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Impact of Human Capital and its Complementary Forms on Enhancing Individual and Organizational Productivity in National Thermal Power Corporation (NTPC)

Dr. Md. Umar Rayees*

Assistant Professor, Department of Commerce, Maulana Azad College, Ranchi University, Ranchi, Jharkhand, India.

*Corresponding Author: umarrayees786@gmail.com

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ABSTRACT

Human capital is associated with human assets such as education, health, and skills. Although it is intangible, it can be quantified and analyzed. The organization takes great pride in its workforce, which is considered its most valuable asset. The advancement of human capital in India is essential for ongoing economic growth and social development. Human capital encompasses more than just efficient management; it involves the establishment of a supportive, inclusive, and empowering workplace. NTPC is committed to nurturing a culture that allows its employees to flourish, resulting in elevated job satisfaction and reduced turnover rates. The workforce at NTPC is a dynamic blend of experienced professionals and new talent from all over India, promoting a diverse array of perspectives, skills, and experiences. This diversity enhances our ability to innovate, improves our responsiveness to market changes, and propels our organizational excellence. This article will impact on Human Capital and its complementary forms, including Manufacturing Capital, Financial Capital, Natural Capital, Social Capital, and Intellectual Capital on enhancing both individual and organizational productivity, economic growth, and competitiveness, while promoting sustainable human development.

Keywords: *Human Capital, Complementary Form of Capital, Economic Growth, Sustainability, Corporate Social Responsibility at NTPC.*

Introduction

Human capital refers to the economic worth of an individual's knowledge, skills, and competencies.[1] Human capital development within an organization pertains to the strategic initiatives aimed at enhancing the skills, knowledge, and capabilities of employees to elevate their performance and support the achievement of organizational objectives. This process encompasses investments in training, education, and various other programs designed to realize employee potential and increase productivity.

At NTPC, Human Capital serves as the cornerstone of the organization and is regarded as its most valuable asset. It is imperative to prioritize their growth, wellbeing, and skill development, as they are vital to achieving success. By cultivating a positive work environment and emphasizing employee career progression and overall health, remarkable levels of satisfaction have been attained. This commitment has fueled growth and made significant contributions to the organization's accomplishments. Success is propelled by a team of highly skilled and dedicated professionals who form the foundation of the organization. Human capital, along with other complementary forms of capital such as Financial Capital, Manufacturing Capital, Natural Capital, Social Capital, and Intellectual Capital, plays a crucial role in this regard.[2](https://ntpc.co.in/en)

Objective of Study

- To examine and analyze the impact of enhancing individual and organizational productivity at NTPC.
- To recognize and adapt strategies for fostering innovation and adaptability within NTPC.
- To explore methods for promoting sustainable human development.
- To investigate approaches for supporting economic growth and competitiveness.
- To identify and propose new techniques for increasing human capital development at NTPC.

Literature Review

According to the OECD, human capital is defined as:"The knowledge, skills, competencies and other attributes embodied in individuals or groups of individuals acquired during their life and used to produce goods, services or ideas in market circumstances".[4]

According to Gary Becker in the 1960s, Human Capital Theory suggests that investments in education and training lead to the accumulation of human capital, which subsequently improves individuals' productivity and earning potential.[5]

Research Methodology

This study is fundamentally descriptive in nature, relying on secondary data sourced from case studies, journals, newspapers, books, and online databases. We have ensured that the research study is straight forward and easy to comprehend.

Brief Profile of National Thermal Power Corporation (NTPC)

Founded in 1975, NTPC has significantly contributed to India's economic development for almost fifty years. With a dedication to operational excellence and compliance with international standards, it illuminates every fourth bulb in the nation![6]

NTPC stands as the largest energy conglomerate in India, with its origins tracing back to 1975, aimed at enhancing power development in the country. Since its inception, it has positioned itself as a leading entity in the power sector, encompassing the entire value chain of power generation. Initially focused on fossil fuels, it has expanded into electricity generation through hydro, nuclear, and renewable energy sources. This expansion is expected to significantly contribute to reducing its carbon footprint by minimizing greenhouse gas emissions. NTPC became a Maharatna company in May 2010. As of January 2020, there are 10 Maharatnas CPSEs in India. NTPC is ranked No. 2 Independent Power Producer (IPP) in Platts Top 250 Global Energy Company rankings.[7]The below table discloses present installed capacity of NTPC Group is 82,977 MW, comprising of 53 NTPC owned stations and 53 Joint Venture/Subsidiary stations:

Table 1: Installed capacity of NTPC Group

Project / Stations	NTPC Owned		Owned By JVs/Subsidiaries		Total (NTPC Owned & JVs/Subsidiaries)	
	No of Plants	Gross Capacity (MW)	No of Plants	Gross Capacity (MW)	No of Plants	Gross Capacity (MW)
Coal	27	55,170.00	10	9,004.00	37	64,174.00
Gas/Liquid Fuel	7	4,017.00	4	2,494.00	11	6,511.00
Hydro	1	800.00	8	2,925.00	9	3,725.00
Small Hydro	1	8.00	1	24.00	2	32.00
Solar PV	17	983.00	24	6,300.15	41	7,283.15
Wind	0	0.00	5	751.40	5	751.40
Energy Storage	0	0.00	1	500.00	1	500.00
Total	53	60,978.00	53	21,988.55	106	82,966.55

Source: https://ntpc.co.in/index.php/en/installed-capacity

NTPC stands as the largest integrated power company in India, committed to illuminating every part of the nation and fostering a sustainable future for everyone. As a frontrunner in the power industry, it is dedicated to producing efficient and cost effective energy, with a target of reaching 130 GW by 2032. The company adopts a varied fuel mix, incorporating fossil fuels, gas, hydro, nuclear, and renewable energy sources to reduce its carbon footprint.

- **Human Resource Development in NTPC -** NTPC focuses on Human Capital Development through its "People before Plant Load Factor" philosophy, emphasizing employee growth and well-being through a comprehensive approach to competency, commitment, culture, and systems building.

NTPC People-Centric HR Strategy is Built on Four Key Pillars

- Systems Building
- Commitment Building
- Competence Building and
- Culture Building

Objective of Human Resource Development in NTPC

- To improve organizational performance through the establishment of an objective and transparent performance management system.
- To synchronize individual and organizational requirements while fostering business leaders via the implementation of a career development framework.
- To create a streamlined organization equipped with a variety of skills and a strong capacity to adapt to change.
- To develop and maintain learning organization composed of skilled, world-class professionals.
- To embed core values and cultivate a culture of teamwork, ownership, empowerment, equity, innovation, and transparency that will inspire employees and facilitate the attainment of strategic goals.

HR Vision of NTPC

The HR vision of NTPC promotes an environment in which employees createa tightly bonded family of exceptional professionals, working together to drive NTPC towards its goal of evolving into a learning organization. NTPC offers an extensive benefits package aimed at improving employee well-being, facilitating work-life balance, and guaranteeing long-term financial and social security. The below table discloses employee cost:

Table 2: Summary of Employee Cost

Description	2020-21	2021-22	2022-23	2023-24	2024-25
Year end no. of employees	16798	15794	15159	14983	15116
A. Salary, wages and benefits (Incl. Provident fund and other contributions)	5302.16	5561.38	5923.95	5939.8	5947.95
B. Other benefits					
1. Welfare expenses	272.56	337.56	220.54	290.94	300.02
2. Township	288.57	316.73	357.72	366.15	382.75
3. Educational and school facilities	27.67	26.82	72.35	60.47	64.37
4. Medical facilities	249.53	318.44	316.09	323.01	344.75
5. Subsidised transport	2.9	3.88	3.6	3.93	3.34
6. Social and cultural activities	9.08	6.54	6.25	7.1	16.93
7. Subsidised canteen	81.8	95.84	115.1	125.95	143.94
Total (B)	932.11	1105.81	1091.65	1177.55	1256.1
Total (A+B)	**6234.27**	**6667.19**	**7015.6**	**7117.35**	**7204.05**

Source: P-520 | Integrated Annual Report - 2024-25

Interpretation

- NTPC expenditure in Salary, Wages and Benefits (Incl. Provident fund and other contributions) was Rs. 5947.95 Crore, reflecting increase of 0.14% over Rs. 5939.8 Crore in previous year.
- NTPC expenditure in other benefits (Welfare expenses, Township, Educational and school facilities, Medical facilities, Subsidised transport, Social and cultural activities and Subsidised canteen) was Rs. 1256.10 Crore, reflecting increase of 6.67% over Rs. 1177.55 Crore in previous year.

- NTPC overall expenditure in salary, wages and other benefits was Rs. 7204.05 Crore, reflecting increase of 1.22% over Rs. 7117.35 Crore in previous year.

Human Capital

Human Capital serves as the cornerstone of an organization and is its most valuable asset. For nearly five decades, NTPC has significantly contributed to India's economic development. NTPC adheres to the principle that the efficiency, effectiveness, and success of the organization are largely determined by the skills, abilities, and dedication of its employees, who represent the organization's most crucial asset. Consequently, NTPC has established a clear and robust policy framework that allows the organization to attract suitable talent for various positions, ensuring that it is available at the appropriate time and in the right quantity, with the ultimate goal of achieving optimal and effective utilization of human resources within an environment that fosters satisfaction, development, and growth.[8]

Table 3: Key Highlights of Human Capital of NTPC

Financial Year	Particulars	Employee of Learning Opportunities	Man-hours of Safety Training	Spent on Employee Benefits	Spent on Training & Development
2024-25	Human Capital	46.04 hrs	4.52 million	6796.13Cr	40.10* Cr
2023-24		42 hrs	4.42 million	6592.03Cr	54.82* Cr

Source: P-99 |Integrated Annual Report - 2024-25

During the reporting year, NTPC allocated 46.04 hours for Employee Learning Opportunities, invested 4.52 million Man-hours in Safety Training, expended 40.10 Crores on Training & Development, and committed 6796.13 crores to employee benefits programs, thereby enhancing workforce well-being.[10]

Training Infrastructure

NTPC’s training policy anticipates a minimum of 7 man-days of training foreach employee annually. It approach is to create own training systems and provide training internally whenever feasible. Consequently, NTPC has established its own training infrastructure, which includes –

- **Power Management Institute** – This is the premier training institute of NTPC, situated in NOIDA, near the company headquarters, and it features a state-of-the-art training infrastructure. It includes two residential hostels, each equipped with internet broadband access in every room. PMI offers several training and conference rooms that are outfitted with the most advanced audio-visual training tools. The PMI auditorium accommodates 300 seats and hosts numerous conferences at both national and international levels. PMI is also equipped with an indoor badminton court, a swimming pool, a tennis court, and a gym for the benefit of participants. The Institute boasts a dedicated faculty and organizes training sessions and conferences for NTPC as well as other companies.
- **Employee Development Centres** - Employee Development Centres (EDCs) are situated at all NTPC projects and stations, addressing the training requirements of employees within the unit. They possess infrastructure comparable to that of the PMI and are supported by a dedicated team of 150 employees throughout NTPC. EDCs are designed to fulfill the training needs that can be managed locally.
- **Simulator Centres** - NTPC proudly operates three simulator training facilities for coal-based sub-critical and super-critical plants, recognized as some of the finest in the nation. Sub-critical simulators are currently being set up in Solapur (Maharashtra). While the Super Critical Simulators can be found at PMI, Noida, and Sipat (Chhattisgarh).
- **Online training facility** - PMI has utilized IT-driven platforms such as e-Learning, Video Conferencing, and Web Conferencing to deliver training directly to the desktops of its employees. With the acquisition of the most recent version of the Web conferencing software, instructors can now conduct classes from their own workplaces, regardless of their location in the world.

Planned Interventions

To tackle organizational challenges and objectives aimed at enhancing employee performance, NTPC has established a series of planned interventions tailored for each phase of an individual's career.

Each intervention is a bespoke, medium-term training program, specifically crafted to provide developmental support at a distinct stage in the individual's career.[9]

Financial Capital

NTPC is committed to maintaining the highest standards of corporate governance, promoting growth, and achieving excellence in performance while placing a strong emphasis on sustainability. The strong financial standing and respected corporate reputation of NTPC are direct results of an ethical and fair corporate governance framework and policies. NTPC focuses on optimizing asset utilization, ensuring efficient capital allocation, and making timely payments to capital providers and suppliers to uphold a robust balance sheet. NTPC upholds a strong financial system and emphasizes responsible management of financial resources to reduce capital costs. NTPC is dedicated to enhancing revenue through non-fossil fuel initiatives, inline with our commitment to sustainable development.

Table 4: Key Highlights of Financial Capital of NTPC

Financial Year	Particulars	Revenues Generated	Economic Value Retained	Community Investments	Profit After Tax
2024-25	Financial Capital	1,90,862.45 Cr	30,576.19 Cr	363 Cr	23,953 Cr
2023-24		1,80,605.13 Cr	30,083.68 Cr	255 Cr	21,332 Cr

Source: P-45 | Integrated Annual Report - 2024-25

In the Financial Year 2024-25, NTPC's overall income amounted to Rs. 1,90,862.45crore, reflecting a rise from Rs. 1,81,165.86 crore in the Financial Year 2023-24.NTPC accomplished significant milestones, culminating in a net profit of Rs. 23,953.15 crore.[11]

Manufactured Capital

At NTPC, the manufactured capital serves as the foundation of power generation capabilities, consisting of a wide range of physical assets including power generating stations, captive coal mines, equipment, machinery, raw materials, andlogistical infrastructure. These assets are essential for providing reliable and affordable electricity to the nation while maximizing the use of material resources and enhancing energy efficiency. NTPC’s commitment goes beyond mere asset ownership; it emphasizes the continuous improvement of asset performance and resilience through strategic planning, the integration of advanced technologies, and the implementation of sustainable operational practices. NTPC is dedicated to enhancing the efficiency and sustainability of the manufacturing ecosystem by incorporating responsible resource management, reducing emissions, and fostering process innovation throughout all operations. The organization is resolutely focused on substantially increasing its renewable energy capacity to aid India in achieving its net-zero goals.

Table 5: Key Highlights of Manufactured Capital of NTPC

Financial Year	Particulars	Total installed capacity	Capacity installed in reporting year	Total generation	Non-fossil capacity added in reporting year
2024-25	Manufactured Capital	78.61* GW	3.97 GW	438.68 BU	0.33 GW
2023-24		74.64* GW	3.26 GW	422.20 BU	0.33 GW

Source: P-53 | Integrated Annual Report - 2024-25

In the financial year 2024-25, NTPC produced 438 billion units (BU) of electricity, reflecting a year-on-year increase of 3.9%. With a dedicated emphasis on power generation, NTPC consistently contributes to the enhancement of India’s energy sector and economic development, while providing sustainable, long-term benefits to all stakeholders.[12]

Natural Capital

NTPC incorporates environmental sustainability into its fundamental business strategy, acknowledging the vital role of responsible natural resource management in mitigating climate risks and ensuring long-term value. The company makes significant investments in advanced technologies and process enhancements to reduce emissions, optimize water usage, manage waste efficiently, and protect biodiversity. NTPC consistently enhances its environmental performance through effective engineering solutions and rigorous regulatory compliance, with all NTPC stations certified under ISO 14001 for comprehensive environmental management. NTPC's ongoing initiatives are in harmony with national priorities, the UN Sustainable Development Goals (SDGs), and global best practices, positioning NTPC to not only meet compliance requirements but also to take a leadership role in India's sustainable energy transition.

Table 6: Key Highlights of Manufactured Capital of NTPC

Financial Year	Particulars	(Y-o-Y) Increase in Avoided GHG Emissions	(Y-o-Y) Increase in energy savings	Trees Planted
2024-25	Natural Capital	11.80%	1.74%	40 MN+
2023-24		8.56%	10.74%	1 MN+

Source: P-79 | Integrated Annual Report - 2024-25

In the financial year 2024-25, NTPC anticipates an 11.80% year-on-year increase in avoided greenhouse gas emissions, a 1.74% year-on-year rise in energy savings, and an increase in the number of trees planted. [13]

Intellectual Capital

Intellectual capital signifies the priceless intangible assets and resources that enhance the value and competitive edge of NTPC. Our dedication to research and development reinforces this financial asset, converting knowledge into concrete results. It includes our advanced methodologies, intellectual property such as patents, trademarks, and copyrights, as well as our comprehensive advisory services, educational institutions, and programs aimed at promoting innovation and sustainable practices. By cultivating and leveraging our intellectual capital, we create pathways for ongoing growth and success, fostering a positive impact and resilience within our organization and in the wider community. In 2009, NETRA is crucial in creating sustainable, efficient, and future oriented solutions for the energy sector.[14]

Table 7: Key Highlights of Intellectual Capital of NTPC

Financial Year	Particulars	Patents granted to NTPC	Increase in R&D expenditure	Won in IT and digitalization
2024-25	Intellectual Capital	52	20.5% (Y-O-Y)	5 Awards
2023-24		47	70.60% (Y-O-Y)	5 Awards

Source: P-145 | Integrated Annual Report - 2024-25

In the financial year 2024-25, NTPC was granted 52 patents, reflecting a year-on-year increase of 20.5% in research and development expenditure, along with the achievement of 5 awards in the fields of information technology and digitalization.[15]

Social Capital

Social capital at NTPC manifests in multiple ways, such as shared values, strong social networks, active community involvement, and effective mutual support systems. Its significance is rooted in its capacity to promote social cohesion, resilience, and collective action, which allows individuals and communities linked to NTPC to tap into opportunities, resources, and support networks that enhance their well-being, development, and overall societal advancement. NTPC acknowledges the importance of social capital in creating a sustainable and inclusive organization that positively influences the lives of its employees and the communities in which it operates.

Table 8: Key Highlights of Social Capital of NTPC

Financial Year	Particulars	Procurement from MSEs	Customer Satisfaction Score	Spent towards group CSR activities	Lives touched through CSR work
2024-25	Social Capital	47.68%	96.90%	362.94 Cr	18.04 Lakhs
2023-24		51.64%	96.89%	254.62 Cr	16.03 Lakhs

Source: P-121 | Integrated Annual Report - 2024-25

In the financial year 2024-25, NTPC achieved 47.68% procurement from Micro and Small Enterprises (MSEs), a customer satisfaction score of 96.90%, and allocated362.94 Crores towards group Corporate Social Responsibility (CSR) initiatives, positively impacting 18.04 Lakhs lives through our CSR efforts.[16]

Sustainability and Corporate Social Responsibility at NTPC

- To provide both business and environmental benefits through projects that are advantageous for the business and the broader ecosystem.
- To guarantee sustainable energy development by minimizing waste throughout operations.

- To make a proactive contribution to societal advancement.
- To take the lead in the industry regarding resettlement, rehabilitation, and environmental protection, which encompasses efficient ash utilization, peripheral development, and energy conservation practices.

Conclusion

Human capital refers to the economic value derived from an individual's knowledge, skills, and competencies. It serves as the cornerstone of an organization and is considered its most significant asset. Investing in education, skills development, healthcare, and addressing gender inequality is crucial for unlocking India's human potential. Effective human capital development requires strategic investments, policy reforms, and collaborative efforts among the government, private sector, and civil society. This human resource can be converted into human capital through the effective application of education, health, and ethical values. The process of transforming raw human resources into highly productive human resources through these inputs is known as human capital formation.

NTPC has implemented strong talent management systems to guarantee that the company meets its promise of offering substantial growth and challenges to all employees. NTPC prioritizes the attraction, development, and retention of top talent, resulting in a remarkably low attrition rate.

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