICAL AND CONCEPTUAL FRAMEWORK

This article argues that, to overcome the binary dichotomy of degrees and skills, human capital should be disaggregated along four functions that education and training can serve, with degrees and skills respectively each playing a role in each of these functions. The main argument of the framework is that all these functions are necessary for development and that none of the educational modalities fulfils all of these functions completely.

The first is the basic function: teaching literacy, numeracy, logical thinking and the metacognitive ability of learning to learn. The function is overwhelmingly that of general education, and is the base upon which all later specialization rests. If a worker does not have the basic cognition, they will not be able to learn the skills effectively and also lack the ability to re-train when skills are outdated. Hanushek and Woessmann have shown that cognitive skills have an empirical primacy, which makes the function of development central.

The second is the signalling and sorting function: how credentials carry information about skills and aptitude to an employer in an uncertain world. After Spence, this function of labour markets is also real,

valuable, and not merely a by-product of productivity enhancement, since it lowers the transaction costs of matching workers and jobs. But, if credentials are inflated to the extent that they are not backed up by actual skills, signalling can turn into credential inflation the extent to which ever taller credentials are necessary for jobs that haven't changed.

The third is the productive function: directly improving the ability of the laborer to carry out valuable activities. This is the function that is most closely related to the applied and vocational skills, be they technical skills like programming and machining or transferable skills like communication and teamwork. It is also the skill where there is the most disconnect between India credentials and labour-market readiness as the employability literature highlights.

The fourth is the adaptive function: the ability to learn new skills, because of changing technologies, tasks, and industries. At a time when new skills are being automated and replaced by Artificial Intelligence, the half-life of certain skills is being reduced and adaptive capacity is perhaps the most economically valuable of all skills. The Adaptive Function is built on General Education, but is realised via the institutions of lifelong learning and continuous reskilling.

The framework may be presented in the schematic form. Following the developmental argument, aggregate human capital may be written as a product of its foundational, signalling, productive and adaptive components, namely In which a lack of any one function limits the ability of the other functions. The educated but unemployed graduate that is repeated in emerging economies is a worker with strong productive skills and weak foundations, who cannot adapt, while a strong signal and weak productive and adaptive attributes create underemployment. The multiplicative intuition expresses why it is the correct premise, that complementarity is the right one, namely that the marginal return to any one function increases with the level of the other.

This framework also redefines the demographic dividend. The dividend can be viewed as the fraction of the population that is of working age times the average productive human capital of that population. A high and widespread second term increases the dividend, which is realized if the first term is also high, thanks to the population of a large group of young people. The framework therefore shifts the policy focus from an emphasis on ageing population and to the institutional engineering of capability of all four functions.

4. METHODOLOGICAL APPROACH

This is a manuscript that takes an integrative conceptual and analytical approach, deemed suitable given the intention to synthesize a variety of theoretical perspectives and rethink a controversial policy debate. There are three movements that follow each other. It first performs a critical synthesis of the theoretical and empirical literature, drawing on the existing evidence, it considers competing explanations to come up with the analytical premises. Second, it develops a novel concept matrix, the functional disaggregation mentioned above, which brings the evidence into a structured form that can be used to formulate testable hypotheses. Third, it uses this framework analytically in eight domains related to innovation, inferring from the premises of the framework to the implications for practice, society and policy.

The evidentiary base includes the theoretical literature and official documents, cross-national empirical literature e.g. that of the OECD and the World Bank, and literature on returns to education, skill mismatch, and labor-market polarisation. All quantitative claims are based on published meta-analyses and or internationally accepted estimates and are used as an illustration of the magnitude, not a point estimate. The analytical reasoning is a comparative one, with India as an anchoring case and with other economies as a

source of inspiration to identify generalisable mechanisms and contingencies. Although this approach has obvious drawbacks, as outlined , it is most suitable for the purposes of the article conceptual clarification and construction of a framework which is a necessary step, and one that will guide further empirical testing.

5. MAIN ANALYSIS AND DISCUSSION

The functional framework will enable a more focused understanding of the Indian situation than the conventional debate does. Think of the main paradox: In India, on one hand, we have significant number of graduates and on the other hand, we have high levels of graduate unemployment and underemployment. This paradox is hard to explain in the context of a simple human capital model that would predict that more education equals higher productivity and employment. In the signalling model, it is understandable as credential inflation. However, the functional framework provides the most comprehensive explanation the Indian system has largely released the signalling function and to some extent the foundational function and at the same time, has underinvested in productive and adaptive functions. While degrees are being churned out the skills they are supposed to certify often do not exist, and reskilling institutions for continued learning are sparse. This translates to a credentialed but incapable, and capable but inflexible workforce.

The implications of this diagnosis to the returns-to-education debate are important. Though the average returns reported in the literature around the world is high, there is significant variability. Where degrees consistently package basic, indicator and productive functions, returns are high and socially productive. As degrees offer empty signals and no substance, private returns may remain for the lucky few who can find formal-sector jobs, but social returns may diminish since the productivity of the aggregate does not grow in proportion. The question for India is whether the wage advantage of its degrees is due to its capability formation or simply a positional advantage in the queue of the very few formal jobs available.

The analysis also sheds light on why, much as the skills-first movement is a needed corrective, it is not enough by itself. A purely skills-based approach, without investing in basic education, can lead to workers being prepared for today's jobs, but not for change the very weakness that automation exposes. For Autor, his research on the changing nature of tasks in work suggest that the skills that are in most demand are those skills that are hard to routinise: complex problem-solving, judgement, interpersonal coordination, and the ability to combine machines output with human decision-making. Such learning of higher order skills is not possible via a narrowly vocational training without the basic reasoning. The logic of skills first as correctly understood is thus not in opposition to degrees, but is in favor of making sure that education at all levels fosters applied and adaptive competence along with degrees.

An additional analytical issue is the institutional coherence that is the basis of the multiplicative human capital function. These four functions are usually provided by separate institutions schools and universities for foundations and signals, vocational and corporate training productive skills and a less developed lifelong learning infrastructure adaptation. The developmental pay-off is not only the strength of each institution, but linkages among institutions, such as whether curricula meet the needs of the labour market whether credentials can be transferred and trusted whether there are opportunities for transition from vocational to academic pathways or vice versa and whether information on changing skill demand is fed back into the educational design. On this reading, what is most important is that the fragmentation between these institutions is the greatest structural impediment, and more significant than underinvestment in any single institution. The premise that is developed in the innovation-oriented chapters is that the best interventions are the ones that reinforce those connections.

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6. PRACTICAL APPLICATIONS IN EDUCATION AND LABOUR MARKETS

The functional framework has practical outcomes and implications for education and training design. The first is that applied competence is integrated into the degree programmes, thus breaking down the artificial distinction between academic and vocational streams. Work-integrated learning (WIL), where structured experiences in work are integrated throughout degrees, is one approach that directly addresses the lack of productive-function without losing the functions of degrees as a foundation and signaler. Bundling all four functions under one roof, so to speak, is a template offered by apprenticeship models, in which all four are integrated in one coherent pathway, as is the case in Germany and Switzerland. In this regard, what is relevant for India is to transfer this kind of demonstration to the universities and the entire informal-sector training system, so that the two skills and the degree are not learnt in isolation or not learnt at all.

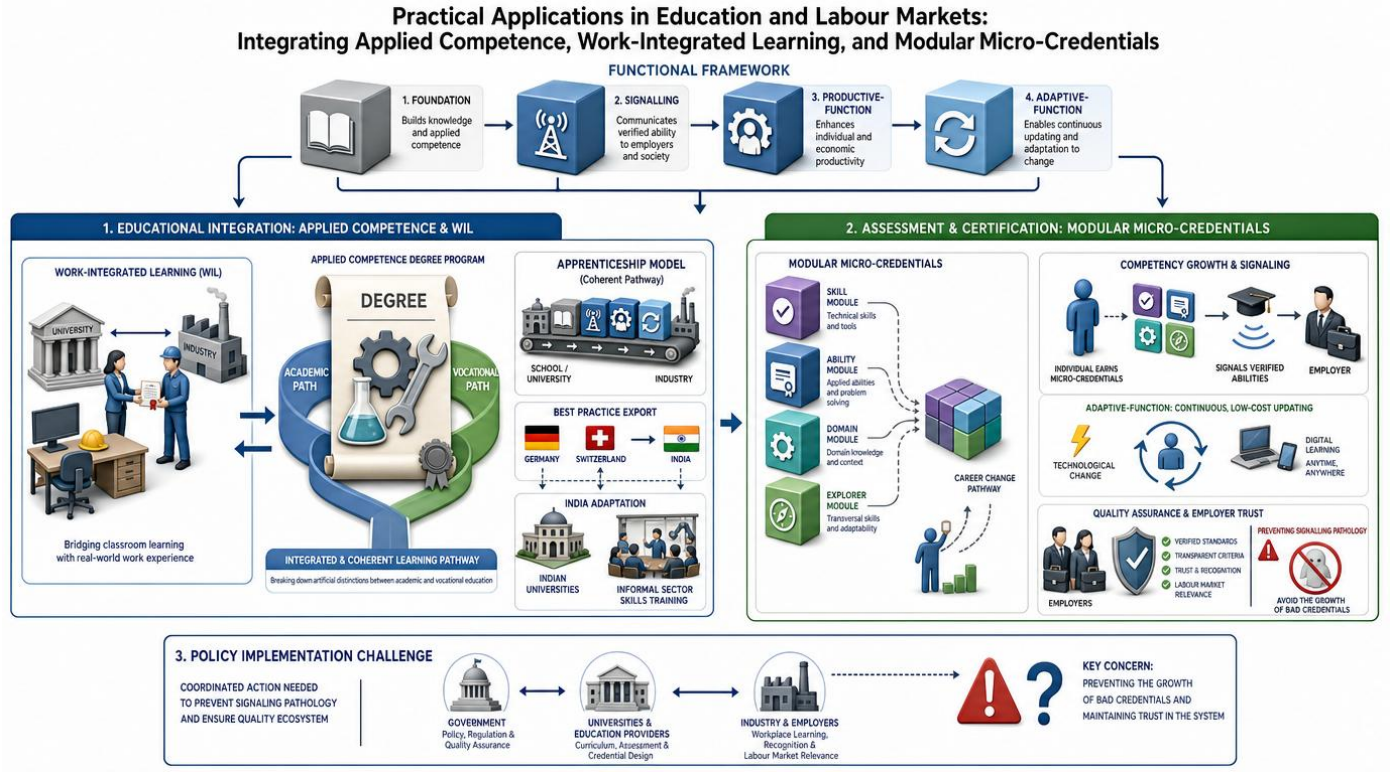

Fig -2: Practical Applications in Education and Labour Markets

The second practical application is in the area of assessment and certification. The system of assessment is a high leverage intervention if the central issue is that credentials are not a measure of competence. By providing competency-based credentials, such as modular micro-credentials that certify specific skills and abilities, workers can learn, signal and build their competencies gradually, as well as recombine credentials as careers change. The real power of micro-credentials is the fact that they are readily designed to align with the adaptive function, which means that they can be used for continuous, low-cost updating of competence in response to technological change, as long as they are quality assured, and trusted by employers. The implementation challenge, discussed below, is to prevent a growth of bad credentials that would simply be a new reinventing of the signalling pathology.

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7. SOCIETAL IMPACT AND INCLUSIVE DEVELOPMENT

But the issues at stake of human capital architecture being right are not just aggregate output. Economic growth is inclusive or polarising, depending on the distribution of foundational and adaptive capabilities. The Autor's polarisation thesis poses the risk that technological change can lead to a polarization of labour markets, with positive consequences for high-skill, cognitive jobs and negative consequences for routine, middle-skill jobs. This leaves things to market forces and leads to a concentration of opportunity among those who have access to quality education and increases inequality. In this context, an integrated degrees-plus-skills system is not just an efficiency measure, but one of social justice it can provide several routes to gain access to productive employment and lessen reliance on a single and narrow channel of elite credentialing.

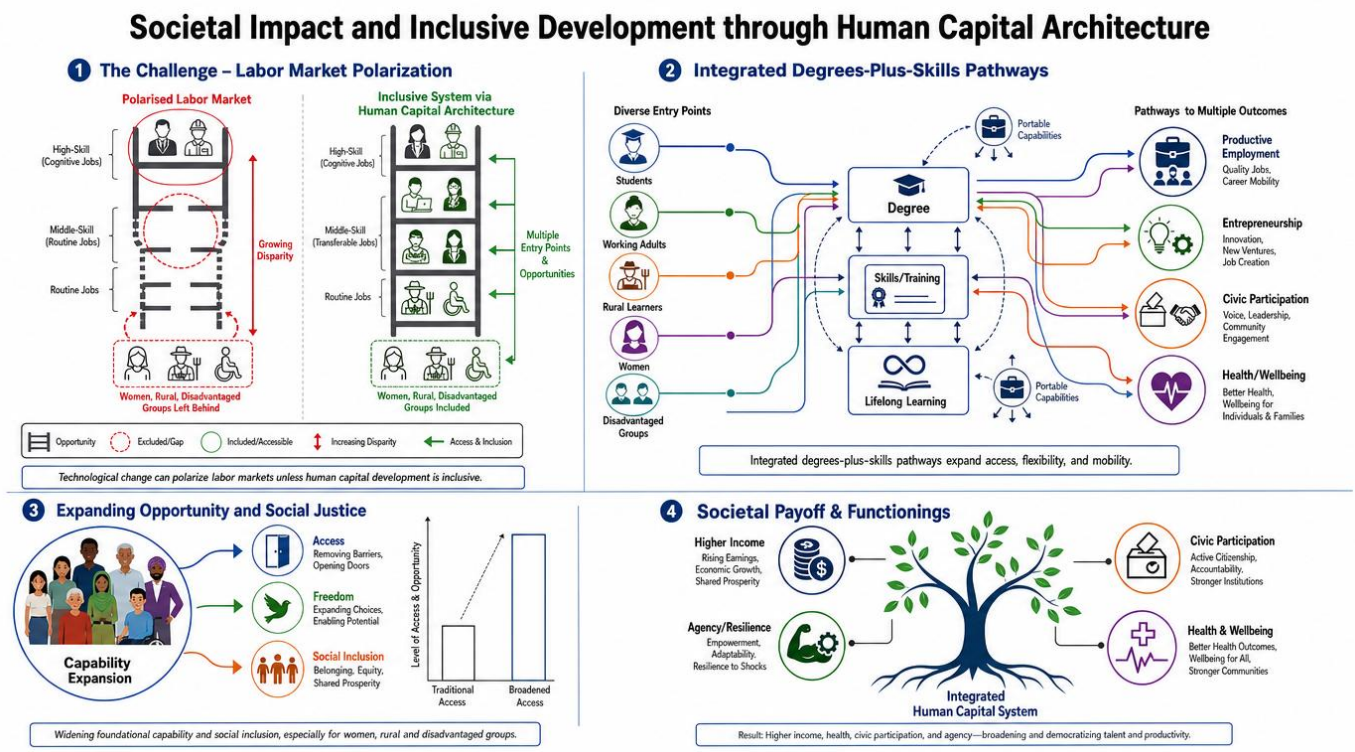

Fig -3: Societal Impact and Inclusive Development Through Human Capital Architecture

The social effects are especially high for those who have traditionally not been included in the formal education system, such as women, rural communities and disadvantaged groups. The capability approach argues that development should be assessed in terms of actual freedoms people have, not in terms of averages, which mask exclusion. A system of human capital development that establishes foundations widely, provides a variety of pathways to capability that are portable and a enables lifelong learning can help expand true opportunity for individuals who cannot pursue a traditional residential degree. The payoff for society is not only higher income but the more general functionings that the capability tradition focuses on health, civic participation and the agency to deal with a changing economy. Skills and education are thus integrated and the base from which talent and productivity can rise is broadened and democratized.

8. BENEFITS TO SOCIETY AND THE DEMOGRAPHIC DIVIDEND

The demographic dividend is a term which is commonly mentioned but not necessarily subject to a sophisticated analysis. The functional framework clarifies that the window is a window and not a promise, and that it's realisation can be dependent on the pace and scale at which the young population gains productive and adaptive capability before the window closes due to ageing. The benefit for society of a well-engineered human capital system is thus time-sensitive every cohort of poorly prepared people entering the labour market is an irretrievable loss of dividend, as is the demographic structure that gives rise to the opportunity.

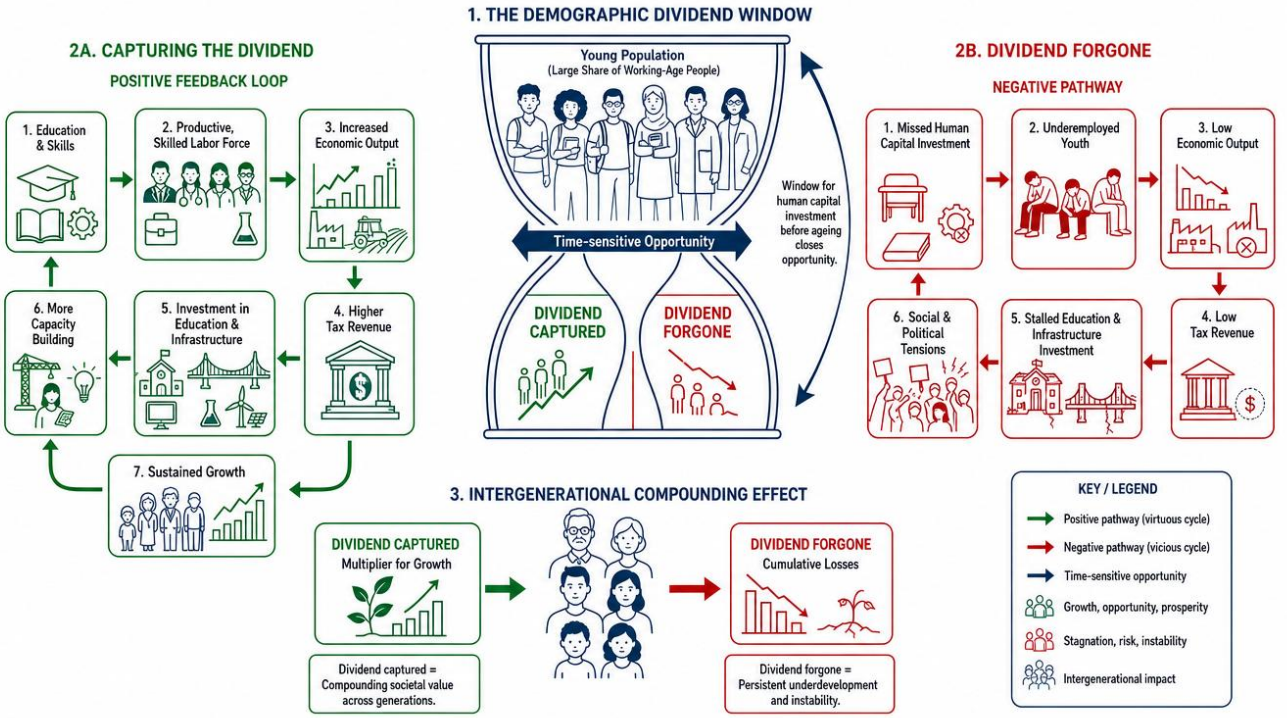

Fig -4: Benefits to Society and the Demographic Dividend

There are cumulative and self-reinforcing benefits to society from capturing the dividend. An educated and skilled labor force increases the country's output, which leads to more taxes, which provide more investment in educational and infrastructure projects, which help form more capacity, which generates more output, and so on. On the other hand, a lack of ability of demographic potential to transform into capability can lead to the opposite a large population of underemployed young people and social and political tensions. The societal value of integration is therefore best captured not as a gain, but as a dividend captured as opposed to a dividend forgone, and the effects of which are compounded over generations.

9. GOVERNMENT USE AND PUBLIC ADMINISTRATION

Governments are not only the builders of human capital systems, but they are also the direct beneficiaries and the system has implications for public administration. The state has a key role as the system designer to create the institutional links that markets and institutions do not provide by themselves. This involves developing national qualification frameworks that allow for transferability and comparability of qualifications across the academic and vocational sector, and developing labour-market information systems that provide

signals to educational providers on the changing demand for skills and quality assuring the system of issuing qualifications to ensure that they are trusted. These are functions that involve the provision of information as a public good and standard-setting, and thus require public authority.

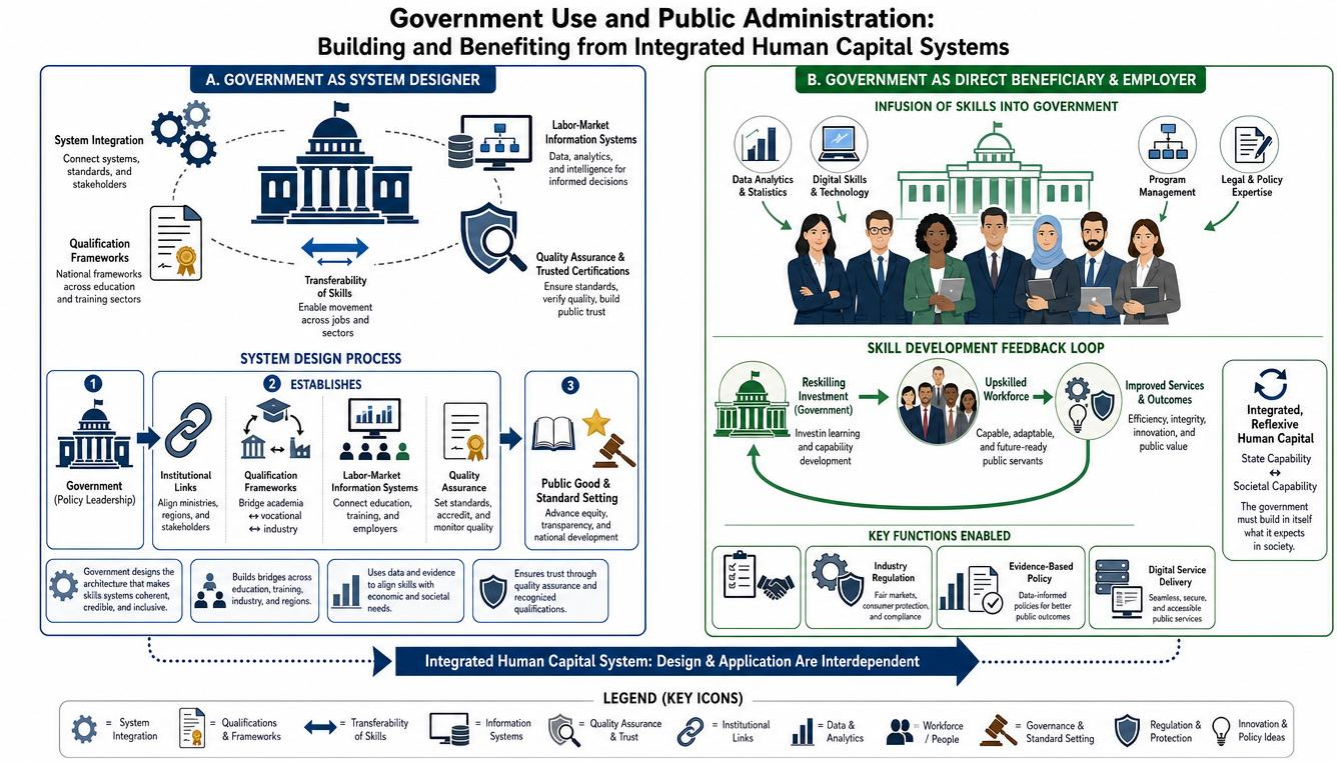

Fig -5: Government Use and Public Administration

Government as a provider of services and an employer is also reliant on integrated human capital. In today's modern public administration, the skills of public servants are becoming more and more complex, with the need to integrate basic reasoning with applied competencies in data analysis, digital service delivery and the management of complex programmes. The human capital embedded in the state's workforce is also a determinant of its ability to provide efficient public services, to regulate complex industries, to develop evidence-based policy, etc. Public sector governments that invest in the ongoing reskilling of their own workforce, especially in digital and analytical skills, enhance their ability to play their coordinating role, on which the broader system relies. The application of human capital frameworks in government is thus reflexive the state needs to have the integrated capability that it wants to build in society.

10. PUBLIC DEVELOPMENT AND INSTITUTIONAL CAPACITY

Public development in this regard means conscious building of institutional capacity that ensures human capital formation in the long run. The analysis above suggests that the limiting factor is often the institutional coherence, and not the overall level of spending. This coherence will need to be built through investment in the connective tissue of the system the bodies that coordinate curricula and industry, the apprenticeship and work-integrated learning system, the lifelong learning system that supports adults beyond the traditional school age, and the data systems that enable the system to be monitored and adjusted.

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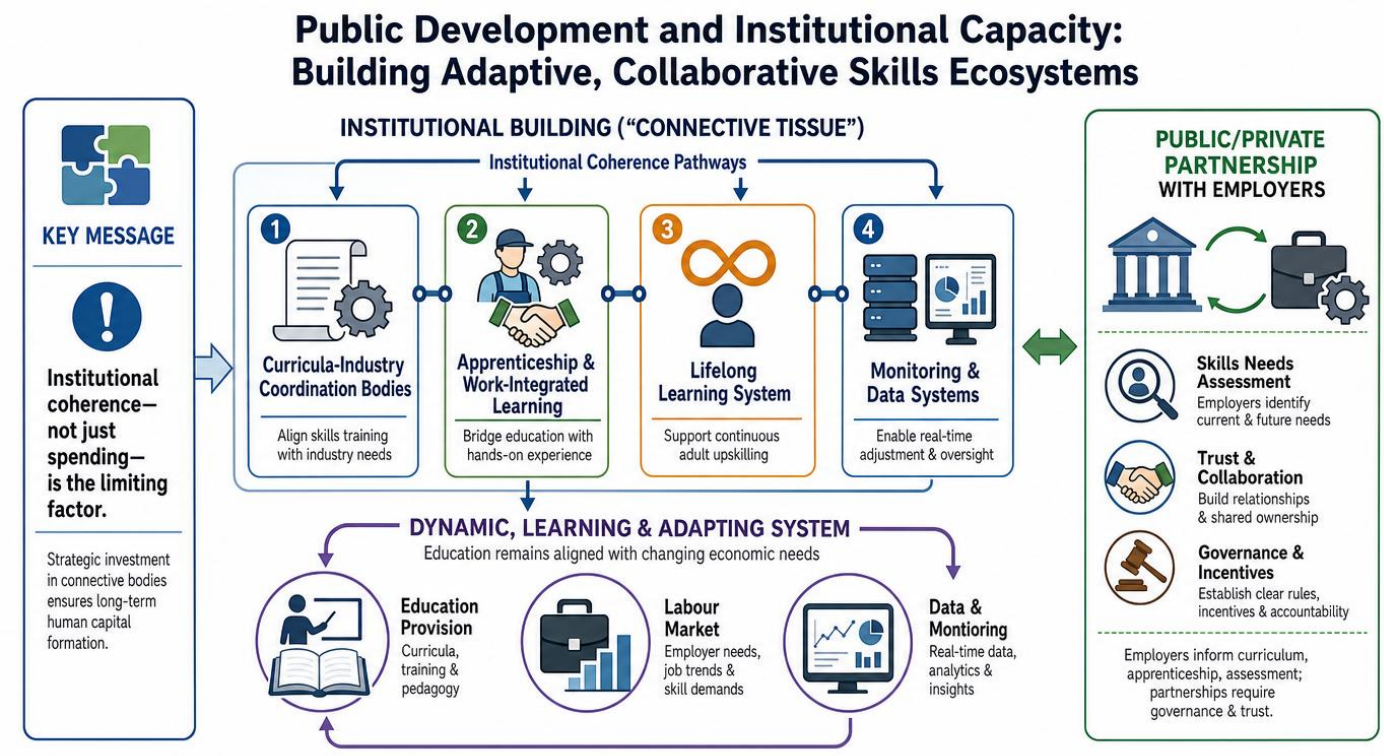

Fig -6: Public Development and Institutional Capacity

An important aspect of public development is the development of public, private partnerships with employers. Employers have the most up-to-date information about the changing needs for skills and are therefore crucial to the process of curriculum design, apprenticeship provision and competency assessment in order to bridge the productive-function gap. But these partnerships are institutions that need to be created and managed, they are not something that will just happen. So public development involves establishing governance structures, incentives, and trust that will allow for ongoing collaboration. The aim is a learning and adapting system, where education provision is continually adjusted based on feedback from labour markets and capability and demand are kept in line as the economy changes, rather than being aligned once and then lost.

11. POLICY RELEVANCE AND REFORM ARCHITECTURE

The functional framework is the policy relevance as it is able to shift the emphasis of reform into a programme of integration. More and more, major education and skills policies in India and similar economies acknowledge the need to de-compartmentalize and integrate the relationship between academic and vocational education and to mainstream skills into regular education, which generally aligns with the framework proposed here. The analytical contribution is to offer a justification for the correctness of these directions as well as a framework for prioritizing these. Since the functions enter multiplicatively in human capital, the weakest function is the one that has the highest return to reform: in the Indian case, the productive and adaptive function that follows credentialing is the weakest.

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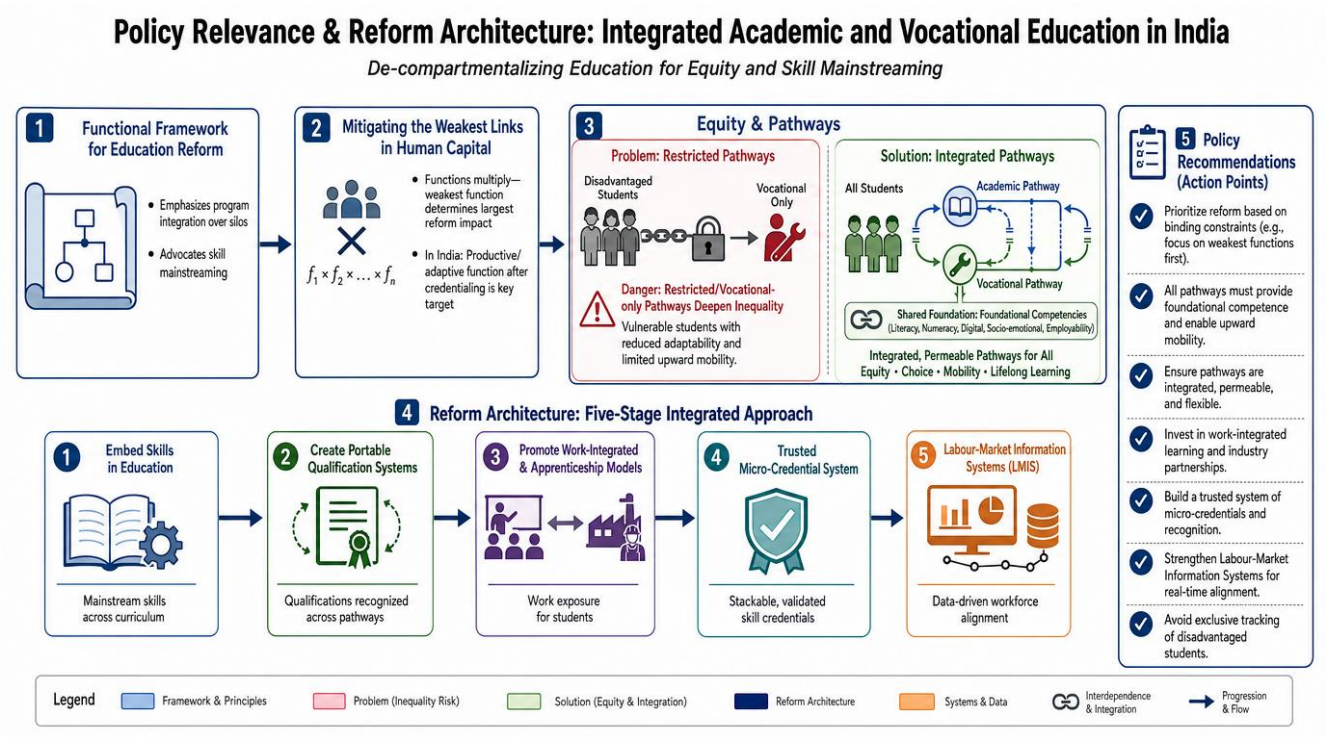

Fig -7: Policy Relevance & Reform Architecture

Equity in the design of a reform is another policy relevant issue. The framework warns of policies that would force disadvantaged students to follow a restricted path towards vocational education while leaving the basic and adaptive education for the privileged few. This type of monitoring would further deepen inequality by reducing the ability of the most vulnerable to adapt to displacement. The policy implication is that there needs to be a permeable link between vocational and academic pathways and all pathways need to provide foundation competence. A coherent reform architecture thus links the embedding of skills in education, the creation of portable qualification systems, the promotion of work-integrated and apprenticeship models, the creation of a trusted micro-credential system and the creation of labour-market information systems, in that order, depending on the location of binding constraints.

12. IMPLEMENTATION CONSIDERATIONS

The challenges to this framework's implementation are daunting and must be met head-on. One of them is the issue of quality at scale. The Indian education system is large and diverse, with successes in elite schools often not translating to mainstream schools. If applied competence and adaptive capacity are to be embedded in thousands of colleges and training centres, then this needs to be accompanied by a change in the competence of the instructors, as they need to have the competencies they are expected to impart. Thus, teacher and trainer development is a prerequisite for reform which is often overlooked.

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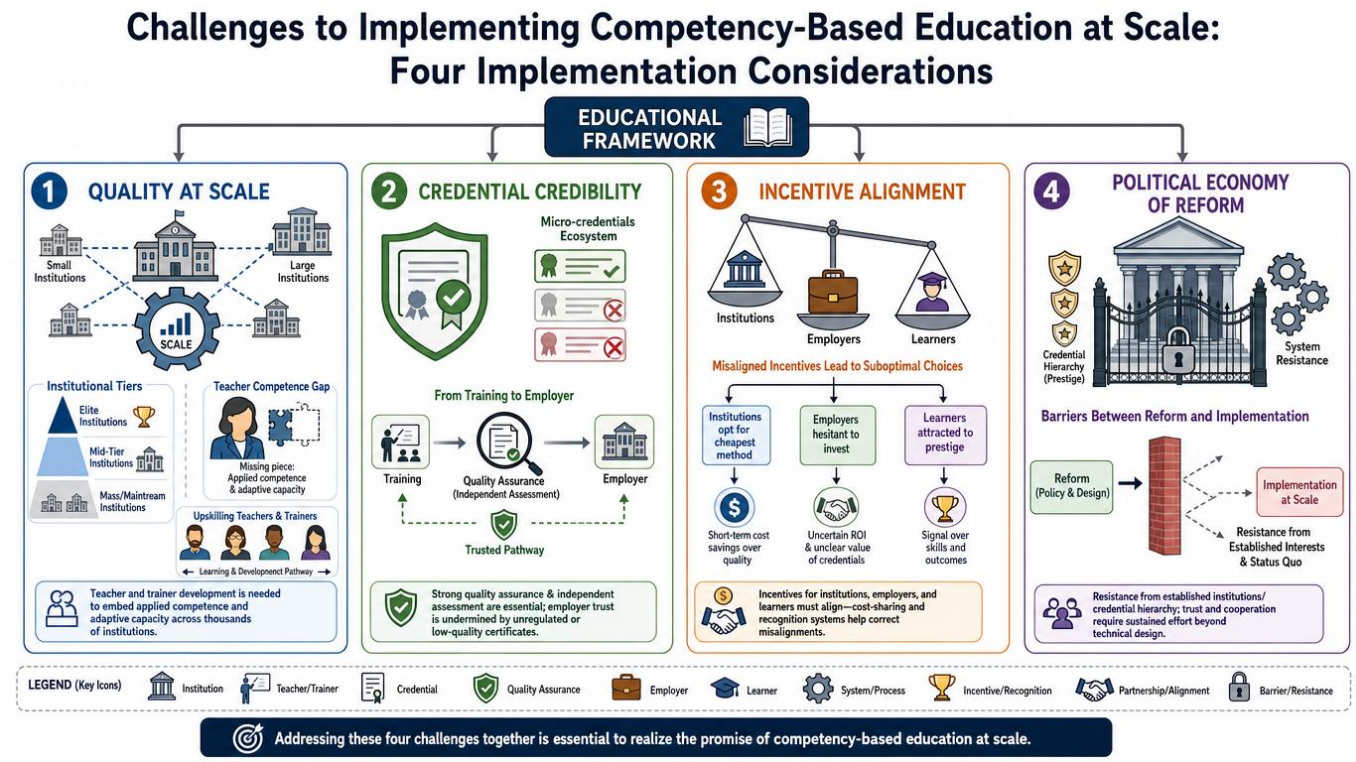

Fig -8: Challenges to Implementing Competency Based Education at Scale

The second is a matter of the credibility of credentials. Employer trust is key to the promise of micro-credentials and competency-based certification, but that trust can be quickly undermined by the emergence of unregulated and or low quality micro-credentials and competency-based certifications. It is therefore imperative and institutionally challenging to establish strong quality assurance and to have a competence demonstrated by an independent assessment. The third challenge is incentives are present for the educational institutions, employers and learners that may not be aligned with the development of the system. Institutions might opt for the less expensive classroom-based learning, employers might be reluctant to invest in training that they can see other employers taking advantage of, learners might choose to go for the signalling of a prestigious degree rather than applied competence. Carefully crafted incentives such as cost-sharing provisions and recognition systems that encourage true ability are needed to correct these misalignments. Finally, implementation has to deal with the political economy of reform, as it is the established institutions and the prestige hierarchy of credentials that create resistance to integration. So, technical design is not enough for sustained reform and building trust among stakeholders whose cooperation cannot be commanded is a process that takes time.

13. FUTURE OPPORTUNITIES AND EMERGING FRONTIERS

Technological change is changing the frontier of human capital development, and the framework can be used to determine where the greatest future opportunities are. AI's spread is both a challenge and an opportunity it increases the value of adaptive and higher order cognitive functions and provides powerful new tools for providing education and training on a large scale. Adaptive learning technologies, which can tailor

learning to the individual, can also promise to reach out-of-reach populations with quality foundational and productive education, thereby slightly easing the quality-at-scale constraint that constrains reform.

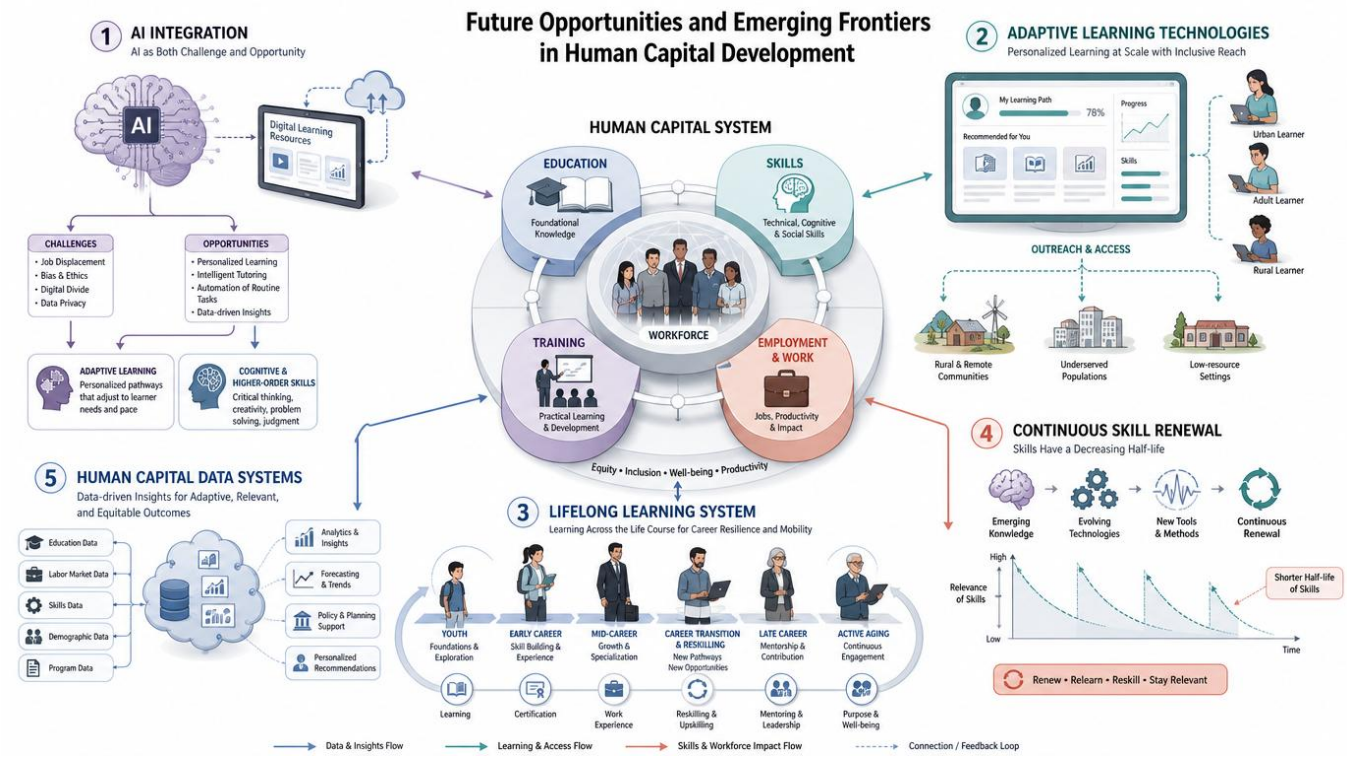

Fig -9: Future Opportunities and Emerging Frontiers in Human Capital Development

Another opportunity is the development of the infrastructure of a lifelong learning system that the adaptive function needs. The half-life of certain skills is decreasing and the place of human capital formation is no longer a distinct youth period but a continuous process throughout the working life. The economies that are able to create accessible, affordable and trusted institutions for adult reskilling will be best positioned to maintain productivity as technologies change. This is a structural shift of the whole human capital system from front-loading education to continuous renewal and the institutions to support this shift are just starting to take shape. Lastly, there are opportunities in the future to connect human capital data systems that would help the system to operate as a learning system, continuously adapting to the educational outcomes, labour-market paths and skill demands of the future. The opportunities can only be realised if the institutional coherence that is emphasised throughout the framework is maintained technology can enhance the capacity of a well-designed system, but can it replace the system itself.

14. FINANCING THE INTEGRATED HUMAN CAPITAL SYSTEM

The institutional architecture outlined above is not costless and any analysis that neglects financing risks that, in turn, prescribes reforms that are not fiscally feasible. The financing issue is threefold the amount of investment, the investment in the four functions and the division of the costs between the state, the employers and the learners.

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The human capital tradition and the endogenous growth tradition share a common conclusion the rationale for public investment in level is education, whose externalities include increased aggregate productivity, larger tax bases, better health and civic involvement, and which are systematically underweighted by private actors. This external effect is a good reason for public funding of the basic function in particular, because the benefits are most dispersed, and the beneficiaries are least likely to pay. Such underinvestment is not only unfair, but also wasteful, because the multiplicative nature of human capital implies that the return on any further investments is limited by the return on the initial investment.

The framework provides a prioritisation rule on allocation not found in conventional budgeting the marginal resources should be allocated to the function which is the most constraining function. In contexts where credentialing is already prevalent, but productive competence is limited, further investments in degree expansion result in lower social returns compared to investments in work-integrated learning, capacity development of trainers, and reform of assessment. Financing decisions should, therefore, be diagnostic and not incremental.

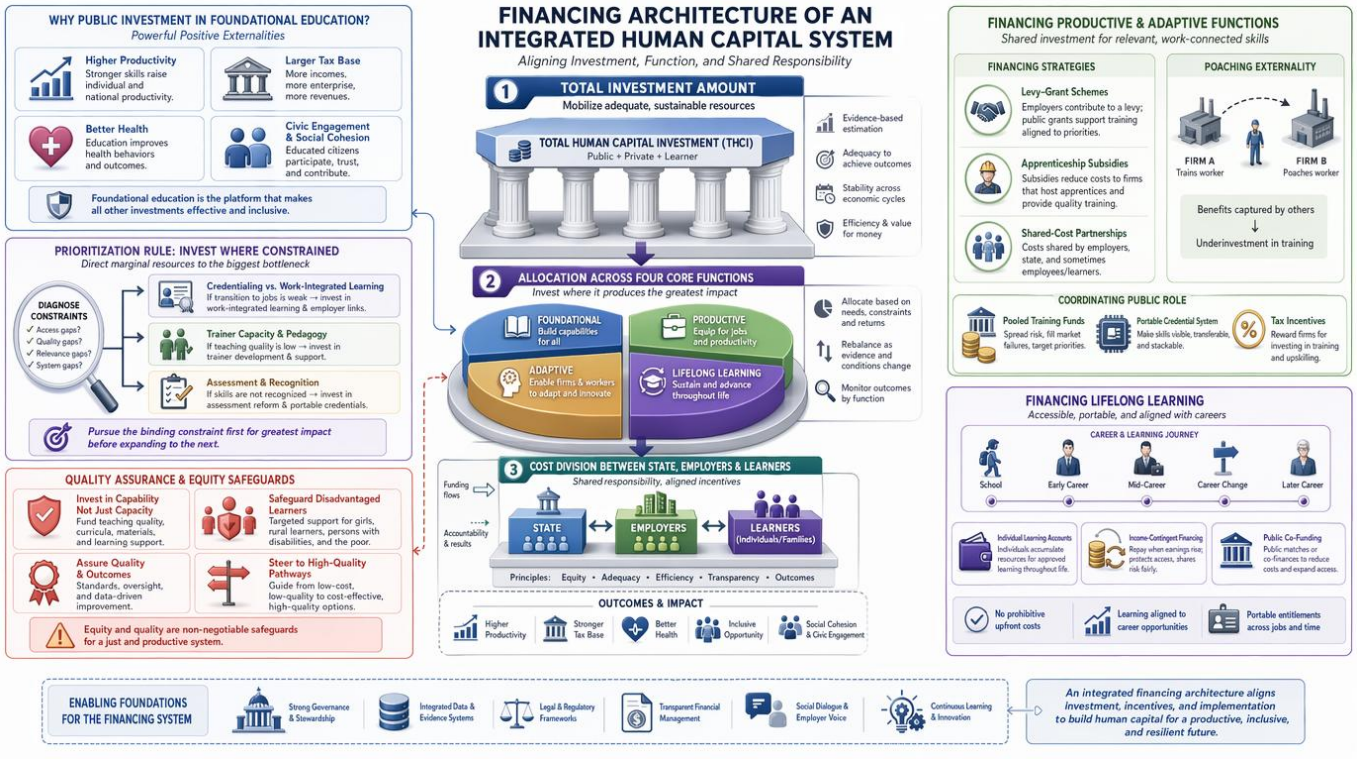

Fig -10: Financing Architecture of An Integrated Human Capital System

The productive and adaptive functions pose a financing issue different from foundations. Co-financing via levy-grant schemes, apprenticeship subsidies and shared cost training partnerships are efficient and equitable, given that employers take a share of the return to job-specific skills and they have the best up-to-date information about the demand for skills. But, there is a well-known poaching externality in employer financed training firms invest less in transferable skills they are afraid will be appropriated by competitors. This calls for a coordinating public role, which internalizes the externality without nationalizing the cost, through pooled training funds, portable credentials and tax incentives.

Financing the hardest challenge is that of lifelong learning, as its beneficiaries are spread out along the working life and capital markets don't lend against future human capital. Measures like individual learning accounts, income-contingent financing, and public co-funding of reskilling can make it easier to access without the up-front costs that are prohibitive to those most vulnerable to displacement.

Two cautions apply. First, spending is not investment: spending that does not build capabilities is consumption spending masquerading as investment; and financing reform must go hand-in-hand with quality assurance to ensure that this is not the case. Second, the financing of equity should be safeguarded to prevent disadvantaged learners from being directed to lower cost, lower quality pathways. Thus, financing human capital is not a budgetary detail that can be handled after the main points of the manuscript have been made, but rather a structural factor that will determine whether or not the integrated system the manuscript proposes can be constructed.

15. SOCIETAL, PUBLIC, AND POLICY IMPLICATIONS

The overall message of this analysis is that the traditional conception of the Indian developmental problem as one between degrees and skills is not just incomplete, but actually misleading and that to continue to think in those terms is an actual cost. The meaning for society is that inclusive development requires the development of all four functions of human capital, in a broad and equitable manner, with special focus on the adaptive function which helps to resist technological displacement. For the public sphere, the meaning is that the most important role of the state is to create the institutional coherence the connective infrastructure of qualification frameworks, labour-market information and quality assurance that markets and individual institutions can't do on their own. The implication for policy is that the emphasis should be shifted from debates on emphasis to a programme of integration, with the emphasis on the weakest function, which limits the whole.

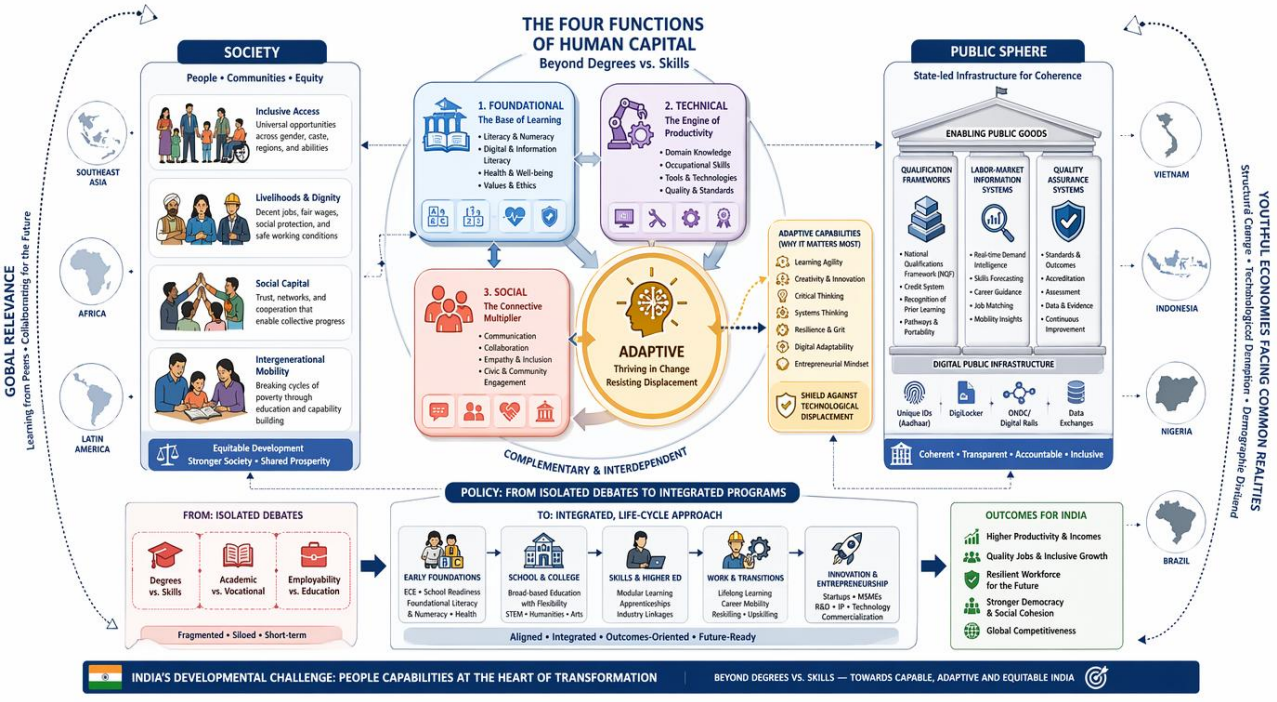

Fig -11: The Four Functions of Human Capital

India is not the only country where these implications hold true. This is the same architecture challenge that any large youthful economy that is undergoing structural change and technological disruption must face. The analytical premise of complementarity and prescription of coherence are generally transferable, although the specific weak function will depend on the context, and the institutional starting points will vary. The framework provided here is not intended to be a one-size-fits-all blueprint, but rather a tool to use for diagnosis and prioritization of reform in a specific context.

16. LIMITATIONS

The contribution of this article is conceptual and synthetic and as such is limited. First, the functional framework, although analytically useful, is not directly estimated, the multiplicative intuition is provided as a heuristic and further empirical studies would be needed to test the strength and shape of the complementarities it assumes. Second, the analysis is based on existing empirical syntheses, and the magnitudes used are illustrative and the conclusions suffer from the limitations of the studies on which they are based, such as the well-known problems of measuring causal returns to education and measuring skills and mismatch consistently across contexts. Third, the empirical focus of the article on India influences the focus of the article, and the validity of the conclusions for other countries with very different institutional and demographic contexts should not be taken for granted. Lastly, human capital is somewhat de-coupled from the demand side of the economy, and it is ultimately the jobs that can absorb them that determine the productive value of the human capital that is formed, so a full account would incorporate human capital formation with the structural transformation and job creation that it depends upon.

17. FUTURE RESEARCH DIRECTIONS

This analysis suggests a number of research priorities. The most urgent is the empirical operationalization of the functional disaggregation, i.e. the development of measures that differentiate the foundational, signalling, productive and adaptive content of education and the testing of the multiplicative interaction between the contents as the framework assumes. This would involve connecting educational attainment with longer-term labour-market pathways, which would rely on the integrated data systems that are also a future opportunity. A second priority is robust evidence on the effectiveness of integrated pathways such as work-integrated learning, apprenticeships and micro-credentials on capability and earnings outcomes and the conditions that support their success and failure. The third dimension relates to the political economy of reform, and the question of why integration is so often blocked despite the general analytical consensus, and of what institutional and coalitional conditions are necessary for a coherent reform to be possible. The fourth frontier is the study of human capital in the context of rapidly increasing automation, such as measuring and developing adaptive capacity and designing lifelong learning institutions to be accessible and trusted. Lastly, comparative studies of a large number of emerging economies would aid in discerning the portable from the context-specific aspects of the framework, thus enhancing the framework's usefulness as a diagnostic tool.

18. CONCLUSION

The argument whether economic development is better served by degrees or by skills is based on a false premise. Degrees and skills are not mutually exclusive investments but are mutually reinforcing aspects of an overall human capital system that each perform a different role. In this article, the binary has been broken down into the foundational, signalling, productive and adaptive functions of human capital, and it's shown

that the effects of all of these on developmental outcomes are multiplicative, that is, weakness in any one of these functions reduces the impact of the others. As you read through this framework, you will see that the central paradox of India is of credentialed but underemployed graduates, and that this is not a matter of education per se, but a matter of integration, of building signals and partial foundations, and underinvesting in the productive and adaptive capabilities that true capability formation entails.

Thus, realizing India's demographic dividend in the form of a sustained dividend will be less about growing any one model of education and more about coherence in an integrated education system, aligning curricula to the signals of the labour markets, developing portable and trusted certificates, and integrating applied competence into certificates and creating the infrastructure for lifelong learning that adaptation requires. These are functions of institutional design and to a large extent they are a responsibility of the state as coordinator and standard-setter. The argument is global in its scope: the problem of architecture is universal to every large and young economy that is undergoing structural change, and the prescription of coherence, tailored to the locally binding constraint, is universal across contexts. The developmental challenge of our day is not degree or skill, but whether societies can develop integrated, equitable and constantly evolving human capital systems that are the foundation of inclusive and sustained prosperity.

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