SUSTAINABLE WORKSPACES

CATALYSTS FOR PRODUCTIVITY AND PROFITABILITY IN INDIAN BUSINESSES

MARCH 2024

MINISTRY OF FOREIGN AFFAIRS OF DENMARK
Danida

Danish Industry

STRATEGIC PARTNERSHIP AGREEMENT

IGBC

CII
Confederation of Indian Industry

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This publication is an attempt to demonstrate learnings captures from the project ***Improving sustainability of urban areas, buildings, and workplaces in India*** which was conducted with the ambition to contribute to sustainable development of urban areas and workplaces in India and to promote responsible business conducts among stakeholder in the building and construction sector. The goal has been to enhance productivity, physical health and well-being of occupants and employees as well as contribute to resource efficiency and reduction in adverse environmental impacts.

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This year India and Denmark celebrate 75 years of diplomatic relations. The first diplomatic relations marked the beginning of a now lifelong commitment and strong partnership based on shared values. In 2020 the Indo-Danish Green Strategic Partnership was launched and has since been instrumental in fostering collaboration and knowledge exchange between our two nations in the realm of sustainability and green transition.

This report, and the CII-IGBC and DI partnership, serves as a testament to the potential Indo-Danish partnerships holds. When organizations and industry from India and Denmark partner the potential for positive impact, especially within green transition and sustainability, is immense.

I commend this report for its contribution and applaud the efforts of all stakeholders involved in promoting sustainable workspaces in India through the partnership. Together, let us continue to work towards a greener, more prosperous future for generations to come.

Freddy Svane,
Danish Ambassador to India

The Indo-Danish Green Strategic Partnership, established in 2020, underscores the shared commitment of India and Denmark to foster sustainability and green transition, particularly within our urban centres.

Urban areas are hubs of economic activity, innovation, and cultural exchange. By promoting sustainable workspaces, we not only create healthier and more productive environments for our urban workforce but also contribute to the overall sustainability and competitiveness of our cities.

This collaborative effort of CII-IGBC and DI, is a significant milestone in advancing our understanding of sustainable workspaces, sheds light on the importance of green building practices not only in mitigating environmental impact but also in enhancing the quality of life for urban dwellers. I encourage city administrations, businesses, and urban stakeholders to leverage the insights and recommendations provided in this report to drive positive change and build a greener, more sustainable future for our urban communities.

Shri Ashwini Kumar (IAS)
Principal Secretary (Urban Development and Urban Housing), Government of Gujarat

Wellness at workspaces is gaining significant importance in the present context. With the support of all the stakeholders, we aspire to accelerate the adoption of Healthy Building concepts in the country and make it as a larger movement. This can be achieved by demonstrating the health and wellbeing benefits through implementation of this research results and creating an enabling environment for wider adoption.

- Mr. K.S. Venkatagiri,
Executive Director, Confederation of Indian Industry

The building sector in India is embracing the path to net-zero and sustainability. This shift is a recognition of the role that built environment plays in facilitating sustainable development across sectors of the economy.

Buildings are the cornerstone of our communities, workplaces, and daily lives. They influence our well-being, productivity, and the environment around us. By embracing green building practices, we not only reduce our carbon footprint and conserve resources, but also create healthier and more resilient spaces for all.

This report is a crucial step towards sensitizing businesses about the importance of green built environment. It is also a testament to the collective commitment of DI and CII-IGBC towards accelerating the adoption of sustainable practices.

We applaud the efforts of all those involved in producing this report and encourage businesses to take heed of the insights and recommendations presented here and join us in this crucial endeavor towards a greener, more sustainable future.

Jayesh Hariyani
Chairman, IGBC Ahmedabad Chapter

Sameer Sinha
Immediate Past Chairman, IGBC Ahmedabad Chapter

PREAMBLE

THE STRATEGIC PARTNERSHIP AGREEMENT

In 2017, the Confederation of Danish Industry, United Federation of Workers in Denmark (3F) and the Danish Trade Union Development Agency (DTDA) came together to form the Labour Market Consortium (LMC) with the intention to engage in a Strategic Partnership Agreement (SPA) with the Danish International Development Agency (DANIDA) under the Danish Ministry of Foreign Affairs.

The Strategic Partnership Agreement was approved in 2017. Based on the agreement, the consortium makes use of the experiences from the Danish labour market model to support improvements of labour market conditions and private sector growth in emerging markets. The LMC has active partnerships in more than 30 countries around the globe.

The overall objective of the Labour Market Consortium (LMC) and its local partners is *to accelerate a just transition that promotes sustainable production and inclusive, gender balanced labour markets with full respect for workers' human rights, contributing to the creation of decent jobs and better opportunities in the labour markets in developing countries.*

The main assumption is that labour market organisations are key agents of the change needed to achieve a just transition. This assumption is based on the experience from Denmark, that organised workers and employers who engage in constructive dialogue have the competencies to propose, design and implement, innovative and realistic solutions towards more sustainable production.

STRATEGIC INTERNATIONAL PARTNERSHIPS

DI and the other partners in the consortium always work in partnerships with like-minded organisations in partner countries by linking experiences from Denmark with partners' knowledge of the local context. The partners are thus the main drivers of change, and the LMC contribute to this development based on experiences from Denmark. DI always works through equal and mutually beneficial partnerships. Collaboration happens through exchange of ideas, experience and knowledge, as well as advisory assistance and joint international advocacy.

GREEN TRANSITION AS KEY FOCUS AREA

The focus of the engagement in each country varies depending on the capacities and priorities of our local partner organisation, and the context, country, and region in which the engagement takes place. The green transition is, however, at the core of all activities as it is believed to be a key competitive parameter in the future. Countries that are not willing to or capable of implementing green policies and practices risk being excluded from the global value chains and hence loose the potential for creating the necessary local jobs and thereby the foundation for development of local societies.

In short, LMC works for Green and just transition with specific focus on the following priorities:

- Promoting the social dimension related to green and just transition, including focus on workers' rights, social dialogue, social security, up- and re-skilling, promotion of new and decent jobs
- Support the business community's green engagement in introducing new green technologies within areas such as energy, water, environment, food, and health. Focus is on the social and environmental responsibility of companies within sustainable global value and supply chains, decent jobs, and living conditions
- Developing green skills at all levels through skills upgrading, education, and training relevant for the green transition, with a special emphasis on just transition

The Strategic Partnership Agreement runs for the period 2022-2025.

SUSTAINABLE DEVELOPMENT GOAL 8 – DECENT WORK AND ECONOMIC GROWTH

The 2030 Agenda for Sustainable Development identifies 17 Sustainable Development Goals (SDGs) which lend a comprehensive approach to "build a global partnership for sustainable development to improve human lives and protect the environment".

The Goal 8 focuses on "Decent Work and Economic Growth". The targets in this goal are aligned to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

Decent Work, as defined by ILO is "work that is productive and delivers a fair income, security in the workspace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men." (ILO, 2022).

The tangible role of green buildings in furthering the Goal 8 has been well-noted as the increasing demand for green buildings shall promote job creation and skill development to cater to the sector specific requirements. However, measurement and quantification of the qualitative indicators of "decent work" remains a challenge for researchers (Green Jobs Assessment Institutions Network, 2017). These are affected by a complex mix of built space, operational policy and overall management and vision of the business.

An empirical understanding of the contribution of green built environment towards fostering decent work and economic growth, beyond the direct impacts of new job creation and skill development, shall go a long way in furthering the SDG agenda and adoption of green building principles.

PROJECT BACKGROUND

The project explores the interrelationship between a workplace, employees or the users, and the business. It builds upon the understanding that each of these three parameters interact amongst themselves in a direct interface and holistically as well, where one affects the other and their cumulative performance affects the overall productivity of the business.

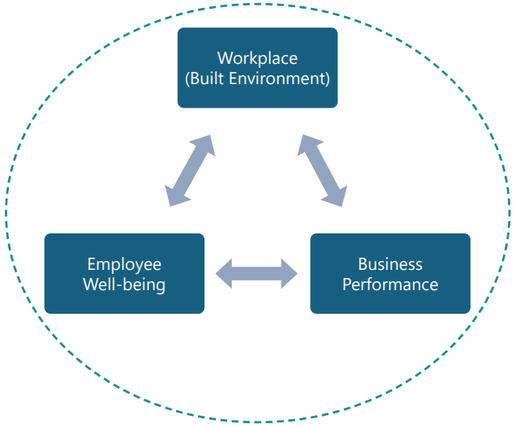


Fig. 01 - Components of Model Framework for the project

The first phase of project was undertaken in 2021-22 where it documented the intangible benefits of integrating sustainability in workspace design through select case studies. The study mapped the relationship between sustainability, business performance, employee well-being and productivity in the workplace environment. The study also documented anecdotal evidence that helped identify the factors that inspires or drives sustainability in these businesses.

The overall ambition of this project is to contribute to sustainable development of urban areas and workspaces in India and to promote responsible business conducts among stakeholder in the building and construction sector. The goal is to enhance productivity, physical health and well-being of occupants and employees as well as contribute to resource efficiency and reduction in adverse environmental impacts.

The process employed various tools to arrive at the framework, including a detailed review of literature, questionnaire-based survey in the case studies, detailed interviews with the leadership of the selected case studies, workshops with senior management of these organisations and extensive dissemination activities.

The findings noted that many businesses build upon their sustainability quotient not only in the building design, but also in their operations and policies. The businesses see value in adopting sustainable designs and methods, developing healthy work environments, and catering to the employee well-being. The project outcome indicated that sustainability in select cases is driven by three forces; one, where sustainability is ingrained in the company philosophy; second, where sustainability affects the brand value and market positioning thrusts greater action towards integrating sustainability; and third is the technology and compliance driven manifestation of sustainable practices. The report was launched in June 2022.

Building upon the findings, the project aspires to analyse the relationship and the impact of built environment on business performance empirically. The quantification of this impact will help measure the performance of individual business on a common benchmark and showcase the benefits of sustainable built environment as a comprehensive business case to the industry at large. The project envisages to develop a methodology or a tool that can quantify the benefits of sustainable design for business performance and productivity. The purpose of this project is to

enable business owners and employers to measure the impact of sustainable practices on their business performance, employee well-being and productivity.

Launch of Phase-1 Report, June-2022

ABOUT PROJECT PARTNERS

Confederation of Indian Industry (CII)

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering Industry, Government and civil society, through advisory and consultative processes. CII is a non-government, not-for-profit, industry-led and industry-managed organization. For more than 125 years, CII has been engaged in shaping India's development journey and works pro-actively on transforming Indian Industry's engagement in national development. CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages.

With 62 offices, including 10 Centres of Excellence, in India, and 8 overseas offices in Australia, Egypt, Germany, Indonesia, Singapore, UAE, UK, and USA, as well as institutional partnerships with 350 counterpart organizations in 133 countries, CII serves as a reference point for Indian industry and the international business community.

Indian Green Building Council (IGBC)

The Indian Green Building Council (IGBC), part of the Confederation of Indian Industry (CII) was formed in the year 2001. The vision of the council is, "To enable a sustainable built environment for all and facilitate India to be one of the global leaders in the sustainable built environment by 2025".

The council offers a wide array of services which include developing new green building rating programmes, certification services and green building training programmes. The council also organises Green Building Congress, its annual flagship event on green buildings.

The council is committee-based, member-driven and consensus-focused. All the stakeholders of construction industry comprising of architects, developers, product manufacturers, corporate, Government, academia and nodal agencies participate in the council activities through local chapters. The council also closely works with several State Governments, Central Government, World Green Building Council, bilateral multi-lateral agencies in promoting green building concepts in the country.

Confederation of Danish Industry (DI)

The Confederation of Danish Industry (DI) is Denmark's largest, most representative and most influential business and employers' organization. DI represents more than 20.000 member companies, covering all sectors such as manufacturing, transport, energy, IT, health, life science, trade, building, construction, and professional services.

DI is operating based on a core belief that a strong society needs strong companies – just as strong companies benefit from a strong society. Companies are crucial to maintaining the prosperity of all Danes, and to achieving societal goals such as a clean and carbon neutral society. Therefore, DI is committed to sustaining a Danish society in growth and balance.

DI's mission is to help Danish companies win, both at home and abroad. This is done through three main work-streams:

- Activities to improve business regulation at local, national, European and international level in daily dialogue with national and international stakeholders
- Providing members with numerous services and a variety of relevant networks
- Negotiating collective bargain agreements with the Danish labour unions – a crucial function in the strong Danish labour market model – and DI advise members on labour and employment law

The success of Danish companies in global markets is crucial for Denmark's economy. Exports account for almost 70% of Danish GDP. Every day, DI helps Danish companies turn global opportunities into successful business results – locally, nationally and internationally.

DI participates actively in numerous partnerships domestically as well as internationally, and long-term partnerships and knowledge sharing is considered an essential way of working with key stakeholders pursuing long term and mutual beneficial results. DI has over 900 employees at our main office in Copenhagen, Denmark. Furthermore, we have offices in Brussels, Mumbai, Chennai, Berlin, New York, and Shanghai.

DI India

DI India, a vital arm of DI's global network, has due to a growing Danish interest in the country, been strategically positioned in Mumbai since 2008, with a recent expansion to Chennai in 2022. Serving as DI's boots on the ground, the Mumbai and Chennai offices specialize in facilitating Danish companies' entry into the Indian market, aiming to optimize success while mitigating risks. DI India has fostered numerous fruitful partnerships, solidifying its reputation as a trusted ally for Danish businesses navigating the complexities of the Indian market.

DI's office in Mumbai also serves as the regional hub for implementing DI's Strategic Partnership Agreements in India, Vietnam and the Philippines.

ACKNOWLEDGMENT

We would like to express our sincere gratitude to the case studies who generously shared their insights and data, as well as allowed us access to their premises for data collection and surveys. We are also grateful to all the respondents who took the time to fill out our survey forms.

Your valuable contributions were instrumental in the success of this study. We value your continued association and support to the project.

CASE STUDY PARTNERS

ACRONYMS

CEO – Chief Executive Officer
CII – Confederation of Indian Industries
CO2 – Carbon Dioxide
DANIDA - Danish International Development Agency
DI – Confederation of Danish Industries
DTDA – Danish Trade Union Development Authority
ESG - Environmental, Social and Governance
Ft – Feet
GDP - Gross Domestic Product
GIFT – Gujarat International Finance Tech – City
HOF – House of Furniture
HR – Human Resources
HRM – Human Resource Management
HVAC – Heating, Ventilation and Air Conditioning
IEQ – Indoor Environment Quality
IGBC – Indian Green Building Council
ILO – International Labor Organization
IT - Information & Technology
LMC - Labour Market Consortium
MNC – Multi National Company
OECD - Organization for Economic Co-operation and Development
PM – Particulate Matter
PPM – Parts Per Million
SDG – Sustainable Development Goals
SPA - Strategic Partnership Agreement
Sqm – Square Meters
UN – United Nations
WHO – World Health Organization

REPORT SUMMARY

INTRODUCTION

The correlation between sustainable workspaces, employees' productivity & well-being, and business performance has been an area of interest for the researchers as well as the industry. The framework developed in the Phase I of the study demonstrates the relationship between these three parameters and underscores their cumulative contribution to overall business growth.

While existing research offers valuable insights into the influence of the built environment on employee well-being and its subsequent role in productivity, a comprehensive analysis of the interplay between these factors remains limited. Current studies rely on a simplistic distinction between "certified" and "non-certified" buildings as a proxy for sustainability, failing to capture the full spectrum of indoor environmental quality parameters and their potential effects on employee well-being and productivity.

Research suggests that measuring employee thriving is a more meaningful measure to address organizational well-being. Thriving at work is defined as "the psychological state in which individuals experience both a sense of vitality and a sense of learning at work." A thriving employee is understood to be in good health, positive job attitudes, is a good organizational citizen and performs tasks with vigour at work. A quantifiable connection between the built environment and employees' thriving needs to be understood to put forth a strong business case for sustainable buildings.

OBJECTIVES AND GOALS

The project identifies larger goals that guide the research process.

- To quantify the impacts of sustainable built environment on various social and economic parameters in a workplace.
- To develop a matrix that translates the impacts into a comprehensive score that can be used by individual workplaces for self-assessment.
- To identify the benchmarks for establishing the performance indicators for individual workplaces.

Conceptual Framework

METHODS AND TOOLS

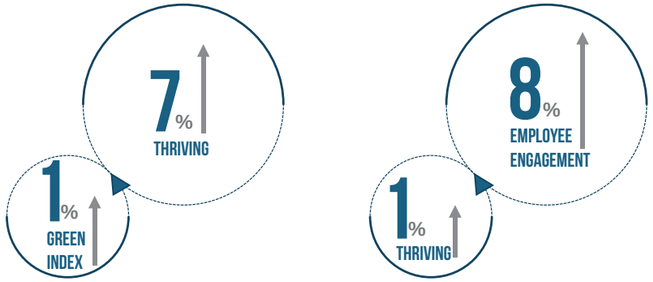
Three parameters of study were identified – the indoor environment quality or the IEQ, the comfort of the occupant in the given indoor environment, and the employees' thriving, i.e., vitality and learning quotient at work. A judicious mix of green certified and non-certified, standalone office space and tenant-occupied offices in Ahmedabad and Surat were identified. Fifteen such case studies were shortlisted for the purpose of data collection and analysis.

Data was collected using variety of tools and methods. First, the IEQ data was collected using scientific instruments that recorded the five parameters namely, temperature, daylight, noise relative humidity, and CO2. Second, user comfort was measured in these workspaces using a questionnaire-based survey. Third, a survey instrument collected data on employee engagement and thriving. A sample of 252 respondents filled out the survey at two different times with a 14-day gap. The study posits consolidated IEQ scores as different levels of "Green." Data on "Thriving", "Employee Engagement", and "Comfort" are based on the survey instrument.

KEY FINDINGS

- Green is not a Binary. It is a range, where the better the IEQ, greater will be the effect on the occupants' thriving in the organization.
  The green quotient in any built environment is not absolute. The quality of indoor environment is a range determined by the health-based and industry standards. Any degree of improvement in the IEQ parameters has a significant impact on the occupants' ability to work efficiently and effectively in the given workspace.

- Human comfort in a built environment has a significant impact on the way people feel and function in the workspace.
  The degree of comfort that occupants experience in a given workspace environment is a significant indicator of the appropriateness of the IEQ. The Green Index is thus a composite indicator of IEQ parameters and the comfort of the employees An integrated effect of both parameters has significant bearing upon thriving.



- The built components of a workspace have significant impact on the employees thriving in the organization.
  Thriving is result of both built and non-built components of a workplace. While the built components have a relatively smaller impact, they emerge as a significant factor that influences the thriving and overall well-being of the employees in an organization.

- Thriving has a significant effect on the degree of Employee Engagement in the organization.
  The impact of thriving manifests directly as greater employee engagement in the organisation. Employee engagement in turn results in a wide range of benefits – from increased productivity, to increased innovation, adaptability and resilience of the employees. Engaged employees come to the workplace with a commitment to purpose, and involve themselves physically, cognitively and emotionally in the work.

RELEVANCE OF THE STUDY

The findings are of particular relevance to Indian businesses where it is reported that more than 75 percent of the workforce experiences high stress and burnout. This can have a detrimental impact on business growth and productivity. The workforce in India is characterised by a significantly high proportion of younger generation. This generation places work-life balance on a high priority and as a result professional choices are often driven by factors such as office location, commute time, flexibility to work remotely, and office design.

The young workforce is the driver of innovation, entrepreneurship, and diversity. In such a scenario, looking at "Thriving" becomes even more significant. Furthermore, considering the rise of ESG (Environmental, Social, and Governance) frameworks, quantifying employee well-being becomes even more relevant. Understanding these factors can establish a measurable foundation for the "Social" aspect of ESG and build stronger social capital within organizations.

While the literature suggests that the non-built components such as the organizational culture and structure, policies, social interactions at work, have a greater weightage in determining the overall thriving, the role of built environment is significant because of its tangibility, limited control variables, faster turnaround in implementation and visible impacts.

The organisations need to align their policies towards creating facilitating work environments by giving their employees a place of work where they are comfortable, energetic and are able to work effectively. An integrated strategy that enhances the quality of physical space and the overall work culture will be the way for the organisations to grow holistically and contribute to the overall development process.

WAY FORWARD

The study highlights the pivotal role of quality of indoor environment and comfort together, in the workspaces in India. The study underscores the imperative for businesses to prioritize the integration of sustainable principles in both the design and day-to-day operations of their built environments. By doing so, organizations can cultivate workspaces that not only foster employee thriving, but also contribute to overarching organizational performance.

While the insights gleaned from this study are based on the cases from Gujarat, they serve as a catalyst for broader exploration. A cross-regional and cross-sectoral examination across diverse climatic zones and organizational cultures within India would yield a more nuanced comprehension of the intricate interplay between the built environment and employee well-being.

A broader investigation could lead to a comprehensive framework that can empower businesses to assess and improve their workspaces. Continued research on this topic can inform business decisions that promote sustainability, improve productivity, and enhance employee satisfaction, ultimately benefiting both employees and companies.

SUSTAINABLE WORKSPACES: BENEFITS BEYOND MEASURE

The role that sustainable workspaces can play in enhancing the business performance and contributing to the growth is manifold. Numerous studies have documented the role of a green working environment in enhancing the well-being of the employees, and enhanced productivity. The current dialogue on workspace and its impact on the users indicates that there is an increasing awareness among the employers as well as the employees about the importance of the quality of workspace and its impact on well-being and performance of the users.

As per the Global Green Building Trends, 2018, Client Demands and Environmental Regulations are the top two triggers for development of green buildings across the globe. **Motivation for creating healthier buildings is the third most influential trigger in opting to develop green buildings** in the global scenario, demonstrating that creating healthier buildings is the goal of developing green buildings. In addition to the mentioned triggers, the study suggests that there is an increased significance of social aspects for developing green buildings.

> **The top three social reasons for developing green buildings are to promote occupant health and wellbeing, encourage sustainable business practices, and increase worker productivity.**

Work environment can have both positive and negative impact on the psychological well-being of the employees. Alongside the tangible benefits in terms of long-term cost cutting and reduction

in environmental impacts, sustainable workspaces offer enormous intangible benefits for the occupants by enhancing their physical, intellectual, and social well-being. Integrating sustainable practices in business creates a multiplier effect, paving the path to achieve the UN-SDGs, reduce greenhouse gas emissions, and contribute significantly to national net zero targets.

The positive feedback of a sustainable workspace into business performance comes through multiple channels. The **triangulation between workspace, health and productivity was thoroughly documented in the Phase I of this research** through detailed anecdotal evidences. The framework in which sustainable workspaces, employees' well-being and productivity, and business performance interact brings forth the need to delve deep into mapping the interplay between these parameters and the channels through which they impact each other. The value created through integration of sustainability in workspace design and in business operations is found to yield manifold benefits for the organisation. **The Phase I of the study, mapped the channels through which the three parameters interact with each other individually and as a whole. A cumulative performance of these parameters affects the overall productivity of the businesses.**

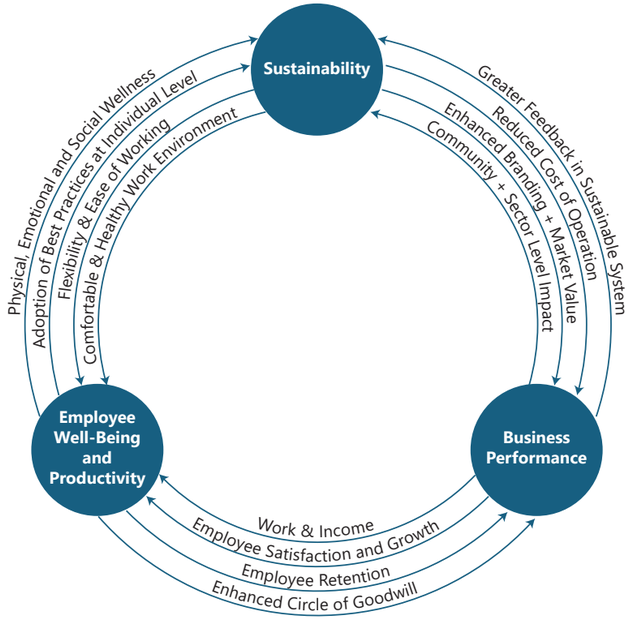


Fig. 02 - Decoding the Correlation between Sustainability, Employee Well-Being & Productivity and Business Performance

The Business Perspective

The adoption of sustainable practices at the organisational level is driven by a variety of factors. **Sustainability in workspace and practices is propelled by the deep-rooted organisational philosophy that believes in good practices as a way of life.** In such cases, the intangible benefits that the "good practices" yield are the cornerstones of organisations' way of working. These organisations are people-centric, with their business sensibility inclined towards employee well-being and human resource development.

The leadership in these businesses envisions the future of workspaces as spaces with enhanced interface with nature, designed to incorporate passive measures, and advanced technological features of modern days. They acknowledge that the companies, in order to become sustainable in the longer run, will need to transition to adopt flexibility in the space and place of work.

Most businesses resonate that the workplaces are spaces where employees spend significant amount of their day. By focussing on creating sustainable workspaces, these businesses bring comfort to the people and create a work environment of ease, reducing the chances of errors at work and aiding an improvement in the overall work quality of the company.

Sustainability in business practices and workspace development also finds its roots in the leadership's vision to the align with the emerging market trends. These businesses

consciously adopt sustainability as they see value in green as a brand and its market demand. Enhanced market credibility and edge in branding as a sustainable workspace also emerges as an important driver of sustainability in businesses. The leadership acknowledges the role of sustainable space and operations in garnering greater trust from end users, thus impacting the business positively.

The Employee Perspective

The framework identifies employees as one of the channels through which the benefits of sustainability manifest in an organisation. **The way people "feel" and "function" in an organisation is also a reflection of the environment they work in.** A healthy and comfortable environment has a positive impact on employee retention and in attracting new talent, making these organisations the preferred employers, and enlarging their circle of goodwill.

With the emphasis on creating enabling spaces for the employees, the businesses also create a significantly positive social footprint, empowering local communities through job creation, enhancing the overall sustainable development of the society. The multiplier effect of the quality of work environment is visible in the vibrant community that is formed around these businesses.

Sustainable work environment is seen to bring greater satisfaction among employees. It boosts their physical and mental performance and gives the comfort of working in an environment that feels safe and healthy. With sustainable practices at work, the employees also experience a sense of fulfilment by contributing to the larger green cause. In some cases, a multiplier effect is also seen where green practices become a way of life for the employees at their individual levels.

The results of the Phase I study reflect that employees value workplace environment, including the space in which they function. These spaces, designed keeping in mind the ability to work flexibly while also bringing opportunities to interact with their peers, and invest in the individual growth and well-being, have a significant bearing upon the 'likeability' and their "commitment" for the workplace.

TAKING THE INQUIRY FURTHER

The framework maps the interactions between workspace, employees' well-being and the intangible effects on the business growth and performance. It gives an insight into the ways sustainability manifests in an organisational framework and the value it generates for the business as well as its employees.

If the value generated by sustainable workspaces can be quantified, it will help position the "green building principles" beyond their environmental significance and 'good practice' approach, bringing forth their contribution **through the lenses of profitability, ease of production & delivery, and enhanced productivity,** thus making their adoption more appealing to the businesses. A measurable impact of workspace on the employee well-being and business performance will also add a **new dimension to the cost-benefit analysis of green building, further enhancing their profitability.**

Tangible benefits of adopting green buildings are easily quantifiable, however, a tempting business case for green buildings can only be developed when both tangible and intangible benefits are acknowledged.

The Indian real estate industry is perfectly poised to accelerate the adoption of green building principles and take the sensibility and knowledge to other industry sectors showcasing the real value created by sustainable built environment.

This phase of the research delves further into studying the impact of physical parameters of the workspace and its impact on employees' well-being, performance, and productivity, making a strong case for green buildings for the industry at large.

SUSTAINABLE WORKSPACES, EMPLOYEE WELL-BEING AND PRODUCTIVITY

Traditionally, employee well-being was looked at from an exclusive human resource perspective. It was during the industrial revolution that the physical workplace considerations came to forefront addressing workers' safety and the need to reduce workplace hazards. With the emergence of scientific evidence in early 1900's, the role of physical workspace on the mental and physical health of employees, and in turn affecting their ability to perform efficiently at work, came to the forefront.

Sustainable workplaces are identified as healthy indoor spaces that provide clean and fresh air, appropriate lighting, thermal comfort and a safe and community-oriented environment, that also provide amenities to encourage physical and mental health and well-being. The parameters of workplace environment that have a bearing upon employee well-being include good office layout, provision of daylight, ventilated workplace, improved indoor air quality, individual temperature control, green cleaning. (Lee, 2016; Jackson, 2008)

> **Work, Workforce, and Workplace are the three pillars for employee well-being in any organisation. Workplace in this connotation indicates "physical spaces and the remote work policies designed with peoples' well-being at the centre.**

Human resource management focusing on diverse programs and benefits to protect employees' health, and social and emotional well-being has been the cornerstone for organisations for a long time. However, investments in workplace can yield numerous benefits ranging from increased employee engagement, productivity, retention, reduced health costs, and brand recognition. To foster a culture of well-being, the organisations need to take an integrated approach addressing both the workplace policies and workplace environment that promotes employees' well-being. (Deloitte, 2022)

A 2018 report by World Green Building Council indicates that green buildings contribute to a significant social and financial growth of the firm including promoting improved occupant health and well-being, increasing worker productivity, creating a sense of community, and supporting domestic economy.

Improved indoor environmental quality (IEQ) that adheres to the principles of green buildings, contribute towards reductions in absenteeism. (Singh, et.al. 2009). Studies highlight that, green buildings lead to benefits like higher productivity, decrease in occupants' health problems, creation of a green image and higher marketability. It is noted that employees respond better emotionally to a good physical working environment. The intangible benefits like occupants' satisfaction levels in green buildings cannot be ignored (Deuble and de Dear, 2012; Duru & Shimawua, 2017)

Another research suggests that improving indoor air quality can reduce absenteeism and work hours affected by asthma, respiratory allergies, depression and stress and self-reported improvements in productivity. The research indicates that employees working in green certified buildings feel happier, healthier and more productive. In a study by Lee (2016), 58% of the tenant respondents recognize that the building environment influences their productivity; Studies also indicate that the users of certified buildings value productivity and well-being enhancing feature more highly than the measures aimed at curbing energy usage (Fuerst and Franz 2021).

A study by Kats (2003) in collaboration with other institutes and industry-based bodies, identified that increased ventilation control, temperature control, lighting control and daylighting—have been positively and significantly correlated with increased productivity from 0.5 – 34%. One 1% increase in productivity (equal to about 5 minutes per working day) translates into $600 to $700 per employee per year, or $3/ft2 per year. In Indian context, this could mean almost INR 50,000 - 58,000 per employee per year. Over 20 years and at a 5% real discount rate, the study estimated value of productivity benefits at about $35/ft2 for Silver Certified Buildings, and $55/ft2 for Gold and Platinum level buildings.

Incorporation of minimal strategies on flexible work environment reduces the financial implications of regular absenteeism and presenteeism (Cascio, 2006). The relatively large impact of productivity and health gains reflects the fact that the **direct and indirect cost of employees is far larger than the cost of construction or energy.** Consequently, even small changes in productivity and health translate into large financial benefits.

This also strengthens the argument for the cost of building green as studies provide evidence that both tangible and intangible benefits offered by a green building must be taken into account when the costs of green buildings are being considered. (Buys & Hurbissoon, 2010).

The willingness to pay more for green building features has seen a shift, upon the realisation of benefits of incorporating these features on the overall firm performance.

Robinson, et.al., (2020) state that of all the green building features, the highest willingness to pay by office tenants in US market is for improved indoor air quality and access to natural light. Public firms, along with those in the energy and information technology industries are most likely to pay for green-labelled buildings, thus also highlighting the market value and role of industry driven norms.

EMPLOYEE WELL-BEING, PRODUCTIVITY, AND PROFITS

Studies find that employee satisfaction and employee productivity is positively associated with customer loyalty and is negatively associated with staff turnover, thereby providing a boost to the overall profitability of the firm. A firm's good performance manifests in consumer satisfaction, longer employee retention, higher revenue per employee, staff turnover, and stock performances. Increasing employee retention rates lowers the overall employee-related cost to company, while enhancing firm performance. (Krekel, et.al. 2019; Ostroff, 1992, Melian-Gonzalez, et. Al., 2015).

Employee Wellbeing and Job Satisfaction are important determinant of longer employee retention (Huang and Ching 2012). Well-being at the individual level manifests as greater creativity and better task performance. At the organisational level, it is reflected in improved key performance outcomes, profitability, and lower staff turnover. (Krekel, et al. 2019).

This correlation pans across the different sectors. Parsat & Fini (2010) in a study on the impact of productivity and quality on profitability in US airline Industry, indicate that labour productivity is the most significant predictor of profitability amongst other factors including, gas price, average annual maintenance cost and employee salary, etc. In case of manufacturing industries, it is identified that the employee satisfaction has strongest profitability amongst all industries. Work systems and environments are positive predictor of employee satisfaction and organizational performance. (Voorde, et.al. 2012).

Studies have given quantifiable evidence to the impact of well-being on business performance. Dr. Kreke et.al. (2019), in his study, indicates that "an increase in job satisfaction by 1 point would increase value-added per hours worked by almost 20%." recommending that interventions focussing on enhancing employee productivity should focus on improving employee well-being. Some of the areas which can be worked on are improved work-life balance, better avenues for social interactions, making jobs more interesting, etc. Another research shows that a meaningful increase in the well-being of employees yields an average increase of 10% in productivity. Analysing the case across industries, the study shows a significant positive correlation between employee well-being and overall firm performance across all industries, including food, retail, manufacturing, etc. (Cascio, 2006).

Literature identifies a range of organisational factors that influence employee's well-being and their satisfaction levels. Firm structure is an important indicator of employee job satisfaction. Employees that work for firms with active founders are more satisfied with their compensation and benefits, their career opportunities, and their work/life balance in comparison to non-family and scion firms. (Mitra, 2022; Huang, Li et.al.,2015)

HRM is considered as a significant non-built component of the firm which can impact employee job satisfaction and enhance productivity. Through good HR policies, costs associated with employee behaviour can be controlled and wise management of employees can increase productivity and decrease operating expenses. HRM policies can enhance employee well-being by 70% and employee performance by 60%. (Cascio, 2006; Voorde et al., 2012) Green HRM[1] supports green behaviour, consequentially improving employee job satisfaction and work-related flow. Adoption of green HRM can improve organization identification by employee and reduce employee turnover rates. (Parida et.al.,2021)

Employee well-being and productivity is affected by a mix of built and non-built components of the work environment. To understand the role of sustainable built environment in enhancing well-being at work, it is essential to quantify the benefits such as employee productivity, job satisfaction, employee well-being on firm revenue, overall profitability, and analyse their relationship with the quality of physical space.

KEY TAKEAWAYS FROM EXISTING RESEARCH

The existing body of research brings forth interesting correlations between sustainable and green office spaces with employee productivity and the overall firm performance, while also

1 Green HRM is defined as the proactive organizational practices that aim to ensure environmental management and consequently, promote sustainability.

EMPLOYEE WELL BEING

Well-being is a multi-dimensional parameter. It includes all aspects of working life – the quality and safety of physical environment, how employees feel about their work, working environment, climate at work and work organization. (OECD, 2023; Meister, 2021; Field). Employee well-being has emerged as is one of the key factors determining an organisation's long-term effectiveness, with research-based evidence demonstrating the direct link between firm productivity and well-being of its employees. (ILO, 2024)

THRIVING AT WORK

Thriving at work is defined as "the psychological state in which individuals experience both a sense of vitality and a sense of learning at work." (Walumbwa, Muchiri, Misati, Wu, & Meiliani, 2018). Vitality consists of feeling energized and having a zest for work. Learning refers to the sense that one can acquire and apply skills or knowledge to develop capability and confidence (Liu, Xu, & Zhang, 2020). Measuring employee thriving runs deeper than superficial issues at work. It looks at cultivating an environment that fosters the development of positive mental health and a sense of fulfilment among employees. (Fagan, 2022)

EMPLOYEE ENGAGEMENT

Employee engagement has been studied in many research studies. Research suggests that employees exhibit engagement when they become physically involved in tasks, whether alone or with others; are cognitively vigilant, focused, and attentive; and are emotionally connected to their work and others in the service of their work (Kahn, 1990; Rich et al., 2010). Employee engagement has been found to positively impact individual performance (Yalabik, Popaitoon, Chowne, & Rayton, 2013), employee well-being (Jenkins & Delbridge, 2013), and work-related attitudes (Barrick, Thurgood, Smith, & Courtright, 2015)

leaving space for new queries. Studies provide significant evidence on the impact that built environment has on the employee well-being, and the role of employee well-being in enhancing productivity. However, these associations have been studied in isolation. **A comprehensive assessment that maps the interrelationship between built environment, employee well-being and the quantum of impact it has on productivity has not been extensively analysed** in the existing body of literature.

With employee well-being determined by a mix of built and non-built components of the working environment, **isolating the role of built components will be the key in bringing forth the significance of sustainable workspaces.** The existing literature looks at the two exclusively. The role of built components on employee wellbeing has been investigated in the domain of green building research, while the non-built components have been studied extensively in the field of HRM and organisation behaviour.

Studies show a strong relationship between the green built environment and employee well-being, thriving and productivity. The most common proxy indicator for green in existing literature is 'certified' and 'non-certified' building. The **literature fails to capture the range in the indoor environment quality (IEQ) parameters and potential effect on the employee well-being or productivity.**

Literature analyses the efficiency of an employee using indicators such as errors at work, absenteeism, employee retention and turnover, and employee related costs to the organisation. The wellbeing is assessed through the individual's physiological parameters. The literature is slim when it comes to **analysing the deeper parameters of an individual's functioning including vitality and learning abilities and their relationship with the workspace and business performance.**

The existing literature provides an understanding of financial and social benefits of adopting green building practices. However, these studies provide a western countries' perspective. Not much research is available in Indian context that investigates the impact of green built environment on the employee performance and the business profitability.

SUSTAINABLE WORKSPACE AND THRIVING – MAPPING THE RELATIONSHIP

Workspace environment has a significant bearing upon the users who occupy that space. The physical parameters such as daylight, sound, air quality and temperature affect the way that employees feel about their space and function within it. Sustainable workspaces are known to have a healthy and comfortable work environment, thereby contributing to the overall well-being of the employees.

To **put forth a comprehensive business case for sustainable buildings**, it becomes imperative that this relationship is analysed and its impact in terms of the "rupee value" that it can potentially generate is understood.

Through select case studies the study attempts **to quantify the relationship between built environment in a workspace and the employees' performance and their ability to learn and perform** in the organization.

The project is a journey towards furthering the case for sustainable and comfortable workspaces, their contribution to the overall employee health and performance, and its role in facilitating enhanced business performance, thereby contributing to the "Decent Work and Economic Growth" for the industry at large. The project identifies specific goals including the quantification of the social and economic benefits of sustainable built environment in a workplace.

In its pilot phase, this study is a step towards achieving the larger goals of the project. By showcasing the quantifiable impact of workspace environment on the thriving levels of the employees, the study gives some definite answers to the social and economic impact of built environment.

GOALS

1. To **quantify the impacts of sustainable built environment** on various social and economic parameters in a workplace.

2. To **develop a matrix that translates the impacts into a comprehensive score** that can be used by individual workplaces for self-assessment

3. To identify the **benchmarks for establishing the performance indicators** for individual workplaces

CONCEPTUAL FRAMEWORK

Fig. 03 - Goals and Conceptual Framework

GUIDING QUESTIONS

1. How does the physical environment of a workspace interface with the physical and mental health of the people who occupy that space?

2. Is there a range in indoor environment where higher performance can lead to better results for the occupants?

3. What is the relationship between indoor environment parameters and the comfort of the occupants?

4. How does the impact of indoor environment, occupants' productivity and well -being translate into the overall business performance?

METHODOLOGY

There is scientific evidence about the role of physical elements on the cognitive and physical ability of human beings. Researchers at the National Institute for Mental Health (NIMH) found light affects brain areas that regulate mood. The sun can help brain function, which can improve the nervous system, hormonal regulation, muscle function, immune health, and carries many other benefits.

Studies have shown that oxygen can have a positive effect on cognitive function and brain health. Increased oxygen levels in the brain can enhance mental clarity, focus, and concentration. It can also help to improve memory and increase overall cognitive performance. In addition, increased oxygen levels have been shown to have a calming effect on the brain, reducing anxiety and improving overall mental wellbeing. Visual connection to nature has been demonstrated to have a positive impact on attention restoration, stress reduction, and overall health and well-being.

Research results suggest that where cognitive performance is the priority, it is wise to ensure a comfortably cool environment. Studies also support the use of fans or natural ventilation to reduce the need for mechanical cooling.

Based on this understanding, the study identified **three distinct parameters to be analysed – the indoor environment quality or the IEQ, the comfort of the occupant in the given indoor environment, and the employees' thriving, i.e., vitality and learning quotient at work.**

SELECTED CASE STUDIES

The study focuses on the corporate workspaces in this phase of the research. To address the diversity in corporate workspaces, a judicious mix of green certified and non-certified, standalone office space and tenant-occupied offices were identified. Fifteen case studies from Ahmedabad and Surat were shortlisted for the purpose of data collection and analysis.

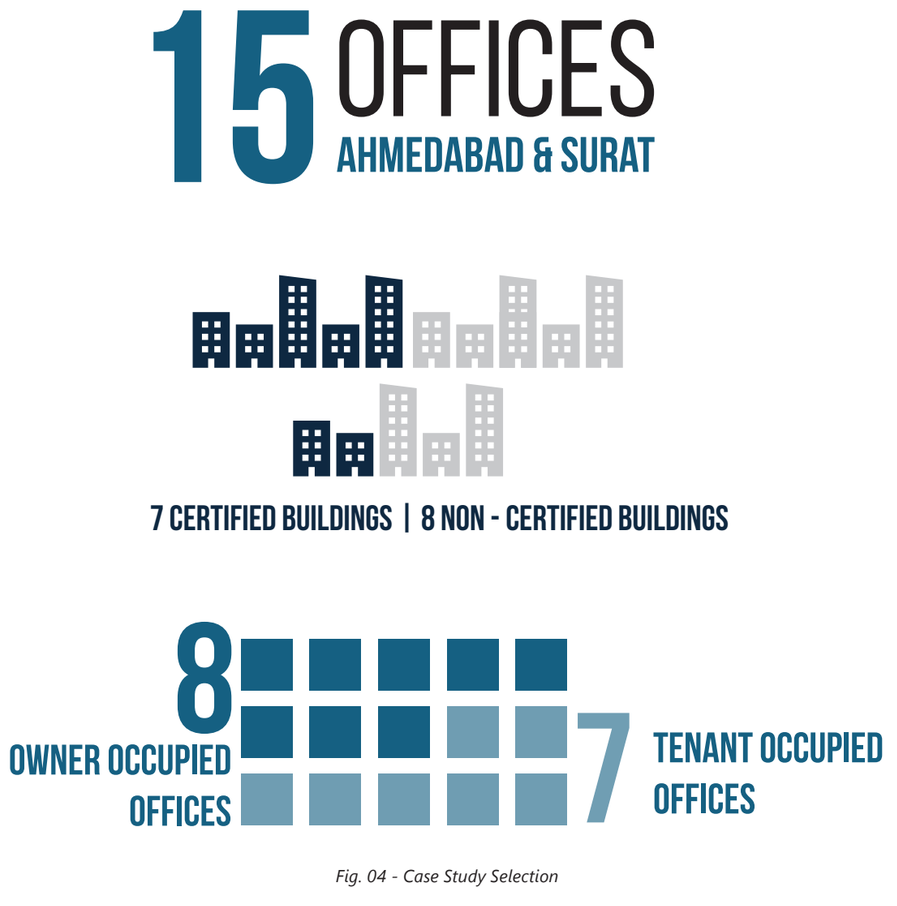


Fig. 04 - Case Study Selection

DATA COLLECTION

Indoor Environment Quality Parameters

The study focuses on the indoor environment, based on the understanding that the indoor environment of a workspace has a more direct effect on the occupants' response to their physical surroundings than the other building parameters. Thus, IEQ data for following five parameters was collected using scientific instruments at each subject workplace - Temperature (deg); Daylight (lux levels); Noise (Db); Relative Humidity (Rh); and CO2 (ppm).

These readings were taken twice in a four-month period. The readings were taken in different locations within the office space to capture the variations in micro-climates within the office space.

Occupants' Comfort and Perception of their IEQ

The user comfort was measured in these workspaces using a questionnaire-based survey. The survey gave insights into the perception of the respondent of their physical environment, their comfort within the given indoor conditions and their ability to control them within or around their locations. The survey was conducted twice in the four-month period, coinciding with the IEQ recordings.

Employee Engagement and Thriving

Third, a survey instrument (validated by previous academic research) collected data on employee engagement and thriving. A series of questionnaires were shared with the participants during the period of data collection. The participants were asked to fill out the surveys with a 14-day gap.

The IEQ data was recoded in scores across different levels of comfort, as recommended by earlier scientific literature. The study posits consolidated IEQ scores as different levels of "Green." Data on "Thriving", "Employee Engagement", and "Comfort" are based on the survey instrument.

WHY "THRIVING"

In today's fast growing and competitive knowledge-based service economy, a thriving workforce is essential for an organization's competitive advantage and sustainable performance. Thriving has emerged as one of the core parameters that the firms look at when assessing organisational health. **Thriving is focused on being energized and empowered to do meaningful work in your role.** (Fagan, 2022; Klinghoffer & McCune, 2022).

> **Thriving at work has been defined as employees' joint sense of vitality and learning.**

Employees who are thriving feel active and strong (i.e., vitality) and, at the same time, believe that they are acquiring new knowledge and skills (i.e., learning). To experience thriving, both vitality and learning have to be present at high levels. If individuals see themselves as learning, but depleted, they are not thriving. This might be captured by the experience of an employee who sees that she is learning in significant ways as she masters new technology but feels burned out in the learning process. Conversely, if an employee experiences vitality at work but has no sense that he is adding to his existing knowledge or skills, he is not thriving."

The components of thriving – vitality and learning – when analysed individually, do not significantly relate to physical health; however, there is a positive relationship between composite thriving and physical health. The notion of health as a central outcome of thriving needs further elaboration. (Kleine, Rudolph, & Schmitt, 2023)

It is essential to focus on the question "how much are the employees thriving in the given work environment?". **When people report that they are thriving at work, they achieve better job performance while also being good organizational citizens, going above and beyond the call of duty** (Spreitzer, Porath, & Gibson, 2012). People who report that they are thriving

tend to be healthier. A state of thriving helps mitigate problems such as absenteeism that may result from burnout, stress, low morale, disengagement, depression, and other illnesses, and may cost organizations up to about $84 billion annually in lost productivity (Forbes, 2013). In one of the studies conducted, researchers found that those who were thriving missed 74% less days of work. Additionally, individuals who are thriving have better psychological health, higher life satisfaction, reduced emotional exhaustion and better work-family enrichment. At work, thriving impacts task performance, extra-role behaviour, taking charge and creativity (Goh et al., 2022). While still nascent, research in the domain of thriving suggests that it has a positive impact on firm financial performance (Porath, Gibson, & Spreitzer, 2022).

Fig. 05 - Benefits of Employee Thriving

DATA ANALYSIS AND INTERPRETATION

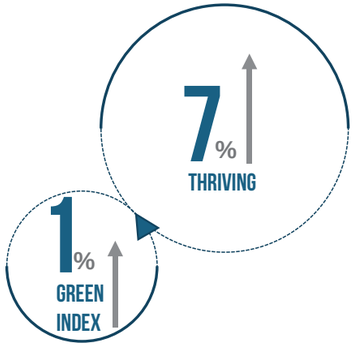


Fig. 06 - Effect of Green Index on Thriving

In order to understand the effect of green buildings and comfort on thriving, the study ran multiple econometric models. However, a small sample size limits our degree of freedom to observe significant associations. The study found that a **combination of green features and comfort, together called for the purpose of the study, the "Green Index", had the largest effect on thriving.** When isolated, we found that workspaces that have higher green scores and are considered more comfortable together, increase the state of thriving within employees. Further, a **1% increase in green index leads to a 7% increase in thriving.**

Further, in order to understand the effect of green buildings and comfort of green buildings on employees, we looked at the impact of thriving on employee engagement. The results show that thriving has a positive impact on employee engagement. That is, **a 1% change in thriving leads to an 8% increase in employee engagement.**

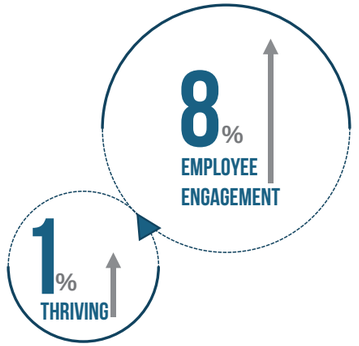


Fig. 07 - Effect of Thriving on Engagement

This study is not without limitations. First, since the data was collected over a small duration of time while the analysis can show significant associations, it cannot draw any causal inferences. The causal inferences are driven by an intuitive understanding of the dataset. Second, the sample size of the data, while sufficient to make some inferences, is not large enough. Finally, to ensure the quality of analysis and mitigate the incomplete responses received, a large set of data and observations had to be cleaned up.

KEY FINDINGS

1 **Green is not a Binary. It is a range, where the better the IEQ, greater will be the effect on the occupants' thriving in the organization.**

The green quotient in any built environment is not absolute. The quality of indoor environment is a range determined by the health-based and industry standards. Any degree of improvement in the IEQ parameters has a significant impact on the occupants' ability to work efficiently and effectively in the given workspace.

2 **Human comfort in a built environment has a significant impact on the way people feel and function in the workspace.**

The degree of comfort that occupants experience in a given workspace environment is a significant indicator of the appropriateness of the IEQ. The Green Index is thus a composite indicator of IEQ parameters and the comfort of the employees An integrated effect of both parameters has significant bearing upon thriving.

3 **The built components of a workspace have significant impact on the employees thriving in the organization.**

Thriving is a result of both built and non-built components of a workplace. While the built components have a relatively smaller impact, they emerge as a significant factor that influences the thriving and overall well-being of the employees in an organization.

4 **Thriving has a significant effect on the degree of Employee Engagement in the organization.**

The impact of thriving manifests directly as greater employee engagement in the organisation. Employee engagement in turn results in a wide range of benefits – from increased productivity, to increased innovation, adaptability and resilience of the employees. Engaged employees come to the workplace with a commitment to purpose, and involve themselves physically, cognitively and emotionally in the work.

RELEVANCE OF THE STUDY FOR THE INDIAN BUSINESS ENVIRONMENT

The changing work scenarios, and the constant need to balance resources and perceived expectation is emerging as one of the greatest stressors for the workforce. Because stress is associated with low productivity and less engagement at work, **a deeper probe is required at what works, and what shall work for the employees to feel energised, learning and contributing or "Thriving", in a work environment.**

Various reports suggest that most businesses pay little attention to the effect that workplace can have on employees' mental health, engagement and overall well-being. This gap is more starkly visible in Asian countries. **In the Indian scenario, studies indicate that less than 25% of the employees across different organisations experience high levels of well-being at work**. As a result, the employees are now reorienting their priorities. This trend further shows a clear demographic divide. The younger generation, or to say the Gen-Z, lays greater emphasis on the workplace environment as compared to older generation. With increasing focus on work-

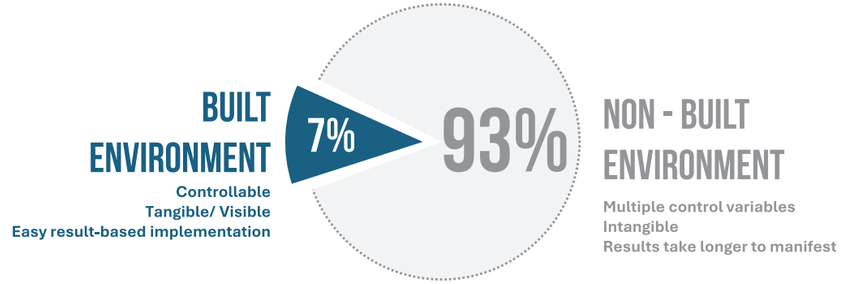


Fig. 08 - Role of Built Environment in Enhancing Employee Thriving

life balance, the Gen-Z's **professional choices are now navigated by factors such as office location, commute time, flexibility to work remotely and office design.** (Carmichael, 2022; CBRE, 2017; Indeed, 2023)

The young workforce is the driver of the innovation, entrepreneurship and diversity. With a significant young working population in India, looking at "Thriving" becomes even more significant in the current business scenario.

Further, as the businesses re-align their strategies to adopt the Environmental, Social and Governance (ESG) Framework, a renewed focus on thriving and ability to quantify becomes even more relevant. An understanding of employees' well-being and thriving and the factors that influence it, can form the **measurable foundation of the "S" in ESG and facilitate the development of social capital in an organisation.**

While the literature suggests that the non-built components such as the organizational culture and structure, policies, social interactions at work, have a greater weightage in determining the overall thriving, the **role of built environment is significant because of its tangibility, limited control variables, faster turnaround in implementation and visible impacts.**

The organisations need to align their policies towards creating facilitating work environments by giving their employees a place of work where they are comfortable, energetic and are able to work effectively. An integrated strategy that enhances the quality of physical space and the overall work culture will be the way for the organisations to grow holistically and contribute to the overall development process.

CONCLUDING REMARKS AND WAY FORWARD

The study highlights the pivotal role of quality of indoor environment and comfort together, in the workspaces in India. It underscores the imperative for businesses to prioritize the integration of sustainable principles in both the design and day-to-day operations of their built environments. By doing so, the organizations can cultivate workspaces that not only foster employee thriving, but also contribute to overarching organizational performance.

The study makes a **unique contribution by highlighting the composite role of IEQ and the occupants' comfort, together defined as the "Green Index"**, which has emerged as a significant factor affecting the employees' thriving in an organisation. The findings further suggest that the **concept of "green" transcends a binary definition. Rather than being fixed as "is" or "is not", it represents a dynamic range.** Any incremental improvement in IEQ parameters can significantly affect the occupants' efficiency and effectiveness. Further, the degree of comfort that the occupants enjoy in a workspace reflects the appropriateness of the IEQ.

The built components of a workspace emerge as one of the key factors that organisations need to look at when addressing their workplace environment, due to their faster implementation, prompt results, and employer's & employee's ability to control the variables within the built environment.

Moreover, the study also delves into identification of the relationship between employee thriving and employee engagement, and in turn present a persuasive case for profitable business at large. It concludes that **thriving correlates strongly with employee engagement. Thriving employees exhibit higher levels of commitment, productivity, innovation, adaptability, and emotional investment in their work**. Thus, fostering thriving not only enhances individual well-being but also fuels organizational success.

While the insights gleaned from this study are based on the cases from Gujarat, they serve as a **catalyst for broader exploration**. A cross-regional and cross-sectoral examination across

diverse climatic zones and organizational cultures within India would yield a more nuanced comprehension of the intricate interplay between the built environment and employee well-being.

A more extensive inquiry holds the promise of elucidating a framework or tool that enables businesses to systematically evaluate and enhance various facets of their workplace environments. Through a continued commitment to studying the nexus between the built environment and employee thriving, organizations can glean invaluable insights to inform strategic decisions aimed at promoting sustainability, bolstering productivity, and nurturing employee satisfaction. Hence, ongoing research endeavours in this realm stand poised to yield transformative benefits for both individuals and enterprises alike.

CASE STUDIES

SELECTED WORKPLACES

INTRODUCTION

Group of cases were selected across Gujarat to understand the impacts, benefits and outcomes of manifestation of green workspace development in Indian context. Fifteen case study partners were identified which represent a healthy mix of diversified workspace and both green certified and non-certified.

The Selected Case Study Partners were:

1. Astral Limited
2. Collated Ventures
3. Deloitte Touche Tohmatsu India LLP
4. Essteam Design Services LLP
5. Filter Concept Pvt. Ltd.
6. GIFT House
7. HOF Furniture System Pvt. Ltd.
8. INI Design Studio
9. Luthra Group LLP
10. Savvy Group
11. Secure Meters Ltd.
12. Shivalik Group
13. Transit Electronics Limited
14. Venus Infrastructure & Developers Pvt. Ltd.
15. Viega India Pvt. Ltd.

> We are committed to investing in low-carbon technologies and manufacturing processes that minimize the impact on the environment. We are focused on enhancing the environmental and social performance of our product.
>
> - Mr. Sandeep Engineer, Chairman & Managing Director, Astral Pvt. Ltd.

ASTRAL CORPORATE HOUSE

Commencement of Project Operations: 2021

Built-up Area: 6084 Sqm.

No. of Employees: 450

Certified/Non Certified: Non-Certified

Sustainability features Implemented:

- Efficient roof envelope with use of insulating material to minimise heat gain
- Energy management system to monitor energy consumption
- Optimised lighting for energy efficiency
- North oriented glazing for diffused daylighting
- Flexible furniture for improved ergonomics

INTENT

Astral Pipes offers the widest range of pipes and fittings for various applications including specialized products for infrastructure development. Today, Astral is one of the fastest-growing companies in the category of building materials and has been a distinguished brand. Astral deploys best-in-globe technologies and fulfils the emerging needs of millions of houses and adds extra mileage to India's developing real estate fraternity with the hallmark of unbeaten quality and innovative building materials solutions.

INFERENCES

Apart from the leadership's intent to develop the company as a "good place to work", adoption of sustainability concepts at the Astral Corporate House office is also an outcome of the strict requirement from the fellow market players. Astral Corporate House is designed to provide occupants with ample daylight to regularly occupied zones internally and views to the outdoor. The three-storeyed cast-in-situ fair face concrete building consolidates all its operations in a single building.

The Office facility includes cabins for directors, managers and support staff, reception/waiting rooms and meeting rooms on all floors, a training room and a lunchroom with pantry in the basement. The main glass facade is strategically planned keeping in mind Ahmedabad's climatology. The facade is designed to face north and shield the interior spaces from severe solar heat gain. Further, to control the glare and at the same time provide unobstructed visibility from the interiors, a fabric based exterior shading system is installed.

Interaction with the occupants revealed that majority of them are well aware of green building concepts and strongly believe that improved comfort in terms of optimum temperature, better visibility from daylight contributes to their wellbeing and reduced noise levels. In fact, a few participants of this research study mentioned that they have chosen seating spaces based on proximity to the windows to get better visibility and views. The office maintains good acoustic comfort with decibel levels within 50 dB.

COLLATED VENTURES

Commencement of Project Operations: 2018

Built-up Area: 545 Sqm.

No. of Employees: 35

Certified/Non Certified: Non-Certified

Sustainability features Implemented:

- Daylight in 100% regularly occupied areas
- Efficient water fixtures to reduce potable water demand
- Task lighting to minimise lighting energy consumption
- Outdoor views from each space within the office
- Core area exclusively for employee well-being activities

INTENT

Collated Ventures is reimagining real estate to create a platform for shared economy businesses. The leadership team believes in putting people first in whatever they do and design buildings to harness the power of network effects and create greater efficiency compared to traditional buildings.

INFERENCES

The project exemplified comfortable working conditions, ensuring temperatures consistently maintained between 24 and 26 degrees Celsius, humidity levels within the range of 50 to 70%, and CO2 differential remaining within 530 ppm as compared to ambient levels.

Strategically designed, the project situates meeting rooms and waiting areas in the southern direction, serving as a buffer to mitigate heat gain from southern direction. Meanwhile, office spaces face northward, featuring expansive daylight windows to allow diffused light while curbing heat gain. In the rainy season, mid of August, a second round of Indoor Environment Quality (IEQ) measurements were conducted. Despite overcast skies, workstation areas benefitted from diffused natural light from the northern exposure, maintaining lux levels above 500.

DELOITTE TOUCHE TOHMATSU INDIA

Commencement of Project Operations: 2015

Built-up Area: 2305 Sqm.

No. of Employees: 200+

Certified/Non Certified: Non-Certified

Sustainability features Implemented:

- Better indoor air quality through MERV 13 filters & CO2 sensors
- Occupancy & daylight sensors to optimise the lighting load
- Use of water efficient plumbing fixtures
- No plastic' policy
- Well being facilities for employees

INTENT

The strategic steps of Deloitte are to define roadmaps to embedding sustainability, meeting regulatory requirements, and accelerating transformation. Deloitte empowers its clients to navigate climate complexity to help deliver sustainable value for investors, customers, businesses, regulators, governments, and communities. By combining leading sustainability technology with Deloitte's proven business capabilities, the company can help drive real and rapid progress on climate-led transformation.

INFERENCES

The Deloitte office is located in a platinum rated building 'Shapath 5'. Deloitte workspaces have been developed on the principal of sustainability, driven by their top management's mandate and further fuelled by the passion of their leadership team for adoption and promotion of green lifestyles. The leadership at Deloitte not only values green principles but also believes in practising before preaching.

The project showcased comfortable working conditions, with temperatures consistently maintained between 24 - 26 degrees Celsius, humidity levels falling within the range of 45 to 65%, and CO2 levels having a differential of less than 400 ppm compared to ambient levels. The well being facilities include indoor games and an outdoor cafeteria for employees.

> Consumption brings happiness - the shifting of this paradigm has opened up floodgates of opportunities to find peace and bliss in everyday life and work. Going green has become, to a great extent, a default setting in the buildings we have designed in the last 15 years.
>
> - Ar. Snehal Shah, MD & Design Director, Essteam

ESSTEAM DESIGN SERVICES

Commencement of Project Operations: 2016

Built-up Area: 565 Sqm.

No. of Employees: 55

Certified/Non Certified: Certified (IGBC Green Interiors; Platinum Certification)

Sustainability features Implemented:

- Reuse of salvaged materials to minimise the use of natural resources
- Use of water efficient plumbing fixtures
- Indoor plants to purify the air within the project
- Facility is designed with ribbon windows to harvest natural light
- Use of shading devices to reduce heat gain

INTENT

A project where architects and interior designers have designed their own office in a very interesting proposition that offers a wonderful opportunity to test self-convictions and understanding about design. The design also offers a chance to culminate thought processes of the work done so far and put up a manifesto for future. At EssTeam, the team is committed to doing only sustainable development right from a small residence interior to a giant corporate house or even a large industrial park and believes in 'Practice what you Preach'.

INFERENCES

The project serves as a commendable illustration of utilizing salvaged materials and low VOC adhesives & paints effectively, thereby ensuring low VOC levels in the office areas to improve the health & well-being of the occupants. As a case study partner, the project team actively engaged in ongoing surveys distributed among the employees.

Notably, the project ensured comfortable working environments by maintaining temperatures within the range of 24-26 degrees Celsius, humidity levels between 50-70%, and CO2 differentials not exceeding 530 ppm compared to ambient levels. Deep floor plates were observed in the workstation area restricting daylight in core areas, however a distinctive feature of the project includes ribbon windows positioned both at the top and bottom, which allowed adequate daylight illumination levels at workstations ranging from 50 to 80 lux. Further to meet the lighting requirements, the employees were provided with task lighting.

> Sustainability is Filter Concept's core values. We believe that our technological innovation & advancement go hand in hand with our environmental responsibility. With a firm commitment to minimizing our carbon footprint, we have developed advanced filtration solutions that not only deliver exceptional performance but also contribute to a cleaner and healthier environment.
>
> - Mr. Mehul Panchal, Chairman & Managing Director, Filter Concept Pvt. Ltd.

FILTER CONCEPT

Commencement of Project Operations: 2002

Built-up Area: 8617 Sqm.

No. of Employees: 85

Certified/Non Certified: Non-Certified

Sustainability features Implemented:

- Use of air purification systems and fresh air ventilation for enhanced indoor air quality
- North oriented windows for better visual comfort and reduce artificial lighting
- Flexible furniture for improved ergonomics
- Use of vertical landscaping in the indoor spaces and dedicated gardens in outdoor areas
- Full height glazing for improved views to the outdoor

INTENT

Filter Concept Private Limited is one of the leading industrial filters & cartridges manufacturers, exporter, and supplier. Based in Sanand, Ahmedabad, the commercial hub of India, Filter Concept provide filtration solutions to various industries for demanding application of air, gas, and liquid filtration. With an innovative approach and consistent efforts in application analysis and technical support, the company has grown and expanded to two offices, three production facilities, and one warehouse. The Filter Concept office cum production facility at Sanand is their flagship facility.

INFERENCES

The leadership at Filter Concept strongly believes in practicing before preaching. Hence, being industry experts in the field of air purification and filtration, their entire office building at Sanand has been provided with superior indoor air quality with reduced CO2 levels, reduced PM 2.5 levels and optimum temperature and relative humidity. The management has provided standalone indoor air purifiers on every floor, along with mixing treated fresh air through their air conditioning systems.

The Filter Concept office is designed as a north-south oriented building, with the southern side being sealed without windows and the north side having full height glazing. This allows diffused daylight to illuminate the workspaces and reduces the dependency on artificial lighting. The north windows overlook a lush green garden, providing the occupants with a pleasant view. The indoor reception area is also provided with a large vertical landscaped wall to give a feeling of freshness.

GIFT HOUSE

Commencement of Project Operations: 2019

Built-up Area: 1143 Sqm.

No. of Employees: 115

Certified/Non Certified: Certified; Green Interiors Platinum

Sustainability features Implemented:

- Low VOC Paints & Coatings are used for interior walls and ceiling surface areas.
- Sound insulation with noise control measures
- Connectivity between the interior and exterior spaces offering a visual delight for the occupants
- Natural ventilation in courtyard ensuring thermal comfort

INTENT

GIFT House is the administrative office building for the operation of GIFT City. With a vision of becoming a leading global financial & technology hub, the evolution of GIFT City is an opportunity to drive reforms towards providing a thriving financial ecosystem critical to support and expand businesses. GIFT City is inclined to provide the conducive business eco-system at par or above with leading global financials hubs. GIFT City is a project of national importance and has become an integral part of the India's growth story as the country marches towards realizing the dream of becoming a developed nation.

INFERENCES

The GIFT House demonstrated comfortable working conditions, with temperatures consistently maintained between 24 - 27 degrees Celsius, humidity levels falling within the range of 50 to 65%, and CO2 levels having an average differential of less than 400 ppm compared to ambient levels. The building exhibits a blend of natural and artificial lighting, maintaining lux levels above 500 in the interiors. The acoustics of the building are well-crafted, maintaining dB levels between 50-60.

HOF FURNITURE SYSTEM

Commencement of Project Operations: 2011

Built-up Area: 2827 Sqm.

No. of Employees: 40

Certified/Non Certified: Non-Certified

Sustainability features Implemented:

- Efficient water fixtures to reduce potable water demand
- Skylight and daylight windows in few office areas

INTENT

HOF is among the leading furniture brands of India, based out of Ahmedabad, Gujarat, catering high-quality luxury furniture. Sustainability is one of the core values of the company. The management makes sure that all the products are manufactured sustainably by the company and is certified under the CII's GreenPro certification for products which thoroughly evaluates the life cycle of the product.

INFERENCES

The IEQ measurements were carried out in June and August 2023 revealed consistent indoor readings for CO2 levels, humidity, temperature, and lux. The employees enjoyed comfortable temperatures (26-28 degrees Celsius) and humidity levels (40-50%). The building boasted a blend of natural and artificial lighting, maintaining lux levels above 300 at working plane. While certain office areas exhibited CO2 differentials within 530 ppm, others surpassed the differential between indoor and ambient by 1,500 ppm. Though the project building sits on one of Ahmedabad's busiest streets, the building's acoustics were well-crafted, maintaining dB levels between 50-60.

INI DESIGN STUDIO

Commencement of Project Operations: 2007

Built-up Area: 1626 Sqm.

No. of Employees: 200+

Certified/Non Certified: Certified; Interiors Platinum

Sustainability features Implemented:

- Comfortable indoor spaces with moderate temperature & relative humidity
- Acoustical panels in ceiling to enhance work environment
- Low flow fixtures to reduce the potable water consumption
- Task lighting to enhance visual comfort
- Indoor air purifying plants
- Motion Sensing Lighting Fixtures

INTENT

INI stands for ideas that are driven by “n” number of I’s (InI) such as Inquiry, Imagination, Innovation, Inspiration, Integration, Inclusiveness and many more. The core purpose of the company is to deliver Integrated Ideas, referring to the integrated and collaborative nature of our practice and out of the box design ideas.

INFERENCES

The leadership of INI believes in designing the spaces with green concepts from the inception stage itself, which is reflected in the projects designed by the team. The office has good daylight in the peripheral areas from all four sides. Glass partitions between the cabins and workspaces offer views of the outdoor environment, promoting employee health and well-being.

With moderate occupancy levels, the project prioritized comfortable working conditions for the employees. The data collection for the Indoor Environment Quality (IEQ) study in the project building was carried out in May and July 2023. During this period, elevated CO2 levels ranging from 1,000 to 2,000 ppm were observed in various office zones, resulting in a difference exceeding 530 ppm as compared to ambient CO2 levels. The immediate measure taken by the project team was to increase the area per person by occupying a larger office space, which then indicated CO2 levels within the differential of 530ppm. The project portrayed comfortable temperatures maintained between 25 & 27 degrees Celsius and relative humidity levels ranging from 45 to 60%.

> At Luthra Group, we convey our respect and sincerity towards nature and environment, by not only implementing green practices in our routines, but also by promoting the 3R Policy. REDUCE, REUSE, RECYCLE
>
> - Girish Ramesh Luthra, Chairman, Luthra Group

LUTHRA GROUP

Commencement of Project Operations: 2021

Built-up Area: 2995 Sqm.

No. of Employees: 180

Certified/Non Certified: Certified (IGBC Green Interiors; Platinum Certification)

Sustainability features Implemented:

- Facility is designed to harvest natural light
- Water efficient plumbing fixtures to reduce potable water consumption
- Native species to minimise water required for landscaping
- Use of high-performance glass to reduce heat gain and cooling loads
- Fresh air system for continuous air supply

INTENT

Luthra Group promotes sustainability through circular economy. The group's mission is to protect future through adoption of innovative, technology driven '3R Approach' in its environment and industrial infrastructure business. Incorporation of the sustainable built-form and business components at Luthra Group were essentially done to reduce the energy consumption and associated carbon emissions. The manifestation of sustainable measures is observed significantly in the design and layout of the facility. It is envisioned to improve the employee productivity by improving the indoor air quality environment.

INFERENCES

The initial phase of data collection for the Indoor Environment Quality (IEQ) study in the project building was carried out in May 2023. During this period, elevated CO2 levels ranging from 1,000 to 2,000 ppm were observed in various office zones, whereas the ambient CO2 level was 428 ppm, resulting in a difference exceeding 530 ppm. The project team promptly documented these findings and commenced investigations into the reasons behind the heightened CO2 levels within the office environment. Discussions highlighted potential factors such as increased occupancy and the need for fresh air system filter replacements. Subsequently, within a month, the project team upgraded the filters to enhance fresh air circulation in frequently occupied areas.

The next phase of data collection phase took place in July 2023 and the indoor CO2 levels ranged from 700 to 1,200 ppm, with an ambient CO2 level of 567 ppm. The upgradation of fresh air system filters demonstrated difference in CO2 levels less than 530ppm, falling within the ASHRAE 62.1 standard requirements.

The health and well-being of employees stood as the paramount concern for the Luthra Group. Apart from the immediate measures taken to enhance the fresh air system, the project also had implemented various well-being initiatives, including a piano playing soothing melodies, interactive spaces, and other activities aimed at promoting employee wellness.

SAVVY GROUP

Year of Establishment of Company in India: 2004

Built-up Area: 1250 Sqm.

No. of Employees: 55

Certified/Non Certified: Non Certified

Sustainability features Implemented:

- Low flow fixtures to reduce potable water consumption
- Outdoor green areas to reduce heat island effect
- Increased space per person in layout for ease of movement and work
- Continuous fresh air circulation for improved air quality

INTENT

The Savvy Group of Companies was conceived as a professional construction group to satisfy the needs of the discerning customer interested in prime commercial or residential space. Within a decade, Savvy established a strong foothold and reliable reputation in the densely saturated construction market of Ahmedabad.

INFERENCES

Savvy Group operates out of the building Shapath IV in Ahmedabad. The office space has very good indoor air quality levels which are consistently maintained by monitoring through air quality sensors. All workspaces and meeting rooms are designed to get a good view of the outdoor and have access to daylight for well-being of occupants. The office has provided a terrace garden as a breakout space for the occupants, which also reduces the heat island effect and enhances the microclimate.

SECURE METERS

Commencement of Project Operations: 2019

Built-up Area: 81104 Sqm.

No. of Employees: 800+

Certified/Non Certified: Certified (IGBC Green Factory; Platinum Certification)

Sustainability features Implemented:

- Solar PV system to minimise dependency on grid
- Use of insulating material in roof to reduce thermal heat gain
- Manufacturing spaces with access to daylight
- Rainwater harvesting pond to collect stormwater
- IOT based irrigation systems with pipes laid below the ground for drip irrigation
- Supply of cool air at work plane level to reduce cooling load at shop floors

INTENT

Sustainable business that endures for generations is the core belief of Secure Meters. In addition to addressing the green concepts, the organisation focuses on enhancing the occupant health & well-being. Secure Sanand facility has been designed to create an uplifting work environment and promote staff well-being while reducing energy consumption, and includes state-of-the art manufacturing facilities, a canteen and recreational hub for staff, a seasonal lake that spreads between one to three acres in size for rainwater harvesting.

INFERENCES

The spatial design of the workstations enhances the overall work environment for the employees. The project showcased comfortable working conditions, with temperatures consistently maintained between 24 - 25 degrees Celsius, humidity levels falling within the range of 60 to 75%, and CO2 levels having a differential of less than 200 ppm compared to ambient levels. The office areas are not designed to allow natural light, however the lux levels are maintained through artificial lighting at an optimum level with artificial lighting to ensure comfort. The project team demonstrated a strong interest in engaging with surveys and actively sought feedback to enhance working conditions, particularly with respect to Indoor Environment Quality (IEQ) levels.

Within the manufacturing areas, ample daylight penetrates the space through north lighting and is complemented by task lighting, effectively reducing overall lighting energy consumption. Furthermore, the project has implemented an efficient HVAC system aimed at diminishing energy consumption within the building while enhancing occupant comfort for employees working in both office and manufacturing spaces.

> In an era where sustainability matters, Shivalik Group takes the lead with green building practices. We're steadfast in taking such a bold approach to effectively implement decarburization in realty sector to go green.
>
> - Mr. Taral Shah, Managing Direction, Shivalik Group

SHIVALIK GROUP

Commencement of Project Operations: 2013

Built-up Area: 2430 Sqm.

No. of Employees: 60

Certified/Non Certified: Non-Certified

Sustainability features Implemented:

- Good views to the outdoor from all working zones
- Optimised daylighting for better visual comfort
- Comfortable indoor spaces with moderate temperature & relative humidity

INTENT

Shivalik Group is building landmark projects since 1998 and are on a quest to build a legacy of timeless elegance. Pioneering the skyline of the Ahmedabad city, the company is now steadily conquering the state of Gujarat in luxurious residential & commercial spaces. The Shivalik team has built over 75 prominent structures with a footprint of 15 million sft.

INFERENCES

The leadership of Shivalik Developers believes in practicing before preaching, which is reflected in the design of their office building, Shivalik House, Ahmedabad. The office space is used for customer interactions and meetings with stakeholders from the construction industry. The indoor lighting particularly helps enhance visual comfort and at the same time elevates the interior aesthetics.

The participants of the research survey resonated with the green index questions and were able to provide accurate and educated responses that helped understand the impact of the interior environment on wellbeing.

TRANSIT ELECTRONICS

Year of Establishment of Company in India: 2017

Built-up Area: 3000 Sqm.

No. of Employees: 170

Certified/Non Certified: Certified Green Interiors Platinum

Sustainability features Implemented:

- Continuous fresh air circulation for improved air quality.
- Low frequency music to enhance work environment
- Increased space per person in layout for ease of movement and work
- Noise absorption material used in ceiling for better acoustics

INTENT

At Transit, the company understands needs to live an easy, comfortable and secure life. Transit uses morden edge technology in order to make those needs a reality. With 30 years of experience in the field of low voltage systems we desired to understand all your requirements and give you the best possible options.

INFERENCES

The Transit Electronics Limited office at Surat has adopted green interior certification and demonstrated excellence in energy performance, water efficiency, use of sustainable materials, and indoor environment quality. The office space prioritizes people centric design and has made efforts to provide a comfortable and engaging work environment. The office is equipped with speakers in the ceiling which play calming melodies and can be controlled space wise. The design team has strategically placed vibrant feature walls to break the monotony in design. The leadership team has made a daily routine to practice ‘desk yoga’, where the employees are encouraged to perform a few simple yoga movements at fixed timings.

> Venus is called the planet of beauty. As the namesakes, we feel the responsibility of carrying this legacy forward on the earth with a commitment towards environment to design for sustainable future.
>
> - Mr. Deepak Vaswani, Director, Venus Group

VENUS INFRASTRUCTURE & DEVELOPERS

Year of Establishment of Company in India: 2002

Built-up Area: 929 Sqm.

No. of Employees: 60

Certified/Non Certified: Certified, Interior Platinum

Sustainability features Implemented:

- 60% circulation space and ergonomically designed furniture
- Interactive and uplifting interior design with feature walls
- BMS to monitor and control air-conditioning systems and lighting
- Use of salvaged materials and materials with recycled content
- Eco-friendly products and materials used in interiors
- Openings oriented toward north to allow diffused daylight for occupants
- Carpets and acoustical finishes to reduce sound pollution

INTENT

Venus is called the planet of beauty. As the namesakes, the company feels the responsibility of carrying the legacy forward on the earth! of the relentless drive towards seeking awe-inspiring innovations, of building a brand that makes one define a space by design and not square feet of developing locations into landmarks of serving customers with unbelievable luxuries and unsurpassed amenities. Venus Group thrives to create futuristic and superior quality lifespaces that complement the grand vision.

INFERENCES

The Venus Group office occupies a floor in the building Venus Amadeus, Ahmedabad. The office space is thoughtfully designed with the latest technological installations and premium finishings. The leadership team advocates green building concepts and ensured that green interior norms are followed in the entire office space to enhance energy efficiency, water efficiency, indoor environment quality, and use of sustainable materials.

The interior lighting has been well planned and the selection of the colour, lux level and temperature of the luminaries has been designed based on the function of the space and requirement. The working areas where majority of the employees are seated get good access to daylight as well and have interactive breakout zones with feature walls. Further, different wall and flooring finishes have been used to enhance the sensory perception. The indoor temperature and RH was well maintained to create a comfortable work environment.

> To Viega, both as an organization and a solution provider, sustainable workspaces and employee meaningfulness is a strategic priority. We are excited to participate in this study and contribute to increased awareness of the impact of green workspaces in India.
>
> - Mr. Shriyans Jain, Managing Director, Viega India

VIEGA INDIA

Commencement of Project Operations: 2015

Built-up Area: 18000 Sqm.

No. of Employees: 115

Certified/Non Certified: Non-Certified

Sustainability features Implemented:

- Daylight in more than 75% regularly occupied areas
- Insulated roof to reduce heat gain & cooling load in the building
- Green areas designed within the campus to improve micro climate
- Shuttle services for commute of employees to reduce carbon footprint
- Low flow fixtures to reduce water consumption in the building

INTENT

Viega is one of the world's leading manufacturers of plumbing and heating installation technology. The manufacturing facility in Sanand includes a logistics centre, research & development department, and a customer experience centre. As a family company and entrepreneurs, Viega firmly believes that sustainability is an integral part of their DNA and a crucial success factor for the future of Viega along with having a vision of being carbon-neutral by 2035.

INFERENCES

From the infrastructure point of view, the Viega India Pvt Ltd. Office location in Sanand ensures that comfortable working conditions are provided which include better acoustic comfort, thermal comfort and visual comfort. For acoustic comfort the project has added sound absorbing material and partitions in all working zones. The office envelope is designed to keep heat out by using insulation and having openings only in the north side. The constant light from the north orientation is capitalized on and double-glazed windows are provided to bring in light and to cut heat.

The project was strategically planned to position workspace areas along the façade, maximizing daylight exposure in the main workspaces, while cabins are placed towards the periphery. Glass partitions between the cabins and workspaces offer views of the outdoor environment, promoting employee health and well-being.

With moderate occupancy levels, the project prioritized comfortable working conditions for the employees. Temperatures were maintained between 26 and 28 degrees Celsius, humidity levels ranged from 60 to 75%, and the CO2 differential remained within 400 ppm compared to ambient levels. IEQ measurements taken in June and August 2023 showed no major changes in readings.

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