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Human Capital in the Haze: Strategic Imperatives for Indian Corporates Amidst Declining Air Quality

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ABSTRACT

India's worsening air quality has been a significant concern over the recent decades, but the narrative surrounding India's air pollution woes has evolved over time in the public consciousness. Once limited to the nation's capital during the winter season, Pollution is now front-and-centre in the general public's mind throughout the year. No longer are concerns of pollution limited geographically to Delhi and surrounding areas in North India: in recent times, Mumbai and Bengaluru too have come under the scanner. Thus, three of India's most prominent cities: the national capital (New Delhi), the financial capital (Mumbai) and the IT city (Bengaluru) now have the unfortunate distinction of symbolising India's dire Air Quality status. Needless to say, this concern is not limited to these cities, but extends to major parts of the country including industrial corridors along the Indo-Gangetic plains. These facts cast a dark shadow on India's economic aspirations, and the costs are substantial (by some estimates, nearly $95 billion yearly) in terms of public health and lost productivity (Dalberg Advisors, 2021). Measures to address this crisis have been half-hearted and inadequate considering the scale of the problem. Mere ad-hoc measures, such as the emergency construction bans in Mumbai or remote work-policies in Bengaluru, while a step in the right direction, simply do not suffice. A robust response calls for long-term solutions geared towards sustainability. And while the lead must be taken by India's policymakers, our Corporates have a vital role to play to address this problem. This is illustrated by the case studies of businesses adapting to changing conditions in Beijing, Seoul and Jakarta, as this paper will demonstrate. Indeed, if India's corporations take the lead and set an example, it will put further pressure on India's policy makers and government to treat this crisis with the urgency it deserves. The Air pollution crisis must feature as a key element of business planning, and not merely stay as a peripheral concern in corporate decision making. It is imperative that this crisis be tackled from multiple fronts for it to not impede India's success story and economic aspirations.

Keywords: *Corporate Resilience, Air Quality Index (AQI), Environmental, Social, and Governance (ESG), Labor Productivity, Green Logistics, Business Continuity Planning (BCP), Urban Sustainability, Clean Air Fund.*

Introduction

Looking beyond the National Capital

Delhi has long been considered the epicenter of the Air Pollution crisis. In the past decade, the problem would dominate headlines year after year. A familiar narrative emerged and was repeated countless times: the pollution in the nation's capital was largely driven by stubble burning in the course of

agricultural activities in neighbouring states. This, combined with Delhi's internal and vehicular emissions; and Delhi's unfortunate geographical location and the climatic changes in winter months further compounded the problem. There was little political will to meaningfully address the problem, and a political blame game ensued every year between the governments of Delhi, neighbouring states and the centre. From a political perspective, the problem seemed limited to one region (albeit the nation's capital), and therefore there was no coordination or decisive action to tackle it. In recent years, however, the problem is no longer confined to Delhi: it seems to have become a national issue affecting major regions and some of the most prominent cities which are the face of modern India's economic rise.

Consider Mumbai. In contrast to Delhi's rather difficult geographical location which exacerbates the pollution crisis; it seemed that Mumbai's favourable geography (being next to the sea) offered it substantial protection from pollution. This long-held assumption has come under scrutiny in recent times, and now the air pollution often features in the 'severe' category as per the Air Quality Index. Consequently, the municipal authorities (most prominently, the BMC) instituted construction bans that freeze substantial investments in developmental and infrastructure projects (Indian Express, 2025). Bengaluru, India's counterpart to California's Silicon Valley, has its own Air Pollution woes. The IT hub's sheen as the premiere city for tech, innovation and start-ups has somewhat dimmed in recent years, as professionals consider the health implications of air pollution in their future career decisions. In sum, the crisis is not merely limited to one city or one season; it threatens India's very economic growth and aspirations.

The economic costs notwithstanding, the real tragedy is the staggering cost to human health. By some estimates, air pollution in India now reduces life expectancy by an average of 3.5 years (Energy Policy Institute at the University of Chicago, 2025). The economic costs are perhaps easier to measure and quantify: research by the Clean Air Fund and the Confederation of Indian Industry puts the loss of productivity at USD 95 Billion (Clean Air Fund & CII, 2021). To put that in perspective, this is roughly 3% of India's GDP: effectively making it an invisible tax (Dalberg Advisors, 2021). The costs are apparent not merely in terms of lost productivity, but also in less apparent ways: accelerated degradation of assets and capital; and increased spending in healthcare.

The Economic Cost of Pollution

The harms of worsening air quality are extremely varied and not always easy to discern. It affects different sectors, businesses and regions in different ways. The complexity of the problem is such that even to ascertain the scale of the problem requires deep and systematic study, let alone the research and work required to meaningfully address it.

The Impact on Productivity

In the recent decades, the service sector in India has expanded. This is the norm in developing economies: as economies grow, the service sector captures a greater share of the GDP. In the service sector, the most valuable asset is the human being. Air pollution impacts not merely health, but also the cognitive performance of human capital. While the ways and the extent to which air pollution impacts productivity requires further research, particulate matter is undoubtedly a toxin for the brain and impacts performance (Dalberg Advisors, 2021). Employees may be physically present at the workplace, but cognitively may not function optimally, a fact that has come to be recognised by economists as 'presenteeism.' Needless to say, the impact on the service sector due to this phenomenon is not trivial.

And its not merely cognitive performance that is impaired, air pollution is now actively leading to a change in behaviour. Increasingly, professionals are factoring in air pollution as a key consideration in deciding where to work. Bengaluru and Hyderabad, the centre of IT and biotech centres in the country, are increasingly witnessing the phenomenon of pollution migration, with professionals moving (quite literally) to greener pastures to escape pollution.

Many professionals may not even be compelled by attractive pay packages: such is the severity of the problem. While a limited phenomenon so far, this worrying trend threatens India's share in the global services market, particularly in the modern age where work can easily be outsourced across borders and remote work is the norm.

And it is not merely individual behaviour that is undergoing change: MNCs considering expansion in India may be forced to reconsider due to air quality concerns. Again, the lost economic

opportunities may be difficult to measure. It is best for our policymakers to address air quality concerns before these emerging trends start to threaten India's success story.

Regulatory Uncertainty Disrupting Business Plans

The regulatory response to tackle the pollution crisis, especially ad-hoc measures, are also fraught with difficulties and impact business operations and planning. Consider the case of Mumbai: as AQI worsened, municipal authorities mandated a ban on constructions and real-time monitoring at project sites (Indian Express, 2025). The sudden imposition of these norms frustrate normal business operations and disrupt future planning, particularly for real estate developers and infrastructure firms. Beyond the firms, the cost unfortunately also falls on the construction workers, many of whom are daily wage earners. It is difficult to strike a balance between addressing the concerns of air pollution (which affect everybody), and the concerns of particular industries and labourers with the cost of compliance falling entirely on them in such circumstances.

In an uncertain regulatory environment, it is difficult for any business to plan. Suddenly air pollution and the associated regulatory compliance, which is not always easy to predict, becomes another factor to be considered while making long term investments. As a result, project deadlines are not met, capital costs go up, and budgets need to be revised. The businesses are often further mandated to invest in measures to reduce pollution (such as dust suppression technologies and mechanising technology to reduce exposure to workers), adding further to costs (Indian Express, 2025).. Despite the costs imposed, it is a step in the right direction for businesses to adopt such technologies to address air pollution and the welfare of workers. Legislative measures must be accompanied by a proactive approach by businesses for a multi-pronged approach to address the challenge of air pollution.

Mere ad-hoc measures, however, would not suffice. Measures like controlling pollution at construction sites are aimed at reducing harm, not at addressing the root causes of air pollution itself. Nevertheless, even these steps represent a change in paradigm.

The Impact on E-commerce Workers

In recent years, the e-commerce sector in India has taken significant strides with the advent of quick commerce. But the very people powering this sector are contributing to the issue of air pollution, and are also susceptible to air pollution because of the nature of their work. The gig-economy has created new opportunities, but it has also raised significant issues surrounding occupational safety. Delivery workers often work in hazardous conditions due to air pollution.

Policy makers must take note of this issue. Delivery workers, typically young men on two-wheelers, are often taken for granted in a system that prioritises customer satisfaction. E-commerce has become so deeply ingrained in our lives that we are blind to the human cost of these modern conveniences. The government must be sensitive to the needs of the workers in this gig-economy. While celebrating the growth of this industry, the regulatory framework must allow for its growth, while simultaneously prioritising the needs of the young workers who make it possible. The very industry whose workers are so susceptible to air pollution, is paradoxically responsible for significant vehicular pollution. Emission regulations are required to address this issue, but emphasis must be placed on the growth of this industry and the welfare of the workers.

Corporate Response to Air Quality Crisis

The corporate strategy to tackle air pollution has varied, with some basic measures becoming commonplace in offices. Other organisations, where workers are particularly at risk of being exposed to air pollution, have taken more proactive measures. Broadly, this can be understood as two distinct phases of response.

Internal Changes to Protect Workers

Many businesses have invested heavily in Air purifiers and monitoring systems. It is not uncommon to find hospital grade HEPA filtration systems in offices, with air quality systems giving real-time updates on pollution levels within the workplace. In essence, these systems shield white-collar workers from the harms of pollution outside.

Ensuring a Safe Indoor Office Environment

This shift in trends is apparent in the real estate sector as well. Many commercial developers now seek to certify their buildings through frameworks such as LEED (Leadership in Energy and

Environmental Design) and the WELL Building standard. Certification by such bodies and adherence to exacting standards gives them a competitive edge as well, giving some degree of assurance to the prospective buyers (Honeywell, 2023). Increasingly, such standards are becoming the norm in the corporate sector, essential to attract and retain talent.

Operational Flexibility

The viability of the work-from-home, or the hybrid model became apparent when corporates were forced to resort to these measures as a response to the COVID pandemic. The pandemic may have ended, but these measures have endured, and are now increasingly becoming the norm for many corporations to help their employees minimise their exposure to pollution. Legislative frameworks too have evolved and encourage such measures: in Delhi-NCR, Graded Response Action Plans (GRAP) have been instituted, and government and private employees are encouraged to work-from-home during days when the pollution crisis is severe (Indian Express, 2025). This of course takes into consideration the feasibility of such measures: when air pollution is less severe, such measures may be encouraged but left to the discretion of corporations. When it is more severe, the state may mandate work-from-home arrangements. Essential services (like hospitals, public transport etc) are exempt. Unfortunately, the services and workers which are indispensable for the functioning of society are the ones most at risk to air pollution.

It is plain for everyone to see that these defensive responses, while absolutely necessary, do not go to the root of the problem. Their protections exist only for a certain privileged section of society, while the majority remain without sufficient protections for their health and well-being.

Corporate Response: More Substantial Measures

While defensive measures, as outlined above, are necessary, they are not sufficient; particularly in industries where workers are more exposed to pollution. It is a moral imperative that our corporations lead the way, and not merely wait for legislative mandates to institute change.

It is heartening to note that visible changes are underway in the mobility and supply chain management sectors. E-commerce and Supply Chain Management businesses have committed to fleet electrification. Leading the way are Indian corporates like Mahindra, which has launched ‘eDeL’, which seeks to move to a ‘green logistics ecosystem’ by using a 100% electric fleet to deliver goods (Mahindra Logistics, n.d.) . The creation of such a fleet of vehicles also requires the infrastructure to support it, with charging stations and parking lots. This ambitious project has proven that it is indeed feasible, with its presence now in many major cities in the country, providing substantial environmental benefits and reductions in emissions. Other corporations too have taken substantial measures: Amazon India has deployed over 10000 electric vehicles to reduce their emissions (Sustainability Magazine, 2024) , and Blue Dart is looking at net-zero emissions by 2050 (Blue Dart, 2024) .

These changes are not mere optics, they represent a fundamental change in priorities by some of India’s largest corporations. The corporations are also seeking to stay ahead of legislative mandates. By being proactive in such measures, these businesses can demonstrate their commitment to environmental concerns before legislative measures force them to adopt these measures by force. When such measures do inevitably become more stringent, the businesses that moved and planned for the future early would have a competitive edge to businesses which failed to adapt. In this way, such measures can be seen as a smart business move to anticipate and mitigate future risk and legislative pressures.

For a truly sustainable corporate response, businesses cannot be limited to their organisations. They must coordinate with others in the sector and industry bodies for a coordinated response. Such a change is visible in Circular economy initiatives, like the one spearheaded by the Confederation of Indian Industry. Their initiative calls for the pooling of Corporate Social Responsibility (CSR) funds for crop residue management in Punjab and Haryana (Confederation of Indian Industry, n.d.) . This is used to invest in technology and machinery that manages the agricultural by-products of farming without burning it. The Crop Residue Management (CRM) project was started in 2018 as a pilot project in 19 villages. Once its success and feasibility was proven, the project was extended to cover over 1000 villages across Punjab and Haryana, yielding substantial environmental benefits. The benefit of such an approach is that they work at the source and with the farmers themselves, earning goodwill and trust within the community.

The success of projects like these show how corporate and industry bodies can lead the way to bringing about meaningful change. But at the same time, they point to governance gaps, and a failure of the state in coming with adequate solutions or investments. While businesses can bring about substantial change, they are no substitute for robust legislative and governance measures. Both must work in tandem to address the issue of air pollution.

Case Studies: The Varied Responses in Beijing, Seoul and Singapore

There are precedents in other major cities in the world and how they have tackled pollution. The context varies, and needless to say, there are no readymade solutions which can be blindly instituted in our major cities. But these success stories are nevertheless valuable, and offer some insights to our policy makers.

- **Beijing: The Hammer of Regulations**

The case study of Beijing proves the effectiveness of strong legislative action. Beijing was facing a severe air pollution crisis in 2013. China responded with decisive action: instituting a 'war on pollution' and did not shy away from making difficult choices. While India's focus has concentrated on vehicular emissions, China targeted the worst offenders in heavy industries.

Major industries, like steel manufacturers were asked to adapt to new norms or to shut down their business. Left with little choice, many chose investment in low-emission technologies to continue operations. Environmental concerns jumped from being a secondary concern to an existential threat, and businesses were forced to adapt. The transition was painful and costly, but it forced businesses to internalise the environmental impact of their operations. The impact and environmental cost of production, once borne by the public, now was concentrated at the source itself.

The lesson for India is simple: legislative action must be clear, decisive and far-reaching. Instead of looking at marginal or incremental change, China pushed for major reforms and cuts in emissions, leading to a substantial impact in air quality. Environmental concerns must feature as a key element for a business to continue operations long-term, and thus become a way to mitigate future risks. The more responsible businesses, who adopt and plan early, and exceed regulatory norms, would be better protected if the norms become more strict in the future.

- **Seoul: Decentralised Technology and the Importance of Transparency**

South Korea's adoption of technology carries valuable insights for India. Seoul relies on a wide system of over 50,000 sensors to monitor air pollution in real time. These 'Internet of Things' (IoT) sensors measure not only the levels of air pollution or particulate matter, but also temperature, humidity, noise levels etc. Equipped with this decentralised data, the city is able to monitor, predict and respond to air pollution concerns in real time. For instance, if sensors detect a rise in pollution in a particular region (say, because of a contraction site), people and authorities can respond swiftly by ceasing operations or employing mist-spraying measures in the affected area.

India is beginning to institute similar measures, with air monitoring sensors now visible at many construction sites. The lesson for India is to spread this technology across our cities, and to collect and capitalise on this data in a meaningful way. The data must be readily available for our citizens and our authorities, and these sensors must not be for mere show. Authorities and businesses should use this data to address the pollution at the source in real time.

- **Jakarta and Singapore: An Evolving Solution Across Borders**

The case of forest fires which impact health and business operations in Jakarta and Singapore is particularly instructive for India. Particularly so for the Delhi-NCR region, which faces the problem of stubble burning from neighbouring states. These fires are largely man-made, originating from slash-and-burn agricultural practices in Indonesia. The smoke travels hundreds of kilometres to Singapore, and has become a point of diplomatic friction between the two countries. Breakthroughs however have been achieved in recent times, with the ASEAN Agreement on Transboundary Haze Pollution being introduced (Marsh Risk Consulting, n.d.). This framework creates clarity and enforces accountability. The lesson for Delhi is clear: if countries across borders can cooperate or at least create a framework for addressing air pollution concerns, why can't a similar arrangement be made between the governments of Delhi and neighbouring states (mainly Punjab and Haryana)? The need of the hour is to move away from political blame games and bickering to clear mechanisms that deliver.

In this particular case, businesses too adapted to protect their supply chains and protect the health of their workers. Companies go the extra mile to make sure they do not source from entities responsible for this pollution. This creates incentives for all stakeholders to alter their behaviour for their long-term economic interest.

Strategic Imperatives: From Mitigation to Transformation

The discussion thus far has looked at success stories, and the need for legislative change. The way ahead lies in treating environmental concerns not merely as a legislative concern, but to make corporations realise that it is vital to address their concerns for their long-term economic growth and continued survival.

Air Pollution as an Existential Threat

Environmental concerns, at one point, were merely treated as a peripheral concern. But addressing air pollution is no longer just about getting favourable PR or superficially boosting an entity's green credentials. They have become a key business concern which impacts all stakeholders and the survival of the business itself. This is because it poses a threat to employee health and welfare, the threat of state action and closure due to not meeting regulatory requirements, and also the threat to asset deterioration.

Corporates must not just be passive observers, waiting for legislative compulsions to get their act together: they must be partners in this endeavour. The need of the hour is for corporations to adopt a culture of transparency by disclosing their carbon footprint and even particulate matter footprint, and the steps they are taking to address this (Securities and Exchange Board of India, 2021) Their long-term sustainability depends on it.

Ensuring Responsible Supply Chains

Corporates must institute higher standards for their operations. As seen in the example of Singapore and Jakarta, businesses should pay their due diligence in choosing their vendors and establishing their supply chains, to make sure that they are sourcing from responsible vendors who meet and exceed environmental and air pollution norms.

The increasing reliance on electric vehicles, as outlined earlier in the paper, is another encouraging sign of responsible corporate behaviour. Corporates must work with a sense of urgency to expand on this and stay ahead of regulatory norms. It is increasingly becoming clear that their access to their most lucrative markets in urban areas would depend on their green credentials. Corporates that fail to adapt will lose out to those who act with purpose.

The Need for Collective Action and Policy

Corporate action, while necessary, cannot alone the air pollution crisis. Businesses and industry bodies must work hand-in-hand with the state and legislators to come up with long-term solutions. An encouraging sign of this was the measures introduced by Industry bodies to tackle the problem of stubble burning in Punjab and Haryana, as highlighted by this paper earlier. Instead of being in conflict with regulators to defend industry interests, the corporations worked to arrive at solutions. This cooperation between various stakeholders must be applauded. Science-backed, sustainable, scalable innovations must be expanded in cooperation with the state for the benefit of all stakeholders and the public at large. Indeed, public-private partnerships show immense potential to tackle various concerns: from renewable industry to investing in technologies like bio-decomposers for crop residue.

Conclusion

Air pollution in India has evolved from being a limited concern largely focussing on the capital region of Delhi-NCR, to a far more pervasive problem affecting major cities and regions in the country throughout the year. Our legislators, businesses and industry bodies must respond with diligence to protect the interests and the health of the public, and to ensure that this problem does not further tarnish India’s success story.

A fundamental problem in economics is the ‘Tragedy of the commons’: entities acting in self interest end up depleting a shared resource, even when such use is to everyone’s detriment in the long-term. The air pollution problem exemplifies this problem: where businesses acting in self interest (to maximise profit), end up creating air pollution (depleting a shared resource that is clean air), to the detriment of the public and the very businesses themselves. By internalising the externalities (through

legislative measures and proactive action), businesses can internalise these costs to everyone's benefit. It is in everyone's interest for this problem to be recognised, and for businesses, industry bodies and the state to work together to solve this problem comprehensively.

The need of the hour is to move from mere rhetoric to decisive action, to invest and employ technologies to solve the problem of air pollution. Businesses have a critical role in this regard, they can no longer afford to be mere spectators. Clean air is a fundamental human necessity, and should be recognised as such. There have been some meaningful changes in recent times, from work-from-home arrangements to a shift to electric vehicles and investments in technologies. But we need to be unrelenting in our efforts to solve this problem: there are enough success stories and precedents (as highlighted in the cases of Beijing, Seoul, and Jakarta and Singapore), for us to look at the future with optimism.

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