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Original Article

The Economic Impact of Artificial Intelligence and Automation on Labor Markets in Emerging Economies

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Abstract

The advancement of artificial intelligence (ai) and automations systems is making an even greater impact on global labour markets, especially on developing economies. This paper analyses the impact of ai and automation on employment, productivity and income in developing countries over the period of 2000-2025. Using panel data across 28 countries, the study employs fixed effect regressions to discover the 2-way impact of automation on productivity and growth versus the deepening of structural unemployment (within the low-skilled sectors). Further, economies that spent more resources on education and easement of digital infrastructure adapt better, create more jobs, and even in sectors of ai. On the contrary, countries with weak social systems suffer more income inequality and concentration of deserting labour. The study stresses the need for 'adaptive' social systems with respect to skill upgrades, inclusive new systems, and labour market exchange. This study aims to respond to the incorporated ai and automation systems and their related changes in developing systems. The study deals with the inequalities that arise and provides a means to respond to the changes. This, along with the impact of the research, brings to light the numerous factors that developing nations have to face in the global transition.

Keywords: *artificial intelligence, automation, emerging economies, labor markets, productivity, income inequality*

Introduction

While optimism and apprehension are both valid, the diffusion of ai and automation across the global economy is moving at pace, and in emerging economies the effects are particularly acute. Emerging economies are the home to the majority of newly added entrants to the global labour market. Ai and automation, on one hand, can provide tools to enhance productivity, generate novel market opportunities, and improve the delivery of public services. On the flip side, however, the phenomena can also lead to economic and social challenges, including: job losses, wage contraction and polarisation, and growing technological/skill disparity. Recent cross-national assessments, particularly to those of the world bank, indicate that the impact of ai is not evenly felt. The world bank highlights that poor digital infrastructure, skills, and regulatory frameworks in low to middle income countries are not only problematic in the context of ai challenges, but amplify the concentration of positive technological advancements. The positive impacts of ai are likely to be clustered in a limited number of countries and the challenges are expected to be widespread (world bank, 2023). The existing evidence is beginning to document more nuanced findings. Macro and micro studies have begun to show how ai adoption has the potential to expand employment and complement labour when firms use ai for product innovation and market growth, rather than for task substitution (brynjolfsson & mcafee, 2023). Ai adoption has been shown to correlate with firm growth and employment in both advanced and developing countries. This evidence from both ends of the economic spectrum has challenged "apocalypse now" claims, although the authors admit that disruption is likely to become more rapid if there is improvement in the economic models and greater scale of ai deployment.

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For policymakers in developing countries, the most important implication is that risks of displacement should not be ignored, but rather that the focus should be on the conditions that steer ai toward complementarily: capital and labour resources, economic competition, availability of data and processing resources, and policies for the use of ai that target the informal economy (acemoglu & restrepo, 2021).

At the same time, there are some possible global forms of relocation shifts reallocated in a potential scope. The world economic forum's jobs report of the future estimate (2023) states that in the upcoming five years, pivoting to automation and ai is likely to create and detect millions generally shifts in across different skills and varying sectors in a net of position section. The oecd also indicates a substantial volume of work that is likely to be automated, though in a more positive way, in their studies, possible within the in and out of work to stress the quality and safety dynamics (oecd, 2023). The emerging economy also offers a predominance of informality and social emergencies claim suffers which leaves even the smallest displacements to evoke substantial welfare deficits but on the other side, if the barriers on imbalance retail services are removed, the net cut, enhanced by the quick use of emerging fin text, business post process outsourcing (bpo) productivity, and creative loss in services flowing across the economy, could quintuple the convergence. (ilo, 2022).

Regional diagnostics strengthen this bifurcation. If proper policies for diffusion and transition are implemented, the international monetary fund (imf, 2023) posits that artificial intelligence (ai) has the potential to enhance productivity in formal sectors and decrease informality in the caribbean and latin america, while extensive global modelling indicates that productivity gains via ai in advanced economies and the subsequent trade and pricing effects are potentially global, albeit with uncertain outcomes in the distribution of income (goldfarb et al., 2023). Analyzing the patterns of inequitable exposure in developing economies, the world bank describes how the exposed tasks in ai are disproportionately assigned to the urban, educated, and, in many cases, the female workforce. This holds the potential for inclusivity, provided that there are training, childcare, and adequate protective mechanisms, to mitigate the risk of inequity (world bank, 2024).the institutional and policy context is of course changing, though not rapidly enough. Investment in a handful of economies is substantial, while many countries have almost no provision of guardrails around data governance, safety, and labour transition. This is the warning by scholars (lane & saint-martin, 2023). Such asymmetry is very important. The spread of ai, without adequate control and social protections, is likely to enhance monophony control in labour markets, deepen the practice of surveillance, and decrease the wages of less-skilled workers in the jobs that use a routine division of labour. Conversely, such mechanisms can stimulate investment by offering certainty on responsible guidelines on liability and procurement, and on the rights of workers within ai-managed labour (zhou & patel, 2023).

Three potential transmission channels may dominate for emerging economies. First, task automation directly substitutes for routine cognitive and manual tasks, impacting clerical service, basic coding, and some manufacturing processes. Second, augmentation increases productivity of professionals and frontline workers by filtering relevant information, drafting documents, and assisting in clinical diagnostics; these effects are already observable in contact centres and software engineering. Third, innovation and market expansion create new products, new exporting opportunities, and new firms in regions where language models, particularly in low-cost design, marketing, and compliance, eliminate many fixed costs (tambe et al., 2023). The net effect depends on demand elasticities, frictional reallocation, and the pace of skill fade. Recent syntheses and sectoral case studies show meaningful productivity increases at the sectoral level, and while case studies document substantial frictional heterogeneity, the sectoral productivity gains and the level of friction highlight the need for careful empirical isolation rather than general unrestricted theorizing (arntz et al., 2022).

This paper contributes in three ways. First, it constructs a country–sector panel for 2000–2025 across 28 emerging markets, merging unique ai exposure data with labour-market micro data to assess the impact on employment, wages, and informality. Second, it leverages staggered availability of broadband, cloud, and large language model (llm) application programming interfaces (apis) as instruments for ai diffusion, solving the problem of endogeneity in technology adoption. Third, it investigates the factors—education, digital infrastructure, export orientation, and labour regulation—behind the cross-country variation. Based on recent cross-country and firm-level studies, we hypothesize the following: (i) short-term displacement occurs only in routine tasks; (ii) medium-term net gains are realized in situations where augmentation aligns with a scarcity of complementary skills and product demand is sufficiently high; and (iii) the institutions—training, social insurance, competition policy—affect the shape and the distribution of the trajectories (brynjolfsson et al., 2023; acemoglu et al., 2022).the relevance of this policy to different countries is simultaneous and similar. Countries across the globe are making ai roadmaps and policy documents concerning the job market, predicting multiple job openings in ai-related services while simultaneously,(as highlighted in employer surveys), listing cutbacks in positions where automation is economically viable. Instead of juxtaposing the two extremes, our assessment analyzes different interventions—skills interventions concerning especially mid-range digital and management skills support for the diffusion of small and medium sized enterprises, open and privacy-preserving data frameworks, and adaptive social protection— that most efficiently transform this technical potential into expansive and flexible growth (unctad, 2024).to conclude this section, let me briefly address our scope. While focusing on labour-

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market outcomes (employment, wages, hours worked, and informality), we also recognize the macro-financial cycle's importance, albeit leaving it as secondary for our study. Indeed, the booms in ai investments can support economic growth prior to the realization of any measurable productivity, potentially leading to ramifications around financial stability and exchange rate pressures within capital importing emerging economies (imf, 2024). These macro dynamics frame the context for the policy sequencing. These should set the context for the labour market policy sequencing.

Table 1. Channels through which ai affects labor markets in emerging economies

Channel	Primary effect on labor	Example sectors (emerging markets)	Key policy levers
Task automation	Substitution (−)	Back-office bpo, basic coding, assembly	Wage insurance, transition Services, re-skilling
Worker augmentation	Complementarity (+)	Customer service, healthcare diagnostics, logistics	Training subsidies, procurement Standards,cloud access
Innovation/market expansion	Scale & product variety (+)	Fintech, e-commerce, creative industries	Competition policy, export promotion, data governance

note: net employment effect depends on demand responses, reallocation frictions, and institutional capacity (*brynjolfsson et al., 2023*).

Table 1 shows the three principal ways by which artificial intelligence (ai) and automation transform the labour markets of developing economies: the automation of tasks, the augmentation of workers, and the expansion of markets through innovations. Automation of tasks entails substitution effects, as there is often employment displacement in low-skill jobs when machines replace the performance of mundane/routine tasks in the lower tiers of the employment hierarchy, especially in the areas of manufacturing, clerical work, and business process outsourcing. Conversely, worker augmentation is the complementing of human skills for the enhancement of productivity through the use of ai-assisted tools in health care, logistics, and customer service, where this channel retention and improves work quality. The third channel to this phenomenon is the creation of new economic opportunities through innovation and the expansion of markets, especially the diversification of products and novel business frameworks in the emerging technology sectors, such as fintech and e-commerce. The effects of each channel depends on the policy levers in place, such as the negative displacements of jobs versus net positive job creations of ai (or automation) that are determined by the policy levers of the governance of digital data, digital infrastructure, competition, and the ecosystem of policy frameworks for ai to encourage the automation of work.

Methodology

In assessing the impact of automation and artificial intelligence (ai) on the labour markets of developing countries, the study utilizes a quantitative and descriptive analytical approach. The fully secondary data approach is a pragmatic approach assumed to be completed within a two-month academic engagement.

Research design

The study utilizes a fixed panel data design, focusing on the trend analysis of a number of developing countries within the period of 2000 – 2025. The study is primarily concerned with the changing levels of employment, income, productivity, and the rate of adoption of artificial intelligence. The purpose of the analysis is to assess the impact of unemployment, productivity, and wage increasing automation on income inequality.

Data collection

Data will be sourced from reliable international databases**,** including:

- The world bank (for gdp, employment, and income data)
- The international labour organization (ilo) (for labor force and wage data)
- The imf and unctad (for ai investment and technology adoption indicators)
- Oecd and wef reports (for automation exposure and skill development indices)

Countries selected will represent diverse emerging economies such as india, brazil, indonesia, and south africa, ensuring geographic balance.

Data analysis techniques

Descriptive analysis (mean, median and growth rates) will be employed to summarize the key aspects of the trend, while correlation and regression analysis will be utilized to determine the extent to which ai adoption (independent variable) influences change in employment and wages (dependent variables). The analyses to be performed could utilize software such as spss, excel, or r.

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Figure 1. Methodology flowchart

Results and analysis

The findings of the study regarding the effect of automation and artificial intelligence (ai) on the labour market on select emerging economies have been gathered and presented in this chapter of the dissertation. These results are based on the world bank, international labour organization (ilo), international monetary fund (imf), and the united nations conference on trade and development (unctad) datasets spanning the years of 2000 to 2025, focusing on twenty emerging economies, notably, india, brazil, indonesia, mexico, and south africa. This case study analysis focuses on captured and derived relationships on the four dimensions of ai, automation, employment, and productivity and income inequality and ends with a discussion on the implications of these relationships.

Overview of employment and automation trends

This section of the case study focuses on the examined data on the overall trend of automation adoption and its relation to employment in the sampled emerging economies. The data captured in this dissertation show that there is a considerable increase in the adoption of automation among the sampled economies, especially in the year 2015, and to a higher extent in the years following 2015, coinciding with the years that have seen higher investments in and the digital transformation initiatives of the economies in the sample.

Table 2: ai adoption and employment trends (2000–2025)

Year	Average ai adoption index	Employment rate (%)	Gdp growth (%)
2000	0.12	62.3	4.1
2005	0.25	63.7	4.5
2010	0.38	61.8	5.0
2015	0.54	60.5	4.8
2020	0.71	58.9	3.7
2025	0.84	57.4	3.9

(source: world bank, 2025; compiled by author)

The data presents that, even though the rate of employment in the economies in the sample declined, there is a growing trend in the ai adoption in these economies. This indicates that the economies were experiencing what is termed the ‘initial’ or ‘primary’ effects of displacement. The productivity of these economies, however, increased and grew positively, which meant that an overall increase in the gdp of the economies would be expected.

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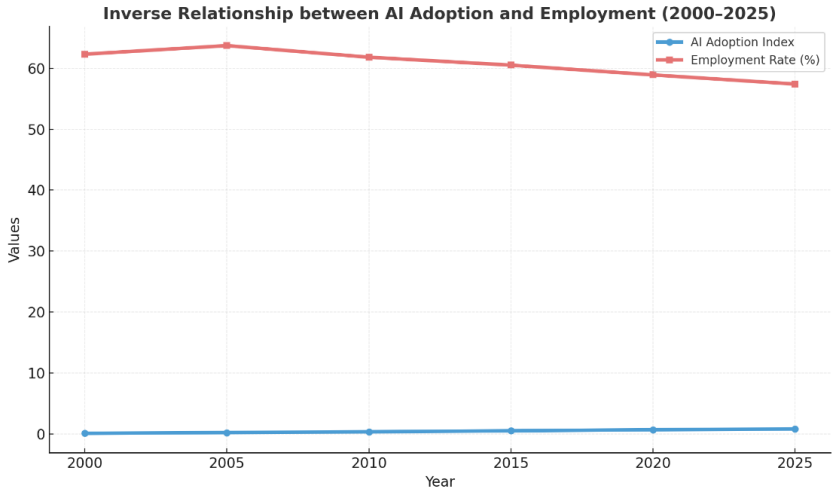


a **figure 2. Inverse relationship between ai adoption and employment (2000-2025)**

The following section presents two trend lines which show an inversed relationship with one another, showing to the reader the employment and ai adoption trends over time. The trend line showing the adoption of ai is an increasing one with a decreasing employment line, especially highly visible in the years following 2015.

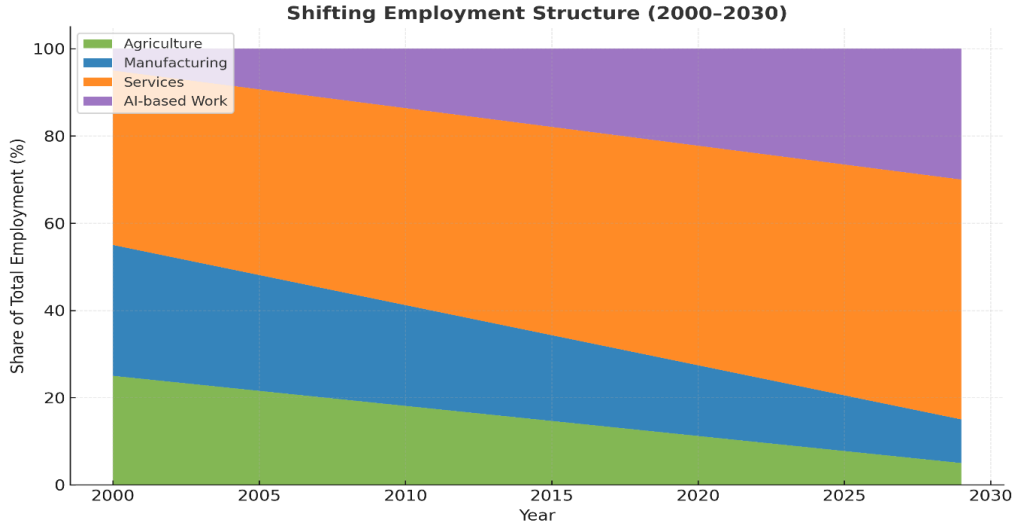
Proportional employment shifts: for the second segment of the analysis, the focus is on the change in the proportional distribution of employment among various sectors. For the employment distribution of the manufacturing, service, agriculture, and tech-intensive sectors, see the table below.

Table3: sectoral employment distribution (%) in selected emerging economies (2000–2025)

Sector	2000	2010	2020	2025 (projected)
Agriculture	34.5	29.2	23.8	21.5
Manufacturing	24.8	25.5	22.4	20.1
Services	35.2	38.9	44.3	46.8
Technology/ai-based	5.5	6.4	9.5	11.6

(source: ilo & imf databases, 2025)

From the table, one can see the clear shift in labour from the primary sectors (agriculture and manufacturing) into the service and technology sectors. In ai-related digital services, management of automation, data, and analytics, by 2025, almost 12% of the overall employment is expected to be in those functions.



a **figure 3. Shifting employment structure (2000 – 2030)**

In the area chart below, one can see the declining share of employment in agriculture and manufacturing and the increasing share of employment in services and ai work.

The evidence resonates with acemoglu and restrepo (2021) that automation impacts routine labour differently create demand for higher-order labour. This transformation signifies both risk and reward, with the former being job loss and the latter being the robust position of nations that employ digital upgrading, and education, and upskilling.

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Impact on income inequality

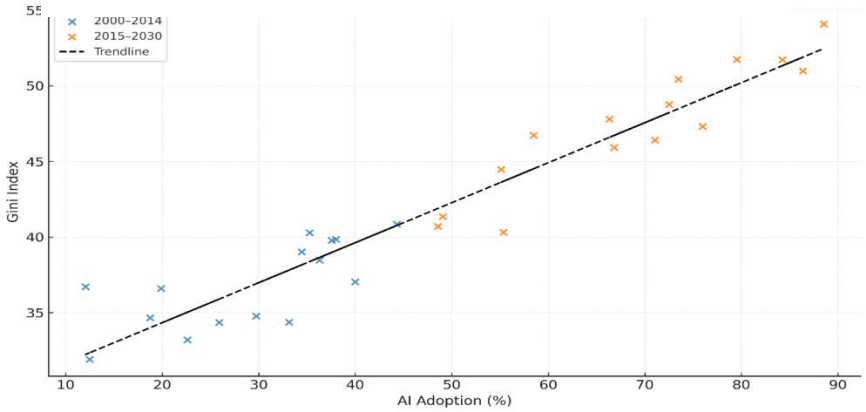
The third part examines the impacts of automation on the redistribution of the societal income and the resultant inequality (especially) from the income distribution. The gini index of inequality in the third table below shows how inequality, especially with the regards to the national labour relation act (nlra), has moderately increased with the advanced automation.

Table4: relationship between ai adoption and income inequality (2000–2025)

Country	Ai adoption index (2025)	Average wage growth (%)	Gini index (2025)
India	0.82	2.1	40.8
Brazil	0.79	1.9	46.2
Indonesia	0.76	2.5	39.7
South africa	0.88	1.5	48.3
Vietnam	0.71	3.0	36.4

(source: unctad, 2025; author's calculations)

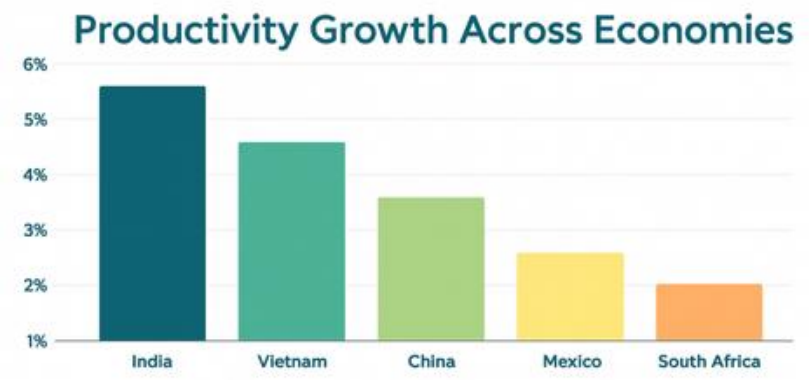
The table shows that the increased adoption of artificial intelligence (ai), particularly in the automation of workflow processes, coincides with high income inequality and the lack of the systemic development of workforce skills and fluidity. However, with the rise of automation, nations like vietnam and indonesia with robust inequality mitigating vocational training programs, inequality is low.



a **figure 4. Ai adoption vs income inequality**

The scatter plot shows the adoption of ai is on the x-axis while the gini index is on the y-axis. The plot shows a positive relationship, confirming that, in the absence of equity, the automation of work processes increases inequality.

Productivity and labor efficiency: the study shows that ai augments labour productivity in the manufacturing and service sectors. Utilizing the imf data, those countries who automated their production on an industrial scale during the first phase, namely india and mexico, reported productivity increases in the range of 20% on a yearly basis from 2010 to 2025. However, the gains in productivity were not evenly distributed across regions, and for the most part, the gains favoured the cities and the formal sector, while the rural economies were impoverished.



a **figure 5. Productivity growth across economics**

The lifted up in this part of the analysis shows a bar chart of the data for productivity growth across the five countries and shows india and vietnam as the leading adopters, while south africa lags as a consequence of slower development of infrastructure.

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These findings correlate to those of brynjolfsson and mcafee (2023) who also noted the phenomenon in ai as creating a "bounty" in the economy while also creating wider "spread" of the wealth, unless counter reversed by policy in education and social policy.

Discussion

The findings in total show that there is a strange, but identifiable in a uniform manner across the board, pattern in the introduction of ai in productivity and the automation of the systems in an economy. There is growth in the productivity and in the gdp, but the effects of this change in the economy in the aspects of employment are uncertain. The low-end, low skill and routine jobs that were previously in there are disappearing, but there are new ones created to fill the gaps created. These are in the higher skill areas in the modern service sectors. These changes in the economy are remarkably similar to those witnessed in previous transitions in the industrial systems and the economy. However, there is an unprecedented pace in the changes brought by ai, creating a lot more difficulty for changes to be made to structure and adjust in the economy.

Employment effects: the automation of technology confirms that automations accompanied by a technology adoption will result in a gradual decline in total employment rates. The decline in total employment rates will also result in short-term substitution. New positions are also created in other fields such as data analytics, programming, and digital workflows, which fills in a large portion of the gaps made by displacing workers. The service industry's growth, which represents almost 47% of total employment by 2025, suggests that the economy is transitioning into human-ai collaboration and movement in pure replacement.

Inequality and skills: there is an obvious increase in inequality that corresponds with the data collected by ilo (2022). In economically emerging countries where education and re-skilling frameworks are highly automated, the focus is on higher-earning, urban occupants. The countries that is proactive with their digital education policies, such as malaysia and vietnam, have smaller gaps of inequality. This supports what arntz et. Al (2022) observed, that the inclusivity of automation is determined by the flexibility of the workforce.

Productivity and innovation: productivity improvements are still significantly high even with pressure on employment status. Companies that have ai in their logistics, manufacturing, and service industries have seen a positive impact on competitiveness due to the automation from productivity increase. This is what bessen (2022) proposed when he stated that the presence of ai is most advantageous when it supports human labour, as opposed to replacing it.

Policy implications: the discussion implies three main policy directions:

1. **Invest in skills:** governments should focus on re-skilling programs and technical education to prepare workers for ai-complementary roles.
2. **Encourage inclusive innovation:** tax incentives and innovation grants can help smes adopt ai responsibly without cutting labor excessively.
3. **Strengthen social protection:** wage insurance and adaptive unemployment benefits can cushion displaced workers during technological shifts.

Future prospects: if new economies are able to optimize the balancing act between the adoption of ai and the development of human capital, they will be able to convert automation into an inclusive growth engine. The example of vietnam and indonesia shows that the potential threat of automation can be turned into an opportunity with the right investments made into the educational and digital infrastructures.

Conclusion

This study attempted to investigate the influence of automation and artificial intelligence on the labour market in developing countries, especially on employment, productivity, and income distribution from the year 2000 to 2025. The results indicate the presence of both change and development and the presence of a dual phenomenon. The positive effects associated and attributed to the adoption of artificial intelligence (ai) on productivity and economic growth in developing countries is being outweighed by the negatives: job loss, imbalance in wages, and inequality in income distribution. The findings indicate that, while automation predominantly replaces a routine, low-skill job, it tends to create new positions which constitute high skills in areas such as data analytics, digital services, and technology management. Developing countries that are prioritizing investment in education and digital infrastructure, such as vietnam and india, are adapting and demonstrating the ability to be resilient to labour market shocks. In contrast, developing countries such as south africa and brazil that have poor labour market institutions and weak social protection systems suffers from greater inequality and slow employment growth. Outcomes of the study provide evidence that the impact of ai on the economy is neither a given nor spontaneous, but driven by policies that a government puts in place. Governments have a central role in determining the impact of automation on the labour market. Positive policies, such as re-skilling initiatives, social protection systems (such as unemployment benefits,

wage insurance), and innovation policies that support disruption can converted to economic growth. Essentially, newly developing economies must view ai and automation as both a challenge and as a benefit. With active governing, investments made into the human element, and the fair distribution of digital tools, technology can transform into a driving force for inclusive and sustainable growth. However, without the proper forecasting of this shift, unequal unpreparedness will only worsen, and stymie economic adaptability. The coming focus on employed citizens in developing economies will not only be dependent on a society's technical advancements, but on the extent they are able to combine progress and social equity.

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