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Incentive mechanisms for Knowledge workers

Theoretical analysis and empirical evidence from IT industry firms

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RESUMEN

En el contexto de una creciente competencia global y rápido desarrollo tecnológico, las empresas enfrentan el desafío de atraer y retener talentos clave, particularmente trabajadores del conocimiento. Especialmente en departamentos informáticos altamente complejos, las tareas de los empleados implican una elevada inversión cognitiva, gran autonomía y baja sustituibilidad, lo que hace que los incentivos monetarios tradicionales muestren una tendencia marginal decreciente para estimular su entusiasmo y creatividad. Este trabajo toma como objeto de estudio a los trabajadores del conocimiento y analiza de forma sistemática la eficacia de los mecanismos de incentivos monetarios y no monetarios.

Utilizando un enfoque metodológico mixto que combina revisión de literatura, modelado teórico y análisis de casos, esta investigación desarrolla un modelo basado en economía del comportamiento que incorpora la heterogeneidad de los empleados y mecanismos de satisfacción laboral. Asimismo, se toma a Google como caso de estudio para examinar específicamente el mecanismo y el efecto de los incentivos no monetarios en la práctica. El estudio concluye que aunque los incentivos monetarios poseen ventajas como su cuantificación y facilidad de distribución, tienden a producir un "efecto desplazamiento de la motivación intrínseca" en puestos de conocimiento orientados a la innovación, debilitando así la motivación intrínseca e identidad laboral de los empleados. En contraste, los incentivos no monetarios satisfacen mejor las necesidades psicológicas relacionadas con la autonomía, el crecimiento y el sentido de propósito, aumentando así su satisfacción, compromiso organizacional y rendimiento.

Además, esta investigación resalta la importancia de identificar diferentes tipos de empleados y aplicar políticas de incentivos diferenciadas. Solo alineando los atributos del trabajo con las estructuras motivacionales específicas de los empleados se logra una asignación efectiva de recursos de incentivos y un sistema de incentivos estable y eficiente. Finalmente, los resultados sugieren que para organizaciones intensivas en conocimiento, un modelo híbrido centrado en incentivos no monetarios y complementado por elementos monetarios resulta óptimo para alcanzar los objetivos organizacionales, alineados con la creación de valor por parte del empleado. Este estudio aporta perspectivas teóricas y orientaciones prácticas para la gestión de recursos humanos en empresas tecnológicas avanzadas.

Palabras clave: Trabajadores del conocimiento, incentivos monetarios, incentivos no monetarios, satisfacción.

SUMMARY

In the backdrop of intensifying global competition and rapid technological development, companies are facing the challenge of attracting and retaining key talents, namely knowledge-workers. Especially in high-complex IT departments, employees' work has high cognitive investment, high autonomy and low substitutability, which makes traditional monetary-based incentives increasingly show a marginal trend in stimulating their enthusiasm and creativity. This paper takes knowledge workers as the research object and systematically discusses the incentive effectiveness of monetary and non-monetary incentive mechanisms.

Using a mixed-methods approach that combines literature review, theoretical modeling, and case study analysis, the research develops a behavioral economics-based model incorporating employee heterogeneity and satisfaction mechanisms. And it takes Google as a case to analyze its specific mechanism and incentive effect in non-monetary incentive practice. The study points out that although monetary incentives have the advantages of quantification and distributability, they are prone to "motivation crowding out effect" in innovation-oriented knowledge positions, which weakens employees' intrinsic motivation and work identity. In contrast, non-monetary incentives can better meet employees' psychological needs in terms of autonomy, growth, and sense of meaning, thereby improving their satisfaction, organizational commitment and performance.

In addition, the study emphasizes the importance of identifying employee types and implementing differentiated incentive policies. Only by matching job attributes with employee motivation structures can we achieve effective allocation of incentive resources and build a stable and efficient incentive system. Ultimately, the findings suggest that for knowledge-intensive organizations, a hybrid model centered on non-monetary incentives and supported by monetary elements is optimal for aligning organizational objectives with employee value creation. This research contributes theoretical insights and practical guidance for human resource management in high-tech firms.

Keywords: *Knowledge worker, monetary incentives, non-monetary incentives, satisfaction*

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1. INTRODUCTION

1.1 RESEARCH BACKGROUND

With the acceleration of globalization and the advancement of a new round of scientific and technological revolution, the era of knowledge economy has arrived. The core competitiveness of enterprises has gradually shifted from capital and technology to talents, relying on the accumulation and application of knowledge and innovation resources. And "knowledge workers" with knowledge as the main capital, as a labor group with creative thinking and high skills, are increasingly becoming the key drivers of corporate value creation. Especially in the IT (information technology) industry, high-tech sub-fields represented by artificial intelligence (AI), data engineering, and cloud computing are developing rapidly, and the demand for high-quality and innovative talents has shown an unprecedented growth trend. In this context, how to effectively motivate knowledge workers and enhance their creativity and productivity has become an important issue in corporate human resource management.

Unlike traditional labor-intensive positions, the value created by knowledge workers is difficult to measure using time or quantity alone (Davenport, 2005). Historically, organizations have relied heavily on monetary incentives such as bonuses, salary increases, and stock options. While these approaches offer the advantages of clarity and quantifiability, they often exhibit downward rigidity and diminishing marginal utility, which can lead to high maintenance costs and short-term focus. Particularly in positions characterized by high autonomy, cognitive complexity, and risk of burnout — such as IT development or AI modeling — monetary rewards tend to show limited effectiveness. Research shows that in high-complexity environments, monetary incentives may attract talent but fail to retain them, and can even crowd out intrinsic motivation (Gneezy & Rustichini, 2000; Frey & Jegen, 2001).

In recent decades, non-monetary incentives have gained growing attention. As P. Drucker emphasized, enterprises in the 21st century must increase knowledge worker productivity through effective motivation. The formula is performance equals F(ability*motivation). Maslow’s hierarchy of needs indicates that beyond physiological and safety needs, individuals seek belonging, esteem, and self-actualization. Through a large number of scholars' research and investigation, it is concluded that knowledge workers have higher-level needs. The purpose of their work is not only to survive, and pure monetary incentives are difficult to satisfy them. Behavioral and organizational economics show that non-monetary incentives — such as autonomy, career development, organizational culture, and a sense of purpose — can stimulate intrinsic motivation and increase satisfaction and commitment, ultimately enhancing performance (Deci & Ryan, 1985; Pink, 2009).

Importantly, employees differ in their motivational structures and incentive preferences. While procedural or production roles may favor monetary rewards, knowledge-intensive and creative roles respond more strongly to non-financial motivators. Tailoring incentive systems to different employee profiles is therefore key to organizational performance and talent retention (Lazear, 2000). This is particularly crucial in the IT sector, where employee motivation is directly linked to innovation and competitive advantage.

The research object of this paper focuses on the IT industry because of the influence of its industry nature, organizational tradition and the role of the industry in the market. The knowledge-based group of IT enterprises has its own significant characteristics. First, in terms of personnel composition, it is a typical technology-intensive and knowledge-intensive high-tech enterprise, relying on technological innovation, and most of the employees are knowledge-based employees. Second, IT enterprises occupy an increasingly important position in economic development.

Google, a global tech leader, has successfully implemented a human resource system centered on non-monetary incentives. This not only enhanced employee innovation and engagement but also earned the company a reputation as one of the best global employers (Bock, 2015). This leads to a critical question: In knowledge-intensive positions, are non-monetary incentives more effective than monetary ones? Can these incentives indirectly influence performance through variables like satisfaction and a sense of belonging?

Building on this background, this study adopts a behavioral economics perspective to examine incentive mechanisms for knowledge workers in the IT industry. It compares the effects of monetary and non-monetary incentives on performance through theoretical modeling, case studies, and empirical analysis. This research not only contributes to theory but also provides practical guidance for designing more effective HR strategies in high-tech firms.

1.2 RESEARCH METHODS

1.2.1 Literature review

This study begins with a comprehensive literature review, incorporating relevant theories of motivation, characteristics of knowledge workers, and empirical findings on the relationship between incentives, satisfaction, and performance. At the same time, this paper also summarizes the current empirical research on the effects of monetary incentives and non-monetary incentive mechanisms in the field of behavioral economics and human resource management.

1.2.2 Theoretical Modeling

Based on a comprehensive understanding of relevant theoretical foundations, this study constructs a theoretical model incorporating the assumption of employee heterogeneity in types. The model simulates the decision-making process that firms undergo when designing monetary and non-monetary incentive menus for different types of employees (e.g., knowledge workers vs. non-knowledge workers). By setting appropriate parameters and conditions, the model derives employees' behavioral choices and effort levels under different incentive combinations, aiming to maximize the firm's profit as the objective function. The model facilitates the identification of the optimal incentive mechanism's characteristics and applicable scope. It not only helps clarify the logical relationships at the theoretical level but also provides theoretical support for case analysis and survey design.

1.2.3 Case study

To test the explanatory power of the theoretical model, this study selects the world-renowned technology enterprise Google as a representative case. Through the analysis of Google's practical experience in incentivizing knowledge workers—particularly its implementation of non-monetary incentives—this study explores how such measures influence employee satisfaction, innovation output, and organizational performance. The case study method helps bridge abstract theory with practical application, thereby enhancing the real-world relevance of the research findings

1.2.4 Survey and Data Analysis

Based on the theoretical framework and case study, this study designs an English-language questionnaire targeting knowledge workers in the IT industry. The questionnaire focuses on core variables such as incentive preferences, job satisfaction, and performance outcomes. It primarily targets knowledge-based positions in Spain's technology sector (e.g., AI development, software engineers, data scientists), using a combination of Likert-scale measurements and closed-ended questions to ensure data standardization and comparability. The collected data will be processed using descriptive statistical analysis, reliability and validity testing, among other methods, to verify the hypotheses derived from the theoretical model and examine the real-world impact of different incentive mechanisms on the satisfaction and performance of knowledge workers.

1.3 RESEARCH STRUCTURE

This study focuses on optimizing incentive mechanisms for knowledge workers. It combines theoretical modeling, case analysis, and empirical research to explore the different impact paths of monetary and non-monetary incentives on organizational performance under

conditions of employee heterogeneity. It further proposes targeted suggestions for optimizing incentive strategies. The specific research content and thesis structure are arranged as follows:

Chapter 1: Introduction
This chapter introduces the research background, methods, content, and structure, elaborates on the theoretical and practical value of the topic, and clarifies the basic research logic and overall framework.

Chapter 2: Research Objectives

Chapter 3: desarrollo

- **3.1** This section defines core concepts such as knowledge workers, monetary and non-monetary incentives, and employee satisfaction. It reviews foundational motivation theories including Maslow's hierarchy of needs, Herzberg's two-factor theory, self-determination theory, expectancy theory, ERG theory, and achievement motivation theory. It also summarizes existing research on non-monetary incentives, motivation of knowledge workers, and the relationship between satisfaction and performance, identifying current gaps and limitations in the literature.

- **3.2** Theoretical Modeling and Analysis
  This section builds a theoretical incentive model based on the perspectives of behavioral economics and industrial organization theory, incorporating the heterogeneity of employee types. It derives the behavioral choices of employees and the changes in firm profitability under different incentive strategies. By comparing the impact of monetary versus non-monetary incentives on knowledge worker performance, it demonstrates the superiority of non-monetary incentives under specific conditions and discusses their scope of application and boundary conditions.

- **3.3** Case Study: Incentive Practices for Knowledge Workers at Google
  Using Google as the case, this section analyzes its diversified non-monetary incentive measures in human resource management. It investigates how these mechanisms foster employee innovation, work engagement, and organizational performance. The case is used to validate the explanatory power of the theoretical model and to provide reference points for optimizing incentive strategies.

- **3.4** Empirical Analysis: Survey Results and Discussion
  This section analyzes questionnaire data from knowledge workers in the Spanish technology sector using descriptive and cross-sectional statistical methods. It empirically tests the impact of different incentive mechanisms on employee

satisfaction and performance. The discussion integrates the findings from theoretical modeling and case study to suggest optimal incentive design paths and practical implications.

Chapter 4: Conclusion and Recommendations

This chapter summarizes the key findings and conclusions, outlines the theoretical and practical contributions of the study, highlights its limitations, and proposes directions for future research and policy recommendations for business management practices

2. OBJETIVOS

Knowledge workers play an increasingly vital role in organizations, yet global incentive systems remain problematic. According to Gallup's *State of the Global Workplace* (2025), only 21% of employees are engaged, a decline from previous years. This disengagement results in major economic losses — up to $438 billion globally in 2024 — and nearly 50% of employees express intentions to quit. This issue is particularly acute in high-tech industries. A MetLife (2022) report found that over 65% of IT employees are dissatisfied with purely monetary incentives, instead seeking autonomy, growth, and cultural alignment.

While many studies have addressed the limitations of monetary incentives, the importance of non-monetary rewards, and the special characteristics of knowledge workers, few have systematically analyzed how incentive mechanisms should be matched to employee heterogeneity. In particular, there is a lack of theoretical modeling and empirical validation from a behavioral economics perspective.

This study has three main objectives:

1. **Theoretical Modeling:** To build a behavioral economics-based model that incorporates employee heterogeneity and analyzes how monetary and non-monetary incentives contribute differently to firm performance, especially among knowledge workers.

2. **Case Study Validation:** To examine Google's incentive design, assessing how its emphasis on non-monetary incentives supports the theoretical framework.

3. **Empirical Analysis:** To analyze data from a survey of knowledge workers in Spain's tech sector, exploring the relationship between incentive preferences, satisfaction, and performance.

By addressing these goals, the study aims to fill a gap in the literature on incentive system design based on employee differences. It deepens our understanding of the incentive–motivation–performance chain and offers both theoretical insights and practical strategies for firms in high-tech industries.

3. DEVELOPMENT

3.1. LITERATURE REVIEW

3.1.1. core concept

3.1.1.1. knowledge worker

As the economic structure transitions from traditional industrial models to a knowledge-based economy, the concept of *knowledge workers* has emerged and gradually become a key focus in organizational and human resource management research. Although definitions vary among scholars, the central idea is that these individuals “live by thinking” rather than through physical labor, actively contribute to innovation and knowledge capital, and are essential in generating value-added for firms. Their work is heavily reliant on knowledge, information, and creativity.

The term was first introduced in 1959 by the American management scholar Peter Drucker in his book *Landmarks of Tomorrow*. Drucker defined *knowledge workers* as laborers whose primary capital is knowledge and who use their professional skills and judgment to create value. He emphasized that, unlike manual workers, knowledge workers' contributions cannot be measured solely by time or quantity of output, but instead require thinking, innovation, and decision-making. In a later work (1999), Drucker identified five characteristics of knowledge workers: high autonomy, continuous learning needs, outcomes that are difficult to quantify, strong goal orientation, and performance measured by results rather than time invested.

In 1997, Thomas H. Davenport further analyzed the nature of knowledge work in *Thinking for a Living*. He argued that knowledge work revolves around information processing, solving complex problems, and innovation, stressing the importance of the cognitive process over repetitive operations. Knowledge workers generally enjoy high degrees of professional autonomy, and their outcomes depend heavily on individual expertise and experience.

In the 21st century, additional scholars have expanded on this concept from various perspectives. Canadian scholar Francis Horibe (2000) defined knowledge workers as “those who add value to products through their analysis, creativity, judgment, synthesis, and design,” emphasizing their role as intellectual assets within the firm. He advocated for incentive mechanisms that protect and stimulate employees’ knowledge contributions. Carleton (1997) emphasized creativity, complexity, and responsibility as defining features of knowledge workers, suggesting that traditional command-and-control management styles are ineffective in motivating this group. From a dynamic organizational perspective, Mládková et al. (2012) highlighted the irreplaceable role of knowledge workers in innovation, learning, and competitiveness. Warren P. et al. (2016) empirically demonstrated that knowledge workers mediate the relationship between organizational learning and innovation capabilities.

A synthesis of existing research allows us to summarize the characteristics of knowledge workers through the following lenses:

- **Subjective traits:** Knowledge workers are typically well-educated, possess a strong sense of self-actualization, and demonstrate a high level of personal awareness. They are driven more by personal growth and career development than by monetary rewards (Drucker, 1999; Horibe, 2000).

- **Job characteristics:** Their work is often unique and challenging, with outcomes that cannot be straightforwardly captured by traditional key performance indicators (KPIs), relying more on innovation and problem-solving capabilities (Davenport, 1997).

- **Organizational role:** Knowledge workers possess valuable intangible assets and contribute significantly to ongoing innovation efforts and organizational development initiatives. (Mládková et al., 2012; Warren P. et al., 2016).

Based on the above characteristics, knowledge workers' demands for incentive mechanisms also present a significantly different pattern from those of traditional job employees. They tend to attach more importance to non-monetary factors such as relationships, environment and challenging work content, growth opportunities, work autonomy, and organizational value recognition. Therefore, when designing incentive strategies, their special motivation structure and performance characteristics must be fully considered to maximize the incentive effect.

3.1.1.2. Monetary and non-monetary Incentives

Incentives are an important means for organizations to stimulate employees' potential and mobilize their work enthusiasm. Different types of incentives will have different effects on different types of employees. Its essence is to start from personal needs and stimulate personal potential and pursuit of desires through internal or external incentives, thereby prompting individuals to work hard to achieve goals and thus improve company performance. Its forms can be roughly divided into two categories: monetary incentives and non-monetary incentives. The two incentive mechanisms have significant differences in action mechanisms, effect dimensions, and applicable objects, but both have a profound impact on employees' behavior and psychology.

As the most traditional form of incentive, monetary incentives usually use money or material as a medium to directly acknowledge the effort and performance of workers in their roles or tasks completed. Typical examples of monetary incentives include basic salary, bonuses, commissions, performance bonuses, equity incentives, year-end dividends, etc. The characteristics of this kind incentive are:

• Measurability Aspect: The incentive object and the incentive amount can be easily quantified in terms of money units, for management and oversight.

• Immediacy: After completing specific tasks or achieving performance goals, employees can quickly obtain monetary rewards, forming direct positive feedback.

• Standardization: It is suitable for large-scale, standardized job management and simplifies the process of creating and executing uniform procedures.

Based on the above characteristics, its advantages are high standardization, strong operability, and controllable management costs. It is especially suitable for positions that are short-term performance-oriented and easy to quantify results. In classical economic theory—particularly models based on the rational agent assumption such as agency theory—monetary incentives are viewed as the core tool to mobilize employee effort and improve organizational efficiency. However, with the development of behavioral economics, more and more researchers have pointed out that monetary incentives have a "motivation crowding-out effect" in certain situations (Gneezy & Rustichini, 2000), that is, monetary rewards may weaken employees' original intrinsic motivation and lead to a decline in their enthusiasm for the work itself. Especially in knowledge-based positions dominated by creative and cognitive labor, performance is difficult to standardize and quantify, and the incentive effectiveness of traditional monetary incentive models is often limited or even counterproductive.

Non-monetary incentives refer to mechanisms that achieve incentive effects through work itself, organizational atmosphere, and employee psychological satisfaction, in addition to money and considered valuable by employees. Common examples include granting more autonomy, offering career development opportunities, cultivating a sense of belonging, implementing recognition systems, providing flexible work arrangements, and supporting mental well-being. These forms of motivation are aligned with the higher-order needs described in Maslow's hierarchy—such as social belonging, esteem, and self-actualization—and resonate strongly with the aspirations of knowledge workers (Maslow, 1943; Deci & Ryan, 1985). Other key features include:

- **Diversity and personalization:** Non-monetary incentives can be tailored to the specific needs and motivational profiles of employees, offering high flexibility.
- **Intrinsic motivation:** Compared to external rewards, non-monetary mechanisms are more effective at stimulating genuine interest in work and fostering self-driven behavior, resulting in more durable motivational effects.

Blaskova (2011), approaching the issue from a psychological perspective, divided incentives into "monetized" and "non-monetized" categories, arguing that the latter are more effective for roles requiring high cognitive effort and long-term engagement, as they rely more on intrinsic drive and emotional identification. Similarly, Jeffrey Mello (2006) emphasized that tools such

as career coaching, participative decision-making, and organizational culture support can significantly enhance job satisfaction and engagement without financial compensation.

Other studies have expanded the scope of non-monetary incentives. Condly et al. (2003) distinguished between *tangible non-monetary incentives* (e.g., travel or physical gifts) and *intangible ones* (e.g., recognition, respect, empowerment). Li et al. (2006) constructed a non-monetary incentive model based on three dimensions: challenge-based tasks, social recognition, and growth pathways—offering a theoretical foundation for structured incentive systems. Schneckenberg (2014) further argued that, in an increasingly globalized and networked world, practices such as employee empowerment, information transparency, and collaboration mechanisms form the basis of a firm's non-financial appeal to knowledge workers.

Notably, Hammermann & Mohnen (2014) conducted an empirical study comparing the effects of monetary rewards versus non-monetary recognition and found that the two activate different motivational pathways. Monetary rewards tend to stimulate *extrinsic motivation* and are more suitable for short-term, output-driven tasks. In contrast, non-monetary rewards (such as trophies or public praise) are more likely to trigger *intrinsic motivation*, making them more appropriate for complex and innovative tasks. Crucially, the researchers emphasized that incentive effectiveness is not a binary matter. Rather, it depends on the *fit* between the type of employee and the characteristics of the incentive. This directly supports the central premise of this study: different types of employees respond differently to various incentives, and organizations must adopt differentiated strategies to match incentives with individual and job profiles.

As workforce structures evolve and values diversify, non-monetary incentives are no longer peripheral. Their adaptability and ability to trigger internal motivation make them particularly valuable in roles and industries emphasizing creativity, learning, and identity. They are becoming essential tools for attracting and retaining high-quality knowledge workers. To remain competitive in the modern talent market, organizations must reevaluate their incentive systems from a strategic perspective—blending monetary and non-monetary mechanisms and avoiding overreliance on any single form of motivation.

In this study, while the focus lies on *non-monetary incentives* for *knowledge workers* in the IT sector, a comparative analysis of both monetary and non-monetary mechanisms will be conducted in the following chapters. The goal is to assess their effectiveness under different conditions and provide evidence-based recommendations for incentive system optimization.

3.1.1.3 Job Satisfaction

Job satisfaction is a core variable in organizational behavior and human resource management. It has long been considered a key predictor of employee behavioral tendencies, performance, and turnover risk. It reflects employees' overall subjective evaluation of factors such as the work environment, job tasks, incentive mechanisms, and organizational culture, and it indirectly indicates whether the incentive system is functioning effectively. Fluctuations in satisfaction levels are closely associated with work efficiency, organizational loyalty, and

innovation capacity, which is why job satisfaction is increasingly central in the design of incentive systems.

Scholarly definitions of job satisfaction vary. Hoppock (1935) defined it as the degree of psychological and physical satisfaction and pleasure employees derive from their work and environment. Locke (1976) described it as "a positive or negative emotional state resulting from an individual's appraisal of his or her job or job experiences," emphasizing the subjective nature of the evaluation. Spector (1997) viewed job satisfaction as a multidimensional construct composed of employees' satisfaction with job content, working conditions, compensation systems, supervisor relations, and promotion opportunities. According to this view, job satisfaction arises from both cognitive and emotional responses following the fulfillment of workplace needs.

In line with mainstream academic interpretations, this study adopts a broad definition of job satisfaction: it is the overall emotional appraisal formed by employees based on a combination of factors such as their work environment, task characteristics, organizational structures, and incentive mechanisms. Employees with high satisfaction levels typically show stronger engagement, a greater willingness to innovate, and higher organizational commitment. Conversely, low satisfaction levels are often associated with negative emotions, burnout, and turnover intentions.

Key Dimensions of Job Satisfaction

Based on the frameworks proposed by Spector (1997) and Judge et al. (2001), job satisfaction generally consists of the following six dimensions:

- **Satisfaction with the job itself:** Refers to employees' recognition of task content, challenge, and the sense of accomplishment derived from their duties.
- **Satisfaction with compensation and benefits:** Reflects the degree to which employees are satisfied with financial rewards such as salaries, bonuses, and stock options.
- **Satisfaction with promotion and development opportunities:** Refers to employees' perceptions of career paths and professional growth prospects.
- **Satisfaction with coworker relations:** Indicates the quality of collaboration, communication, and team atmosphere.
- **Satisfaction with supervision and management:** Refers to how employees perceive leadership style, fairness, and managerial support.
- **Satisfaction with organizational culture and values:** Reflects employees' acceptance of the firm's overall environment, cultural identity, and sense of mission.

While these dimensions may vary in weight or interaction across organizations and employee groups, they jointly shape the overall level of job satisfaction.

A substantial body of research has confirmed a significant positive correlation between job satisfaction and employee performance. Judge et al. (2001), in a large-scale meta-analysis, found a correlation coefficient of approximately 0.30, indicating that employees with higher satisfaction tend to display more effective work behavior, greater innovation, and improved service quality (Organ & Ryan, 1995). In addition, job satisfaction has been shown to reduce turnover, absenteeism, lateness, and burnout, making it a key variable for maintaining organizational stability and cohesion (Organ & Ryan, 1995).

Among *knowledge workers* in particular, the influence of job satisfaction on performance is even more pronounced. These employees are more likely to be motivated by factors such as autonomy, growth opportunities, and cultural alignment—elements typically addressed by *non-monetary incentives*. Their job satisfaction therefore depends heavily on non-financial aspects such as workplace autonomy, development pathways, recognition systems, and psychological safety (Davenport, 1997; Bock, 2015). This implies that, in designing incentive mechanisms for cognitively intensive roles, neglecting the satisfaction factor may render the system ineffective or even counterproductive.

Moreover, in the design of incentive mechanisms, job satisfaction acts not only as an outcome variable but also as a mediating variable. That is, incentives (monetary or non-monetary) influence employee performance *through* their effect on satisfaction (Frey & Osterloh, 2002). The presence of this *incentive–satisfaction–performance* mechanism means that simply increasing financial rewards may not lead to improved outcomes for knowledge workers. Only by raising satisfaction levels can organizations achieve optimal incentive effects. Therefore, in this study, job satisfaction serves as both a key variable of interest and a mediating factor in the theoretical model and empirical analysis, providing structural support for evaluating the effectiveness of different incentive strategies.

Although this study does not directly apply a pre-existing job satisfaction measurement scale, the survey instrument was designed based on several key dimensions from the *Minnesota Satisfaction Questionnaire* (MSQ), including task challenge, sense of belonging, supervisor feedback, opportunities for growth, and perceptions of fairness. These elements were adapted to reflect the specific context of incentive systems for knowledge workers in IT firms. The survey thus balances theoretical rigor with contextual relevance, providing a robust foundation for measuring the job satisfaction variable in this study.

3.1.2 Theoretical Foundations

3.1.2.1 Content Theories of Motivation: The Intrinsic Sources of Employee Motivation

Content theories focus on the “what” of motivation—that is, the internal needs, goals, and sources of drive within employees. One of the most well-known is Maslow’s *Hierarchy of Needs*,

which proposes that individual needs are arranged from low to high: physiological, safety, social, esteem, and self-actualization. Although the model has been criticized for being overly rigid in its hierarchical structure, it offers a useful framework for mapping incentive systems to human needs, particularly when analyzing the higher-level needs (e.g., esteem and self-actualization) of *knowledge workers*.

Building on Maslow, Alderfer developed the *ERG Theory*, which condenses the five levels into three: *Existence*, *Relatedness*, and *Growth*. These needs can coexist, and the theory introduces the concept of *frustration-regression*, which explains why employees may experience declining satisfaction even when basic needs (such as salary) are met—if their growth needs remain unfulfilled.

Herzberg's *Two-Factor Theory* divides job factors into *hygiene factors* and *motivators*. While hygiene factors (e.g., salary, working conditions) prevent dissatisfaction, they do not actively promote satisfaction. True motivation, according to Herzberg, comes from factors like responsibility, recognition, and opportunities for growth. This theory provides a strong rationale for the use of non-monetary incentives, particularly for high-skill roles where marginal responsiveness to monetary rewards is lower.

McClelland's *Theory of Needs* identifies three dominant motivators in individuals: achievement, power, and affiliation. He emphasizes that different employees exhibit different need structures, and thus incentive strategies must be tailored accordingly. In the case of *knowledge workers*, the need for achievement is often more pronounced, making them more responsive to non-monetary incentives such as task challenge and development opportunities.

Finally, McGregor's *Theory X and Theory Y* takes the perspective of the manager, proposing two contrasting assumptions about employee nature. *Theory X* posits that people are inherently passive and require control and material rewards to be productive, while *Theory Y* sees people as naturally goal-oriented and capable of self-development. This framework reinforces the importance of aligning incentive methods with employee characteristics and provides the foundational assumption for this study's argument that different types of workers require different types of incentives.

3.1.2.2 Process Theories of Motivation: How Employees Evaluate Incentives

Unlike content theories, which explore what employees want, process theories investigate how employees evaluate and respond to incentives. These theories suggest that the effectiveness of an incentive is not determined solely by its content but also by how it is cognitively assessed, compared, and anticipated by the individual.

Vroom's Expectancy Theory proposes that motivation results from a combination of three beliefs: expectancy (the belief that effort will lead to performance), instrumentality (the belief that performance will lead to rewards), and valence (the perceived value of the rewards). This framework highlights that merely offering incentives is insufficient—employees must believe that the goals are achievable and that the rewards are both attainable and personally meaningful. Compared to monetary incentives, non-monetary incentives (such as participation or growth opportunities) tend to be more subjective in their perceived value (valence), and thus more individually variable.

Adams' Equity Theory adds a relational dimension by emphasizing the role of perceived fairness. Employees compare their inputs and outcomes not only to their own expectations but also to those of others. When individuals perceive inequity—believing they are receiving less relative to others—they may reduce effort or disengage from the organization. In environments with opaque performance evaluations or vague promotion criteria, even objectively fair rewards may be perceived as unfair, undermining their motivational power.

Goal-Setting Theory, developed by Locke and Latham, argues that specific, challenging, and feedback-oriented goals can enhance intrinsic motivation. This theory suggests that, when designing non-monetary incentive systems, organizations should ensure clarity of tasks, clear development pathways, and robust feedback mechanisms—rather than merely offering rewards in quantity.

3.1.2.3 Behavioral-Modification-Based Motivation Theories: How Incentives Reshape Employee Behavior

This category of theories is grounded in behavioral psychology and experimental economics, emphasizing how external rewards reshape and modify specific employee behaviors.

Skinner's operant conditioning theory posits that human behavior can be regulated through reinforcement, punishment, and extinction. According to this view, reinforcement schedules and the degree of reward control are essential elements of this theoretical system. However, this school of thought tends to focus on short-term plasticity, and its reliance on external stimuli limits its applicability in contexts requiring long-term behavioral change.

A more relevant contribution comes from the field of behavioral economics—particularly the crowding-out effect theory proposed by Gneezy and Rustichini (2000). Their research suggests that when monetary incentives are introduced to replace intrinsic motivation in tasks originally performed voluntarily, employees may begin to attribute those tasks solely to financial rewards, leading to a decline in intrinsic interest and engagement. This effect is particularly pronounced among knowledge workers, who tend to value autonomy and purpose in their work. Therefore, inappropriate use of monetary incentives may undermine intrinsic

motivation and hinder performance, underscoring the importance of considering incentive compatibility and the long-term psychological effects of reward mechanisms.

3.1.2.4 Integrated Motivation Models: Aligning Incentives, Satisfaction, and Performance

Integrated motivation theories tend to explore the link between “incentive mechanisms – satisfaction – performance” through multi-dimensional causal chains, highlighting that motivational systems are not isolated but interact with other organizational systems.

The Path-Goal Theory of Leadership provides a concrete example of this. It holds that employee performance depends not only on ability and task perception but also on whether rewards are perceived as fair, valuable, and aligned with personal goals. The feedback effect of performance outcomes on satisfaction plays a crucial role: only when rewards are recognized by employees and perceived as fair can they lead to long-term motivation and commitment.

This theory emphasizes that incentive system design should not rely solely on “intensity” or “magnitude” of rewards, but must consider whether the motivational pathway is rational and whether the feedback mechanism leads to employee satisfaction. In the context of this study, this theory provides the theoretical basis to explain how non-monetary incentives may influence performance by enhancing employee satisfaction.

Summary

In summary, these four types of motivation theories are all rooted in understanding employee needs, extending from physiological and safety needs to knowledge acquisition, behavior shaping, performance feedback, and satisfaction. Together, they form a comprehensive motivational logic system. Although they share a common premise—motivation affects performance—they are not absolute truths. Instead, the effectiveness of motivation depends on employee characteristics and the context-specific appropriateness of different types of incentives.

For knowledge workers—the representative group in this study—they tend to value the autonomy, recognition, and long-term development supported by non-monetary incentives. Therefore, there is a need to advance beyond basic theoretical linkages and further refine the differentiated path from “motivation – satisfaction – performance” through customized incentive designs.

3.1.3 State of the Art

3.1.3.1 Current Research on the non- monetary incentives

As organizations have come to better understand the role of intrinsic motivation, non-monetary incentives have evolved from being supplementary tools to becoming core elements of modern human resource management. According to Deci and Ryan's (1985) Self-Determination Theory, non-monetary incentives can effectively fulfill employees' basic psychological needs for autonomy, competence, and relatedness, thereby stimulating long-lasting and high-quality intrinsic motivation.

Empirical studies have further confirmed the positive effects of such incentives. Mekler et al. (2017) found that elements such as task meaningfulness, growth opportunities, and team belonging significantly enhance job satisfaction and sustained engagement. Similarly, Bock (2015), in his analysis of Google's incentive systems, emphasized that flexible work arrangements, learning opportunities, and cultural integration can boost the creativity and loyalty of knowledge workers.

Further empirical work reinforces these conclusions. Markova and Ford (2011) showed that non-monetary incentives—such as respect, recognition, and opportunities for personal development—are more influential on the performance of knowledge workers than financial rewards. Similarly, Horwitz et al. (2006), in a separate empirical study, identified flexible working hours, career progression options, and cultural fit as key factors in attracting and retaining employees in knowledge-intensive roles.

Recent studies have expanded the empirical analysis of non-monetary incentives. Nabila and Bari (2021) reported a significant positive relationship between non-financial rewards, employee satisfaction, and job performance. Notably, this correlation persisted even after adjusting for variations in salary. Gubman (2003) also emphasized that non-financial incentives are more effective in fostering intrinsic motivation and strengthening organizational commitment.

Pattnaik and Jena (2021), in their review of existing research, argued that non-monetary incentives can produce more sustainable outcomes than financial rewards, particularly in terms of employee retention, innovation, and organizational cohesion. Their conclusions strongly support the current study's emphasis on the strategic relevance of non-financial rewards for knowledge workers.

3.1.3.2 Current Research on the Motivation of Knowledge Workers

Given that knowledge and innovation are the core productive assets of knowledge workers, the design of their motivational systems must differ substantially from those used for traditional

labor roles (Drucker, 1959). As Davenport (1997) noted, the value generated by such employees is highly dependent on their autonomy and cognitive engagement, implying that incentive systems should reflect these distinctive motivational patterns.

This perspective is widely supported in the literature. Mlôdková et al. (2012), drawing on empirical data, found that knowledge workers prioritize growth opportunities, autonomy, and organizational identification more than monetary benefits. Likewise, Bieńkowska and Ignacek-Kuźnicka (2017) observed that intrinsic factors, particularly those tied to personal development, have a stronger influence on performance than financial rewards.

Horwitz et al. (2006) also argued that salary increases alone are insufficient for attracting or retaining top talent among knowledge workers. Instead, they recommend fostering a learning-driven culture, promoting innovation, and implementing recognition systems. These practices closely mirror the principles of Self-Determination Theory, which highlights the importance of fulfilling autonomy and competence needs.

Markova and Ford (2011) further noted that while monetary incentives may deliver short-term gains, they can undermine intrinsic motivation by diverting attention from the inherent value of the work, ultimately suppressing creative performance.

Despite widespread agreement on the importance of non-monetary incentives for knowledge workers, some limitations remain in the literature. First, most studies focus on individual incentive practices—such as autonomy or learning opportunities—without systematically comparing combinations of monetary and non-monetary strategies. Second, there is a lack of research that considers heterogeneity among knowledge workers, such as differences in career stage or motivational profile. Consequently, theoretical models and empirical studies that explore differentiated incentive strategies for diverse types of knowledge workers are still rare. This gap forms a central rationale for the present research.

3.1.3.3 Current Research on the Relationship Between Job Satisfaction and Performance

The relationship between *job satisfaction* and performance has been validated by extensive empirical research. Judge et al. (2001), in a large-scale meta-analysis, reported a moderate positive correlation ($r \approx 0.30$) between the two variables—indicating that employees with higher levels of satisfaction tend to demonstrate greater engagement and performance output.

Subsequent research has shown that satisfaction not only directly influences performance but also plays an *indirect* role through mediating mechanisms. Frey and Osterloh (2002) proposed that incentive systems enhance performance primarily by increasing job satisfaction. Even

monetary rewards depend, to a large extent, on how much they elevate satisfaction and stimulate motivation in order to yield performance gains.

Studies focusing on non-monetary incentives have further supported this link. Nabila & Bari (2021) found that non-financial rewards have a significant positive effect on job satisfaction, which in turn enhances employee performance. Similarly, Rahman (2020) demonstrated that recognition, growth opportunities, and autonomy—all forms of non-monetary incentives—are strong predictors of job satisfaction.

Specifically for *knowledge workers*, job satisfaction appears to be even more critical. Bock (2015), in a study of tech firms such as Google, found that *knowledge workers'* satisfaction is driven primarily by a sense of purpose, opportunities for growth, and freedom to innovate—rather than by salary levels. These findings are strongly supported by empirical studies from Mládková et al. (2012) and Bieńkowska & Ignacek-Kuźnicka (2017).

To summarize, satisfaction is a key *mediating variable* in the relationship between incentives and performance. Its role is widely supported across studies, particularly within high-skill, cognitively demanding positions. For *knowledge workers*, the pathway from *non-monetary incentives → job satisfaction → performance* is especially relevant and valuable. This provides a robust foundation for the hypotheses and theoretical framework developed in this research.

3.2. THEORETICAL MODELING AND EQUILIBRIUM ANALYSIS

To explore the differential effects of *monetary* and *non-monetary incentives* on distinct employee types and their implications for firm profitability, this chapter develops a theoretical model inspired by the frameworks and methodologies used in the papers *Customer-Oriented Employees: Blessing or Curse for Firms?* (Ester Manna) and *Pay for Performance with Motivated Employees* (Claudia Cerrone, Ester Manna). Drawing from behavioral economics, game theory (subgame perfect Nash equilibrium), contract theory (adverse selection mechanisms, as in Holmström & Milgrom, 1991), and labor economics (Lazear, 2000; Kreps, 1997), we construct a simple model incorporating employee heterogeneity.

The model involves three key actors:

1. **The firm**: Chooses whom to hire and how to design incentive contracts, aiming to maximize profit.
2. **Two types of employees**: Salary-oriented (Type S) and mission-driven (Type N), with different utility functions. Employee types are hidden to the firm.
3. **Customers or society**: Modeled indirectly—not a strategic player in the game—but influences employee utility.

The model also incorporates the relationship between job satisfaction (*M*) and performance, as introduced in Section 3.1.1.3. Specifically, part of the *non-monetary incentive* increases utility directly, and part does so indirectly by increasing satisfaction. Wages also affect satisfaction. The model unfolds in two stages: the firm first makes its decisions, and employees respond. Employee behavior follows the *utility maximization* principle.

3.2.1 Variables and Model Structure

Table 1: Variables and Definitions

Symbol	Meaning
q	Effort or performance level
ω	Wage (Contract A: ω_h; Contract B: ω_l)
$I(q)$	Interest or sense of accomplishment from the task (e.g., complexity, autonomy)
$C(q)$	Social impact of the task (e.g., AI project user engagement)
M	Job satisfaction function
θ_1, θ_2	Preferences for $I(q)$ and $C(q)$
α_1, α_2, α_3	Weights in the satisfaction function: α_1: impact of $I(q)$ on satisfaction α_3: impact of ω on satisfaction
γ	Sensitivity of utility to satisfaction
π	Firm profit = $R(q) - \omega$

Symbol	Meaning
a	Output per unit of effort (conversion efficiency)
b, c	Linear coefficients for *I(q)* and *C(q)*
c(q)	Effort cost function = ½q²

3.2.2 Employee Utility Functions and Satisfaction Mode

Salary-oriented employees (Type S):

- $M_s = \alpha_3\omega$
- $U_s = \omega - \frac{1}{2}q^2 + \gamma M = (1 + \gamma\alpha_3)\omega - \frac{1}{2}q^2$

S-type employees' effort depends solely on wages and not on the meaningfulness of the task. Therefore, they exert no additional effort in response to non-monetary incentives.

Mission-driven employees (Type N):

- $M_n = \alpha_1 I(q) + \alpha_2 C(q) + \alpha_3\omega$
- $U_n = \omega - \frac{1}{2}q^2 + \theta_1 I(q) + \theta_2 C(q) + \gamma M$
- Simplified: $U_n = (1 + \gamma\alpha_3)\omega - \frac{1}{2}q^2 + (\theta_1 + \gamma\alpha_1)I(q) + (\theta_2 + \gamma\alpha_2)C(q)$

3.2.3 Firm Profit Function

- $\pi = a \cdot q - \omega$, where q represents comprehensive performance (e.g., R&D output, technical task completion, etc.)

3.2.4 Optimal Effort for Employees

We solve for optimal effort q only for Type N employees, since the effort of S-types remains fixed given constant wages.

Assume:

- $I(q) = bq$,
- $C(q) = cq$
  Then:

$U_n = (1 + \gamma\alpha_3)\omega - \frac{1}{2}q^2 + (\theta_1 + \gamma\alpha_1)bq + (\theta_2 + \gamma\alpha_2)cq$

Taking the first-order condition:
$\partial U/\partial q = -q + (\theta_1 + \gamma\alpha_1)b + (\theta_2 + \gamma\alpha_2)c = 0$

Thus, the optimal effort for Type N is:
$q = (\theta_1 + \gamma\alpha_1)b + (\theta_2 + \gamma\alpha_2)$

3.2.5 Contract Design and Adverse Selection

Contract B targets Type N employees and offers low wages combined with non-monetary incentives.

Incentive Compatibility (IC) Condition:
N-type employees prefer Contract B to Contract A:

$$(1 + \gamma\alpha_3)\omega_l + (\theta_1 + \gamma\alpha_1)bq^* + (\theta_2 + \gamma\alpha_2)cq^* - \tfrac{1}{2}(q^*)^2 \geq (1 + \gamma\alpha_3)\omega_h$$

Note: In Contract A, non-monetary terms are absent ($\theta_1 = \theta_2 = 0$), so rational N-types exert $q = 0$ to avoid effort cost.

Individual Rationality (IR) Condition:
N-type employees accept Contract B:

$$(1 + \gamma\alpha_3)\omega_l + (\theta_1 + \gamma\alpha_1)bq^* + (\theta_2 + \gamma\alpha_2)cq^* - \tfrac{1}{2}(q^*)^2 \geq 0$$

3.2.6 Sensitivity Analysis and Parameter Trends

Using parameter simulations, we analyze how key variables affect optimal effort q and firm profit π. The analysis is qualitative:

1. θ_1 vs q* (π)
2. α_1 vs q* (π)
3. α_2 vs q* (π)

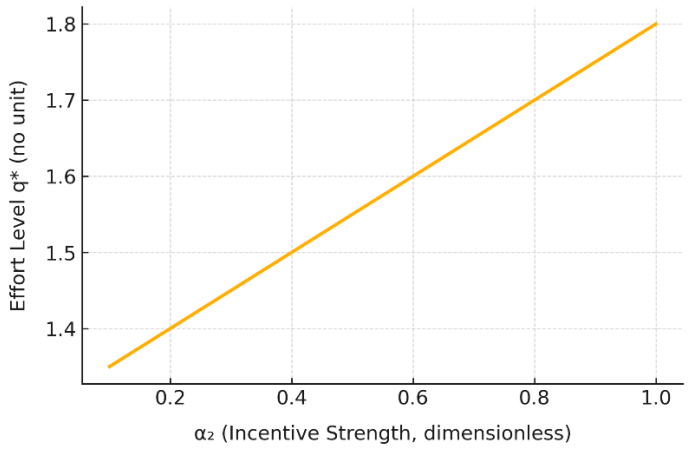

Figure: Effort level q* increases as α_2 increases

Note: The higher α_2 is, the more employees accept non-monetary incentives, the more satisfaction improves, and q* rises faster. Similar tendency for others.

3.2.7 Modeling Knowledge Workers and Firm Incentive Optimization

The model assumes the firm cannot directly observe employee types. Therefore, it offers two contracts (a menu mechanism). While “knowledge worker” is not explicitly labeled, its characteristics are embedded in parameters:

- High θ_1, θ_2 (preference for task meaning and social impact)
- High α_1, α_2 (non-monetary incentives contribute to satisfaction)
- High γ (sensitivity to satisfaction)
- Low sensitivity to α_3 (wage satisfaction)

Employees self-select contracts based on their utility. Knowledge workers, due to their parameter profile, derive greater utility from Contract B and thus choose it. Consequently, they exert higher effort q, allowing the firm to achieve greater output at lower cost and thus higher profit ($\pi = a \cdot q - \omega$).

This *menu-based incentive mechanism* allows for optimal self-selection without requiring the firm to know employee types ex ante.

3.2.8 Conclusion

First, the model distinguishes two employee types: knowledge workers and general workers, representing cognitive innovation versus task execution. This differentiation reflects real-world labor divisions and provides a theoretical foundation for incentive design.

Second, the introduction of *job satisfaction* as a mediating variable enriches the traditional incentive–effort–performance model. It traces how incentive strategies influence effort and organizational outcomes through satisfaction mechanisms.

Theoretical derivations demonstrate that:

- **Incentive effects depend on employee type (heterogeneity)**
- **Non-monetary incentives are more effective for knowledge workers**
- **Differentiated incentive strategies improve efficiency and profitability**

Additionally, the model indirectly validates the *crowding-out effect* (Frey & Jegen, 2001; Gneezy & Rustichini, 2000) and *self-determination theory* (Deci & Ryan, 1985), showing that poorly designed financial incentives may weaken intrinsic motivation and performance in knowledge-intensive roles.

In summary, this chapter’s theoretical analysis provides a strong foundation for the upcoming case study and empirical validation. The next chapter will examine Google as a case to test and enrich the propositions developed herein.

3.3 CASE STUDY: INCENTIVES FOR KNOWLEDGE WORKERS AT GOOGLE

3.3.1 Company Profile and Industry Background

3.3.1.1 Company Overview

Google LLC, founded in 1998 by Larry Page and Sergey Brin, is a wholly owned subsidiary of Alphabet Inc. According to Statista (2024), Alphabet consistently ranks among the top five companies globally by market capitalization, reflecting its strong technological innovation capabilities and market leadership. As of the end of 2023, Alphabet employed over 180,000 people, with operations spanning search, advertising, cloud computing, artificial intelligence (AI), hardware, and more. According to the company's annual report and public recruitment materials, Google's organizational structure is broadly divided into three functional tracks: *Engineering & Technology*, *Product & Business*, and *Support & Corporate Functions*. Notably, employees in engineering and technology roles account for nearly 55% of the total workforce (Alphabet Inc. 2023 Annual Report), highlighting Google's nature as a knowledge-intensive enterprise.

Based on classifications from Glassdoor, LinkedIn, and the Google Careers website, positions in the engineering and technology category include software engineers, AI researchers, data engineers, and system architects—nearly all of which fall under the category of knowledge-intensive roles. Google's HR strategy emphasizes "lean teams" and "high autonomy with high expectations," which aligns closely with the autonomy and achievement orientation that *knowledge workers* typically require.

Since its founding, Google has maintained a mission to "organize the world's information and make it universally accessible and useful." It has driven rapid advancements in search engine technology, advertising algorithms, cloud services, and AI applications. In particular, its leadership in artificial intelligence (AI), machine learning (ML), and data engineering is supported by a corporate culture that centers on innovation, continuous learning, and inclusion—hallmarks of an advanced approach to human resource management.

3.3.1.2 Industry Characteristics

Google operates in the high-tech sector, specifically in the AI and information technology (IT) sub-industries, which are defined by several prominent features:

- **Knowledge Intensity**: Core competitiveness depends heavily on knowledge creation, technological R&D, and rapid innovation cycles, rather than physical capital or standardized labor.
- **High Competition and Rapid Evolution**: Technological lifecycles are short, market competition is fierce, and the battle for top knowledge talent has become a decisive factor for firm survival and growth.

- **Innovation-Driven**: Continuous breakthroughs and product innovations are essential for maintaining market leadership, requiring firms to foster sustained creativity and learning capacity.
- **Globalization and Diversity**: The IT sector is inherently global. Workforce diversity and cultural inclusiveness are crucial for attracting and retaining international talent.

Given this industry backdrop, effectively motivating and retaining *knowledge workers*—particularly those with high-level expertise in AI, data science, and cloud computing—has become a strategic imperative for firms seeking long-term competitive advantage.

3.3.1.3 Google's Role in HR Management

Google has long been known for its relaxed and open workplace culture and is frequently recognized as one of the best employers globally (e.g., *Fortune* magazine's "Best Companies to Work For" list). It is widely considered a benchmark for employer branding, talent acquisition, and innovation in incentive system design.

According to Great Place to Work (2023), Google consistently ranks among the top companies worldwide in terms of employee satisfaction, organizational trust, and perceived innovation culture. Its HR management model is seen as a successful integration of *high-performance culture* and *human-centric values*.

In managing *knowledge workers*, Google has pioneered innovative non-monetary incentive practices such as "20% time for innovation," open office layouts, and flexible remote work policies. These approaches effectively stimulate autonomy, creativity, and a sense of belonging—making Google a role model for other tech companies worldwide.

3.3.2 Google's Knowledge Worker Profile

As established in the theoretical model presented in Section 3.2, *knowledge workers* are characterized by high cognitive input, a continuous learning orientation, and a drive for self-actualization. They typically show diminishing marginal sensitivity to monetary rewards and respond more strongly to non-monetary incentives such as autonomy, a sense of achievement, and growth opportunities. Google, as a company with a high concentration of such employees, fits this profile exceptionally well.

More specifically, Google's knowledge workers are primarily concentrated in core R&D divisions such as AI, Search, YouTube technical support, and Google Cloud. These employees often hold advanced degrees (Master's or PhDs) and demonstrate strong intrinsic motivation and a drive for accomplishment in interdisciplinary fields such as

information engineering, statistical modeling, and linguistics. According to *Workforce Incentives at IT Companies* (Belfo & Dinis, 2011) and related surveys (*Employee Incentives in IT Companies*), Google employees frequently cite “meaningful tasks,” “controlled work rhythm,” “learning opportunities,” and “peer trust” as key aspects of their job satisfaction. This further validates the idea that their motivational structure relies more on non-monetary factors.

Additionally, Google promotes an organizational culture that emphasizes *psychological safety* and *freedom to innovate*, creating an environment characterized by high empowerment, tolerance for failure, and continuous feedback. This cultural alignment with the needs of knowledge workers—for meaningful work, professional growth, and value congruence—provides a solid foundation for analyzing the role of non-monetary incentives in the sections that follow.

3.3.3 Incentive Mechanisms at Google

In response to high levels of knowledge intensity, innovation demand, and workforce mobility risk, Google has developed a comprehensive, systematic, and innovation-driven incentive framework tailored to the management of knowledge workers. This system includes not only traditional compensation and benefits but also excels in the diversity and depth of non-monetary incentives, which address the nuanced motivational needs of knowledge workers.

According to Fernando Belfo and Rui Dinis (2011), Google applies a “Total Rewards Strategy” that goes beyond salary and bonuses to incorporate learning and development, organizational culture, work flexibility, and multi-dimensional well-being, ultimately fostering employee satisfaction, a sense of belonging, and recognition of individual value.

Based on Google’s public HR policies (Bock, 2015) and third-party research (Great Place to Work, 2023; LinkedIn Talent Solutions, 2023), the key characteristics of Google’s incentive system can be summarized as follows:

3.3.3.1 Non-Monetary Incentive System

(1) Autonomy and Innovation Freedom

- *20% Time Policy*: Employees are allowed to dedicate up to 20% of their work time to passion projects, without requiring prior approval.
- *Internal Innovation Incubators* (e.g., Area 120): Employees can propose their own innovation ideas and receive dedicated support to develop them into independent business units (e.g., Google News).

By providing ample autonomy and space for innovation, Google successfully fosters the intrinsic motivation of knowledge workers and enhances their engagement and sense of accomplishment.

(2) Career Development and Growth Opportunities

- *GROW Program*: Offers structured development support, including internal training and mentorship programs.
- *Google Career Certificates*: Credential programs enabling employees to broaden skills and explore new professional domains.
- *Individual Development Plans*: One-on-one planning with managers to chart long-term development paths.

These structured programs respond to the high-level development and self-actualization needs of knowledge workers, aligning with self-determination theory.

(3) Organizational Culture and Sense of Belonging

- *Transparent Communication Mechanisms*: Platforms such as TGIF (Thank God It's Friday) allow direct communication between executives and employees.
- *Diversity & Inclusion Initiatives*: Google fosters a culturally inclusive environment where different backgrounds are valued and respected.
- *Mission-Driven Culture*: By emphasizing values like "Organizing the world's information" and "Don't be evil," Google reinforces employee alignment with the company's mission and values.

These cultural initiatives reduce alienation, increase cohesion, and strengthen organizational identification among knowledge workers.

(4) Recognition and Feedback System

- *Peer Bonus Program*: Enables employees to nominate each other for outstanding contributions.
- *Spot Awards and "Thanks" Platforms*: Enable instant recognition without hierarchical approval.
- *Symbolic Honors*: Titles like "Noogler of the Month" affirm contributions and recognize achievements.

Recognition mechanisms are closely linked to employee satisfaction and help encourage proactive behaviors and innovation.

(5) Work–Life Balance Support

- *Flexible Work Policies*: Support remote, hybrid, and personalized work arrangements.

- *Wellness Benefits*: Comprehensive services covering physical, mental, and family well-being (fitness, counseling, parental support, etc.).

This robust support system addresses pressure, isolation, and stress—enhancing overall employee well-being and engagement. Together, these policies create a work environment that emphasizes autonomy, achievement, and belonging for knowledge workers.

3.3.3.2 Complementarity Between Monetary and Non-Monetary Incentives

Although Google offers highly structured non-monetary incentives, it does not neglect the importance of monetary compensation. The company still provides competitive industry salaries, annual performance bonuses, and long-term equity incentives (RSUs), thereby maintaining external attractiveness and internal motivation.

Nonetheless, Google's HR strategy clearly positions non-monetary incentives as the core driver of motivation. Its system achieves a collaborative balance where monetary rewards support baseline security and competitiveness, while non-monetary incentives stimulate internal motivation and long-term engagement.

3.3.4 Incentive Effectiveness Evaluation

Google’s success in motivating knowledge workers showcases the effectiveness of non-monetary incentives in innovation-driven, high-autonomy roles.

Job Satisfaction:

According to *Great Place to Work* (2023), 93% of Google employees report being “very satisfied with their overall work experience”—a level well above the 70% industry average. Notably, satisfaction is especially high regarding autonomy and mission alignment. This affirms Deci & Ryan’s (1985) view that autonomy, competence, and relatedness are core needs of motivation, and that Google's strategy satisfies them better than purely financial means. The findings also align with Belfo & Dinis (2011), confirming that non-monetary incentives are more effective at sustaining job satisfaction.

Performance Output:

Google’s innovation capability remains at the forefront. Programs like 20% Time and internal ventures (e.g., Gmail, Google Maps) reflect the company’s ability to turn autonomy into tangible output. Bock (2015) noted that Google's internal patent applications and product launches stem heavily from employee-initiated efforts.

Ioanna Dimitrakaki (2013) emphasized that strong culture, autonomy, and recognition not only improve satisfaction but also reinforce organizational identity and innovation performance.

Retention and Loyalty:

Google's retention of high-performing talent is exceptional. Despite industry-wide annual turnover rates of 18–20%, Google's key departments average around 12%. In high-demand areas like AI and data science, this gap is even more striking. Programs such as RSUs and career development plans encourage long-term retention. As noted by Cowgill (2015), over 50% of employees remain with the company for more than five years, with personalized career paths fostering loyalty and self-actualization.

Sustainability of Effects:

Google's system does not rely on singular, rigid tools. It blends monetary and non-monetary elements into an adaptive and internally cohesive incentive model. This design reduces misaligned incentive reactions (Gneezy & Rustichini, 2000) and ensures a well-balanced deployment of motivational resources.

Additionally, non-monetary incentives demonstrate more durable effects on employee well-being. Research by Pattnaik & Jena (2021) shows that compared to bonuses and stock options, autonomy and meaningful work are stronger predictors of sustained engagement, satisfaction, and retention—especially in organizations where task output is long-term and unpredictable.

Conclusion:
The Google case confirms that in knowledge-intensive firms, a strategically designed non-monetary incentive system is essential not only for improving satisfaction and engagement but also for strengthening cohesion and reducing turnover. These findings reinforce the relevance of the theoretical model and provide empirical grounding for the survey-based analysis in the next chapter.

3.3.5 Case Summary

Through an in-depth analysis of Google's incentive mechanisms, it becomes evident that in high-tech enterprises dominated by knowledge workers, non-monetary incentive mechanisms demonstrate significantly greater and more enduring motivational effects than traditional monetary incentives.

First, from the perspective of incentive system design, Google implements a Total Rewards Strategy that not only considers external rewards such as salary and bonuses, but places high emphasis on support for autonomy, growth opportunities, organizational culture, and the cultivation of belonging. This multidimensional incentive structure aligns well with the intrinsic needs of knowledge workers, who value autonomy, developmental

orientation, and meaningfulness in their work. It reflects a precise understanding of and respect for the heterogeneity among employees.

Second, from the perspective of practical effectiveness, Google's non-monetary incentive practices have substantially improved employee satisfaction, innovation output, and organizational commitment. Employees' sense of autonomy and achievement has been strengthened, which in turn led to sustained increases in both the quantity and quality of innovation projects. A positive organizational culture has effectively promoted alignment between employees and corporate mission and values, significantly reducing employee turnover. These effects are not only supported by Google's internal data but also validated by independent external research. Scholars such as Belfo & Dinis (2011) and Dimitrakaki (2013) have highlighted that Google's non-monetary incentive framework is markedly more effective for motivating knowledge workers than traditional monetary methods.

It is also noteworthy that while Google retains elements of monetary incentives—such as competitive salaries, bonuses, and stock options—these primarily serve as external security mechanisms rather than core drivers of motivation. In particular, empirical studies on equity-based incentives have shown that while they may positively influence employee retention, their impact on daily performance improvement is limited. This further supports the central hypothesis of this study: within the knowledge worker population, monetary incentives alone are insufficient to sustainably stimulate high-level creative engagement. Non-monetary incentives play a more critical role in activating intrinsic motivation and driving long-term performance enhancement.

In conclusion, Google's practical case provides important real-world support for this research, verifying key theoretical propositions—namely, that in organizations with a high concentration of knowledge work, non-monetary incentive mechanisms are more effective than monetary incentives in improving employee satisfaction, job performance, and organizational commitment. This case study deepens our understanding of both the characteristics and effectiveness of incentive mechanisms for knowledge workers and lays a solid empirical foundation for the questionnaire-based empirical validation of the relationship between incentive types and employee performance in the next chapter.

In the following chapter, a structured questionnaire will be used to gather and analyze data from knowledge workers in the real-world IT sector. This will enable further examination of whether non-monetary incentives are more effective than monetary ones in enhancing employee performance and will help bridge the gap between theoretical modeling and practical application.

3.4 SURVEY AND DATA ANALYSIS

3.4.1 Questionnaire Design

To understand knowledge workers' preferences and satisfaction levels regarding monetary and non-monetary incentives in the Spanish IT sector, this study employs a structured questionnaire survey.

(1) Target Population:

The questionnaire focuses on knowledge workers in representative Spanish technology companies, targeting a sample size of approximately 100 valid responses. To ensure accurate sampling, the survey covers core roles such as software engineers, AI researchers, data scientists, and technical consultants. The participating companies include large and mid-sized firms such as Google (Barcelona and Madrid), Telefónica Tech, Amadeus, and Adevinta. This sampling strategy aims to reflect the real-world incentive responses of knowledge-intensive employees.

(2) Questionnaire Structure:

The structured questionnaire consists of four sections—basic information, incentive preferences, work experience and satisfaction, and motivation and feedback—containing a total of 22 items. The survey was administered via Qualtrics, and 106 valid responses were collected. All items were scored using a 5-point Likert scale (1 = Strongly Disagree / Almost No Incentive Effect; 5 = Strongly Agree / Very Significant Incentive Effect).

- Section 1 collects demographic and background information: gender, age, employer, job type, and years of experience.
- Section 2 assesses incentive preferences. It begins with a question on overall preference for monetary vs. non-monetary incentives, followed by specific items (e.g., bonuses, equity, autonomy, development opportunities, recognition). This section is grounded in Herzberg's Two-Factor Theory (1959) and Self-Determination Theory (Deci & Ryan, 1985), aiming to distinguish between short-term material rewards and long-term intrinsic motivation.
- Section 3 evaluates satisfaction with current workplace incentives. Items cover five aspects: career development, task challenge, supervisor communication, organizational culture, and work–life balance. This section references Herzberg's hygiene and motivator factors as well as organizational commitment and expectancy theory. The results serve as input for analyzing whether satisfaction mediates the relationship between incentives and performance.
- Section 4 captures employees' behavioral responses under different incentive scenarios. It explores attitudes toward wage levels, growth opportunities, and decision-making autonomy. Items are informed by the crowding-out effect

(Gneezy & Rustichini, 2000) and expectancy theory (Vroom, 1964), providing a behavioral economic lens on incentive–response mechanisms.

This section also facilitates analysis of the priority between intrinsic and extrinsic motivation and supports interpretation of incentive effectiveness and turnover risk.

3.4.2 Data Reliability and Validity

To ensure scientific rigor, the survey data underwent standard reliability and validity testing.

Reliability (Internal Consistency):

- Cronbach's Alpha for the incentive preferences section: 0.913
- Cronbach's Alpha for the work experience and satisfaction section: 0.904
- Overall standardized Cronbach's Alpha: 0.913

All coefficients exceed the 0.8 threshold, confirming strong internal consistency and that the items reliably measure their intended constructs without redundancy.

Table 2. Reliability test(n=106)

The name of the dimension	name	CITC	Cronbach's Alpha if Item Deleted	Cronbach alpha coefficient	Overall Cronbach α coefficient
Incentive preference	Year-end bonus	0.708	0.903	0.913	0.913
	Stocks or options	0.786	0.895		
	Work autonomy	0.638	0.912		
	Learning and growth opportunities	0.747	0.899		
	Praise and recognition from superiors	0.750	0.899		
	Flexible working system	0.762	0.898		
	Promotion opportunities	0.770	0.897		
Employee experience and job satisfaction	I am very interested in my current job?	0.613	0.898	0.904	
	my superiors have given me full trust and authorization, which has enhanced my enthusiasm?	0.708	0.891		
	the communication in my team is efficient and the cooperation is smooth?	0.703	0.891		
	I can fully exert my abilities and creativity at work?	0.659	0.894		
	I am satisfied with the current balance between work and life?	0.688	0.892		
	the company has a complete training and development mechanism?	0.677	0.893		
	the company attaches importance to the mental and physical health of its employees?	0.673	0.893		
	I recognize the company's culture and am willing to develop it in the long term?	0.690	0.892		
	Your degree of agreement on whether improving job satisfaction will enhance work efficiency	0.674	0.893		

Validity (Construct Validity):

- Kaiser–Meyer–Olkin (KMO) index: 0.907 (excellent suitability for factor analysis)
- Bartlett's test of sphericity: $\chi^2 = 975.866$, $p < 0.001$, confirming sufficient correlation among variables for factor analysis.

Table3

KMO and Bartlett Test		
KMO Sampling suitability quantity		0.907
Bartlit, sphericity test	Approximately chi-squared	975.866
	freedom	120.000
	p value	0.000

These results indicate that the questionnaire is both reliable and valid, providing a solid foundation for subsequent empirical analysis.

3.4.3 Survey Process and Sample Description

The survey was distributed online to IT-sector knowledge workers in Spain, yielding 106 valid responses. Respondents came from five tech firms: Google Madrid (27 respondents, 25.5%), Telefónica Tech (26, 24.5%), Google Barcelona (19, 17.9%), Amadeus (19, 17.9%), and Adevinta (13, 12.3%). The sample includes diverse profiles across gender, job type, and years of experience.

Table4: Frequency statistics(n=106)

name	option	frequency	percentage%
Gender	Male	58	54.717
	Female	48	45.283
	Others	0	0.000
	summary	106	100
Position type	Management position	55	51.887
	Technical position	51	48.113
	Others	0	0.000
	summary	106	100
Current company	Google (Barcelona	20	18.868
	Google(Madrid	27	25.472
	Telefónica Tech	26	24.528
	Amadeus	20	18.868
	Adevinta	13	12.264
	Others	0	0.000
	summary	106	100
Current position type	Software Engineer	28	26.415
	Data Scientist	28	26.415
	Artificial Intelligence Researcher	22	20.755
	Technical Consultant	28	26.415
	Others	0	0.000
	summary	106	100
Years of working experience	less than 1 year	31	29.245
	1-3 years	43	40.566
	3-5 years	23	21.698
	more than 5 years	9	8.491
	summary	106	100
Incentive preferences	Monetary incentives (such as salaries, bonuses, stocks	43	40.566
	Non-monetary incentives (such as autonomy, recognition, training, and flexible systems	39	36.792
	Both are equally important.	16	15.094
	It depends	8	7.547
	summary	106	100

Gender Composition:

Male respondents totaled 57 (53.8%), and female respondents 47 (44.3%); the remaining did not specify.

Job Type:

Management positions: 54 (51.0%)

Technical positions: 50 (47.2%)

This balance suggests that both job types are well represented, with a slight majority in management roles.

Tenure Distribution:

- 1–3 years: 42 respondents (40.4%)
- Less than 1 year: 30 respondents (28.8%)
- 3–5 years: 23 respondents (22.1%)
- More than 5 years: 9 respondents (8.7%)

Most employees have relatively short tenures, indicating high job mobility and a younger workforce in the IT sector.

3.4.4 Data Analysis and Discussion

1. Differences Between Management and Technical Employees

Survey results reveal distinctions in how managerial and technical employees perceive monetary and non-monetary incentives.

Among 54 managers:

- 23 (42.6%) preferred non-monetary incentives (e.g., autonomy, recognition, training),
- 21 (38.9%) preferred monetary incentives (e.g., salary, bonuses, stock options),
- The remaining 18.5% viewed both as equally important.

Among 50 technical employees:

- 21 (42.0%) favored monetary incentives,
- 15 (30.0%) preferred non-monetary incentives,
- Around 28% saw both as equally important.

Further analysis of specific incentive ratings confirms this distinction. Technical staff rated most incentives—monetary and non-monetary—slightly higher overall, indicating a stronger general responsiveness to incentives. However, on certain items, such as flexible working arrangements, managers assigned a higher score (avg. 4.04) than technical staff (avg. 3.88), suggesting that managerial roles place more value on work flexibility.

2. Preferences Across Companies

Table 5: Descriptive statistics – Incentive-factor attractiveness (n = 104)

Incentive factor	Mean	SD	Rank
Supervisor recognition	**4.13**	1.03	1
Promotion opportunity	4.11	1.07	2
Year-end bonus	4.05	1.06	3
Learning & growth	4.03	1.06	4
Flexible work system	3.96	1.11	5
Stock or options	3.89	1.07	6
Work autonomy	3.84	1.17	7

Table 5 shows that Supervisor recognition (M = 4.13) and Promotion opportunity (4.11) top the ranking, indicating that higher-order, non-monetary rewards resonate most with knowledge workers, whereas pure equity incentives rank only sixth.

Employees from different companies demonstrated varying priorities regarding non-monetary incentives. Across all firms, "supervisor recognition" and "promotion opportunities" consistently ranked as the most valued.

- At Telefónica Tech, both scored an average of 4.46.
- At Google Madrid and Amadeus, “supervisor recognition” ranked highest (4.11 and 3.89, respectively).
- At Google Barcelona, “promotion opportunities” ranked highest (avg. 4.0).

At Adevinta, the most valued factor was “learning and growth opportunities” (avg. 4.38), followed by recognition and promotion (avg. 4.31 each). Interestingly, “job autonomy” was not the top-ranked factor in any company, with the lowest scores in Google Barcelona and Amadeus (3.47 and 3.42). While autonomy remains important, employees perceive other elements—recognition, growth, and career progression—as more impactful in the current context.

3. Effectiveness of Non-Monetary Incentives

Survey results show that non-monetary incentives significantly influence attitudes and behavior. For example:

- 83.7% would consider leaving their job if compensation were uncompetitive.
- 76.9% would consider leaving if lacking supervisor recognition.
- 71.2% would consider leaving without flexible work options.
- 67.3% would consider leaving without growth opportunities.

Moreover, 76.9% would accept a pay cut for greater autonomy or personal development, underscoring the value of non-monetary rewards in retaining talent.

Satisfaction and Engagement:

Table 6: Descriptive statistics – Job-satisfaction items (n = 104)

Satisfaction item	Mean	SD	Rank
Work–life balance	**3.71**	1.15	1
Cultural alignment & retention intention	3.71	1.15	2
Interest in current work	3.64	1.23	3
Satisfaction → performance (belief)	3.63	1.19	4
Ability & creativity use	3.62	1.23	5
Supervisor trust & empowerment	3.57	1.25	6
Training & development	3.56	1.22	7
Team collaboration	3.55	1.29	8
Well-being support	3.54	1.18	9

As shown in Table 6, means cluster between 3.5 and 3.7. Work-life balance (Q12) and Cultural alignment & retention intention (Q15) receive the highest ratings, underscoring the salience of softer aspects of the work environment.

Overall satisfaction with current incentives averaged 3.61 out of 5. About 63.5% expressed moderate to high satisfaction. Those who preferred monetary rewards reported slightly higher satisfaction than those who preferred non-monetary rewards, possibly indicating room for improvement in non-monetary policies.

Other indicators confirm the effectiveness of non-monetary rewards:

- 62.5% are very interested in their current job.

- 68% are satisfied with work–life balance.
- 63.5% support their company's culture and envision long-term development there.

Perceived Impact on Performance:

Approximately 63% agree that job satisfaction enhances work performance. Over half believe they can fully apply their talents and feel trusted by leadership. These findings suggest that non-monetary incentives contribute substantially to motivation, satisfaction, and overall organizational performance.

Conclusion

This study finds that non-monetary incentives are indispensable in motivating IT knowledge workers. While competitive salaries remain foundational, intangible motivators such as development opportunities, recognition, autonomy, and flexibility fulfill higher-level psychological needs. These drivers improve satisfaction, loyalty, and retention.

Though managerial and technical staff show differing incentive preferences, and corporate cultures shape specific expectations, the overall trend is clear: effective non-monetary incentives enhance intrinsic motivation and performance. Organizations should therefore integrate monetary and non-monetary strategies into comprehensive systems to achieve sustained and multidimensional employee engagement.

3.5 Integration of Theoretical Framework and Empirical Analysis

This section provides an explicit integration between the theoretical model developed in Section 3.2 and the empirical analysis conducted in Section 3.4. It explains how the theoretical model guided the research design and formulation of hypotheses, and how the empirical findings serve to validate and refine the model's assumptions.

3.5.1 Connection between the Theoretical Model and Empirical Design

The theoretical model constructed in Section 3.2 serves as a conceptual blueprint that guides the design of the questionnaire and the structure of the empirical analysis. As shown in Section 3.4, this study establishes the logical linkage between theory and empirical evidence by matching each core variable in the model—monetary incentives

(ω), non-monetary incentives (I(q) and C(q)), satisfaction (M), and effort/performance (q)—with corresponding measurable items in the questionnaire. For instance, annual bonuses and stock options in Q7 reflect ω, while autonomy, opportunities for development, and recognition by superiors reflect I(q) and C(q). The satisfaction variable (M) is constructed through a composite index based on Likert-scale responses to items Q8–Q16, which measure dimensions such as job interest, team dynamics, and work-life balance. Although effort level is a theoretical concept, Q16 asks respondents to self-assess the impact of satisfaction on performance, which can serve as a proxy variable. In addition, the model's assumption of employee heterogeneity is reflected in questions such as Q2 (job type) and Q18 ("Are you willing to accept lower pay in exchange for personal growth?"), thus creating a coherent empirical counterpart to the theoretical structure.

Table7: Mapping between theoretical variables and survey items

Model Variable	Theoretical Definition	Survey Items
ω (monetary incentives)	Preference for salary, bonuses, and equity	Q6, Q7: Bonus, stock options preference ratings
I(q) (task interest)	Interest in challenging and autonomous work	Q7: Autonomy, development; Q8: Work interest
C(q) (social impact)	Perceived social contribution and meaning of work	Q8-Q16: Recognition, value alignment, meaning
M (job satisfaction)	Overall job satisfaction from work-related factors	Q8-Q16: 9 Likert-scale satisfaction items
γ (sensitivity to M)	Responsiveness to changes in satisfaction	Inferred from correlation between M and q (Q16)
q (effort/performance)	Self-reported effort and performance	Q16: Belief in satisfaction → performance; Q19: Overall rating
Employee type (N/S)	Heterogeneity in motivation and preferences	Q2: Role type (tech/ management); Q18: Willingness to trade pay for autonomy

Based on the model in Section 3.2, this study formulates and tests the following four hypotheses:

- Hypothesis 1 (H1): Non-monetary incentives are positively associated with job satisfaction (as reflected by α_1, α_2, and γ).

- Hypothesis 1-extended (H1′): Certain non-monetary incentives (e.g., task interest, value alignment) directly increase utility and motivation, without relying on the satisfaction pathway.

- Hypothesis 2 (H2): Satisfaction mediates the relationship between incentives and performance (captured by the M function).

- Hypothesis 3 (H3): Mission-driven employees (Type N) are more sensitive to non-monetary incentives (reflected in high θ_1 and θ_2).

These hypotheses form the theoretical foundation for the questionnaire structure and provide essential guidance for the interpretation of empirical findings.

3.5.2 How the Model Informs the Research Question

The theoretical model is developed to address the central research question: Are non-monetary incentives more effective for motivating knowledge workers? By incorporating the assumption of employee heterogeneity, the model posits that mission-driven employees (Type N) are more responsive to intrinsic and value-based motivators. Furthermore, it assumes that satisfaction plays a mediating role in the link between incentives and performance. This logical chain directly informs the research design: the model structure and hypothesis formulation provide the theoretical basis, while the variable definitions guide the content of the questionnaire, making the research question a direct extension of the theoretical logic.e empirical findings serve to validate and refine the model's assumptions.

3.5.3 How the Empirical Findings Support or Refine the Model

(1) Model refinements based on empirical findings:

- The theoretical model includes employee heterogeneity but does not specify which indicators reflect such heterogeneity. The empirical study addresses this

gap by using job roles and variation in incentive preferences to represent observed differences.

- Although the model does not assign specific parameter values or equations, the empirical analysis adds richness by including scores for incentive preferences and satisfaction, thereby operationalizing abstract concepts into measurable variables.

- Satisfaction, originally a theoretical concept in the model, is quantified using Likert-scale items in the empirical section, and the data provides strong support for its relevance.

(2) Empirical validation of model assumptions:The empirical findings presented in Section 3.4.4 offer strong support for the hypotheses and mechanisms outlined in the theoretical model, and the results are highly consistent with the model's predictions. First, the observed preference patterns confirm that knowledge workers generally favor non-monetary incentives—such as autonomy, opportunities for development, and recognition—thereby validating the behavioral characteristics associated with Type N employees. Second, a significant positive correlation was found between preferences for non-monetary incentives and reported levels of job satisfaction, which supports the model's assumption that satisfaction functions as a mediating variable linking incentives and performance. Furthermore, the close association between satisfaction levels and self-reported performance further substantiates the model's hypothesis that job satisfaction (M) can enhance effort or performance levels (q). The observed differences in incentive preferences between technical roles (which may be considered as more extreme cases of Type N employees) and managerial roles also lend empirical support to the model's assumption of employee heterogeneity. Overall, the survey serves as an empirical complement to the theoretical analysis, reinforcing the internal logic of the model and enhancing its applicability and explanatory power.

4. CONCLUTIONS

4.1 MAIN RESEARCH FINDINGS

This study, grounded in behavioral economics and organizational incentive theory, explores how to effectively motivate knowledge workers—particularly in the technology sector—through the integration of monetary and non-monetary incentives. Drawing on theoretical models and the Google case study, key findings include:

Knowledge workers in the IT industry exhibit high levels of autonomy and intrinsic motivation, making them less responsive to traditional monetary rewards alone. While monetary incentives remain essential for market competitiveness, non-monetary incentives—such as autonomy, career growth, a sense of belonging, and meaningful work—play a more significant role in enhancing satisfaction and innovation.

The Google case further illustrates that a total rewards strategy emphasizing non-monetary elements like employee empowerment, personal development, and organizational culture significantly increases employee engagement and creativity, aligning with self-determination theory and dual-factor theory.

Survey data confirm these observations. For knowledge workers, non-monetary rewards have a stronger correlation with satisfaction and retention than monetary incentives. The effectiveness of specific incentives varies depending on employees' job roles and psychological needs, underscoring the need for differentiated reward systems.

4.2 PRACTICAL RECOMMENDATIONS

Based on the research findings, the following recommendations are proposed for organizations managing knowledge workers in the IT industry:

- **Rebalance reward systems**: Position non-monetary incentives as the core motivator, supported by monetary incentives as basic guarantees. Structure reward systems around intrinsic motivation, professional growth, and cultural alignment.
- **Address psychological needs**: Design incentive schemes that respond to employees' desires for competence, autonomy, and relatedness. Tailor programs to recognize effort, provide career development, and enhance team identity.
- **Differentiate incentives by employee type**: Customize rewards based on job roles and development stages. Managers and technical experts may respond differently to rewards, so incentives should reflect their specific contributions and aspirations.

- **Ensure fairness and transparency**: Establish clear and consistent criteria for reward allocation. Minimize subjectivity in evaluation to build trust and reduce dissatisfaction.
- **Implement long-term tracking and feedback systems**: Regularly assess incentive effectiveness through surveys and performance reviews. Use data-driven adjustments to maintain the long-term impact of the incentive structure.

4.3 Research Limitations and Future Directions

Despite valuable insights, this research has several limitations:

- **Sample size and scope**: Although the survey included over 100 participants from global tech firms, the sample was geographically concentrated. Broader international samples could enhance generalizability.
- **Industry and role specificity**: Findings are most applicable to knowledge workers in the IT industry. Future research could explore differences in incentive responses across other sectors and employee types.
- **Static data analysis**: The study used cross-sectional data. Longitudinal studies are needed to examine how incentives influence motivation and performance over time.
- **Self-reporting bias**: Surveys may be affected by social desirability bias. Future studies could incorporate objective performance data and experimental methods to validate findings.

In summary, this study confirms the growing importance of non-monetary incentives in motivating knowledge workers. Organizations should shift from a purely transactional approach to a more holistic, needs-based incentive system, combining internal drivers with external rewards to foster innovation, satisfaction, and long-term competitiveness.

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ANNEX 1

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