

New human capital theory from the perspective of time allocation: Evolution and prospects

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Abstract: In the modern economic system, where the service sector has significantly increased in importance, the accumulation of human capital no longer relies solely on traditional factors such as education, training and healthcare, but increasingly depends on informal education, particularly learning activities during leisure time. Driven by the amalgamation of personality economics and neuroeconomics, a novel theory of human capital has surfaced, which emphasizes the acquisition of cognitive and non-cognitive abilities through informal learning activities such as hobbies and social engagements. Utilizing the time allocation theory as a foundation, this study investigates the role of leisure time in bolstering human capital. The paper spotlights the 'Learning by Doing' and 'Learning by Playing' phenomena, which are instrumental in enhancing practical abilities and creativity. The study offers a critical examination of how human capital theory has evolved, particularly regarding the influence of leisure on skill development. This study also highlights the crucial importance of learning during leisure as a contributing factor to economic growth and positions it as a vital pathway for future human capital accumulation. Moreover, it proposes new avenues of research to deepen the understanding of human capital and leisure economy theories, thereby providing valuable perspectives for the progress of society and the economy.

Keywords: human capital; cognitive skill; non-cognitive skill; leisure time allocation; economic growth

1. Introduction

With the advancement of technology and economic growth, people's quality of life has significantly improved, which is reflected in increased income and a continuous increase in leisure time. For instance, in 2018, the average disposable time per day for residents in China was 3 hours and 56 minutes, an increase of 12 minutes per day compared to 2008 (National Bureau of Statistics of China [NBSC], 2019). In Europe, in 2018, the largest amount of leisure time was recorded in Finland, where people use almost a quarter (24.2%) of their day for leisure activities. Additionally, Germany, Greece, and Belgium were the only countries with values above 23% (Eurostat, 2018).

Scholars have been analysing the impact of leisure time on economic growth since the 1980s. In this period, leisure was treated as an alternative to work and education, which exhibited typical neoclassical characteristics. For example, Ortigueira (2000) assumed that an individual's time is a constant, and is used for work, leisure, and education, with each being mutually substitutable. Thus, allocating more time to education rather than indulgence can enhance an individual's human capital accumulation, thereby promoting economic growth. However, this approach is evidently flawed as it assumes that the inherent price of leisure is the same for all consumers (even heterogeneous ones), and it neglects leisure's role in influencing economic growth through consumption. Economist Galí (1999), using a price stickiness model and data from seven major Western industrial countries, confirmed that technological progress increases leisure time, which leads to higher consumption and economic output. However, Ortigueira (2000) introducing a work-leisure choice into the

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Uzawa-Lucas endogenous economic growth model, found that an increase in leisure leads to diminishing marginal utility of consumption, which inhibits endogenous economic growth.

In summary, the aforementioned studies mainly examine the impact of leisure on the demand side, such as consumption and employment, without revealing its effects on the supply side. The purpose of this study is to investigate whether leisure has a long-term effect on supply factors. This study posits that the long-term effect of leisure on economy depends on whether leisure factors in the economy can be effectively transformed into new human capital. The paper first explores the theoretical basis and framework of this viewpoint. The new human capital mentioned here stems from the “Learning by Playing” effect during leisure time. Specifically, leisure activities like tourism, relaxation, and arts are a form of informal learning, an alternative source of human capital accumulation in addition to formal education (Lechner, 2009). The human capital generated from the “learning while playing effect” is termed new because traditional human capital formed during formal education mainly shapes and enhances an individual’s cognitive skills (such as computational, reading, musical, and artistic skills), while informal learning during leisure can improve non-cognitive skills (including perseverance, self-control, and extroversion) (Heckman & Kautz, 2013) and the irreplicable aspects of individual human capital (Bloom & Canning, 2000).

This study will review and summarize three aspects: the challenges faced by traditional human capital theory, the research progress in new human capital theory, and the impact of leisure time allocation on new human capital and economic development. Furthermore, the paper will provide an outlook on future research directions.

2. Challenges to traditional human capital theory

The emergence of human capital theory in economics, spearheaded by eminent economists like Schultz, Becker, and Mincer, has led to a well-established framework for examining human capital development and growth. Schultz’s groundbreaking 1961 work highlighted the crucial roles of education and training in human capital, while Becker’s 1965 study expanded this to include health as a key aspect alongside education and training. Human capital encompasses various elements such as skills, competencies, and experience (Becker et al., 1990), with education, training, and health recognized as its core components (Hannah, 1987). Wang et al. (2020) observed a diminishing impact of human capital on economic growth, as analysed through the traditional human capital theory’s triad of education, training, and health. This decline is attributed to two main factors: the inability of traditional human capital theory to fully explain income disparities in the labour market (Roberts et al., 2007), and the expansion of the human capital concept to include a wider array of factors (Heckman & Kautz, 2013).

Initially, one could argue that traditional human capital theory has limitations in explaining microeconomic phenomena. This theory heavily focuses on the role of intellectual and physical capital in an individual’s performance. Yet, salary differences based on gender or race persist in the labour market despite comparable levels of productivity among individuals (Lundberg & Startz, 1983). Phelps (1972) noted a significant wage gap between men and women, even after adjusting for factors like education, training, skill level, and work experience. Spence’s (1973) “Signalling Theory” suggests that employers use educational background as a means to screen candidates, rather than as a true reflection of their actual work efficiency. This is linked to the presence of information asymmetry, where companies rely on educational achievements to gauge an employee’s competence due to a lack of complete information about their skills and qualifications.

Additionally, there has been an evolving debate about the traditional interpretation of human capital, which has historically focused primarily on cognitive abilities. Traditional models of human capital have emphasized the importance of cognitive skills like intelligence and specific abilities in determining an individual’s potential. However, recent research has increasingly shown that non-cognitive skills, such as personality traits, self-control, and creativity, have a greater impact on financial success in the labour market compared to cognitive skills (Heckman et al., 2006; Lindqvist & Vestman, 2011). Studies in the United States from 2012 to 2013 have found that personality traits and willpower significantly influence the skill set needed in the 21st century (Le & Hu, 2007). Moreover, Heckman et al. (2006) and Li and Zeng (2012) have identified both cognitive and non-cognitive skills as

crucial components of an individual's core competencies. The increasing body of research indicates that non-cognitive skills, including personality traits, responsibility, and creativity, play a vital role in the formation of human capital and job performance. These skills have been shown to be as influential as cognitive skills, as shown in a study by Borghans et al. (2008). Li and Luo (2020) suggest that early interventions to improve non-cognitive skills can lead to better human capital development. Furthermore, Du and Wang (2021) have underscored the critical role of family structure and decision-making in the early development of human capital.

Moreover, a growing number of researchers are exploring and critiquing the methods used to measure human capital. The adoption of educational indicators as a measurement tool has gained popularity for its alignment with the principle of data availability (Yao & Cui, 2015). Nonetheless, traditional human capital theory's effectiveness in boosting educational outcomes is often questioned. Studies from the United States indicate that higher educational levels do not always translate into increased productivity, better employment rates or wealth equality. Ma and Wang (2014) responded to debates on traditional human capital theory by suggesting a division of human capital production into two stages: 'real human capital' and 'potential human capital.' The inherent nature of human capital, which represents its latent potential, depends on an individual's education and physical effort. On the other hand, transforming potential human capital into actual human capital relies on social factors, such as institutional contexts and economic development.

Previous models of human capital heavily emphasized cognitive skills focusing on education, training and health as key components. However, a global consensus is emerging among scholars about the importance of non-cognitive skills in human capital, which is supported by extensive research from experts like Heckman and Li. This shift results from a deep investigation into the concept of human capital. The study of human capital accumulation from a family economics perspective has attracted significant interest, especially due to the critical role families play in developing non-cognitive skills. Unlike earlier approaches that focused on "capabilities (cognitive and non-cognitive)", this study adopts a time allocation perspective, proposing that human capital accumulation depends on how time is spent. The allocation of time to various activities aids acquiring different types of human capital. This study aims to analyse the allocation of leisure time and its impact on human capital development: it explores how leisure time affects both cognitive and non-cognitive skills thereby offering a comprehensive view that enriches the existing human capital framework.

3. Developments in new human capital theory

Increased Focus on Non-Cognitive Skills

Ayres and Malouff (2007) suggests that personality, as a distinct psychological characteristic, significantly influences an individual's job performance. This indicates that people with positive personality traits are more likely to excel in their professional pursuits. However, Ayres and Malouff (2007) notes that shaping a favourable personality may not be feasible due to its inherent nature. In recent times, economists, particularly in the field of behavioural economics, have increasingly focused on the importance of non-cognitive skills. This interest stems from the desire to understand how these skills affect various psychological aspects, such as expectations and preferences for time and leisure (Heckman & Rubinstein, 2001).

Academics have recently sought to incorporate personality traits into economic analysis in order to assess the impact of non-cognitive skills on job performance. Almlund et al. (2011) used psychological analysis to study how personality traits influence labour productivity and income, and found a positive relationship between traits like positivity, optimism, career focus and financial success. Borghans et al. (2008) argue that a positive personality encourages individuals to overcome limitations set by their resources and abilities. Moreover, they suggest that a mix of optimism and anxiety can affect labour productivity, job performance, and economic decision-making. Li and Zhang (2015) found that extroverted individuals often have better leadership and interpersonal skills.

Conversely, individuals with neurotic tendencies are more prone to anxiety and emotional changes, which negatively affect their performance in demanding professional environments. Rigorous individuals are likely to achieve higher performance levels due to traits

like diligence and strategic planning. Similarly, open-minded individuals tend to be more productive, innovative, and patient. Heckman et al. (2006) studied how non-cognitive skills influence job performance and found that personality traits significantly impact labour productivity and education-related decisions. They also observed that cognitive skills, measured by IQ, explain only a modest portion of salary variations, while personality traits account for a more significant share. Further research has shown that IQ, as a cognitive ability, can only explain 16% of the individual wage differences, whereas personality traits can account for up to 12% of the variation. When analysing based on labour productivity, the level of education or IQ can only determine 55% of individual performance, while the explanatory power of employee personality traits can reach 40% (Chen & Li, 2017). Cheng (2013) concluded that educational attainment and IQ account for just over half of an individual's performance, while personality traits can explain a substantial part of the variance.

In the labour market, there is a growing recognition of non-cognitive skills over technical expertise. A study by the U.S. Census Bureau and the U.K. found that employers greatly value non-cognitive skills like attitude and communication, often more than formal education (Le & Hu, 2017). This highlights the need for education systems to shift their focus from purely cognitive skills to enhancing students' non-cognitive skills, a change that Ayres and Malouff (2007) argues will better prepare students for long-term success in their careers.

Cognitive skills have an indirect yet significant impact on human capital

This relationship between cognitive and non-cognitive skills is characterized by both autonomy and a degree of interdependence. The development of cognitive skills, such as creativity and curiosity, can be affected by the maturation process. Individuals with positive personality traits, determination, courage, and innovative thinking tend to learn faster and can select relevant information more effectively. This ability to efficiently process knowledge is expected to lead to greater success in the job market (Li & Zhang, 2015).

Borghans et al. (2008) discovered a positive link between intelligence and non-cognitive traits like motivation, curiosity, and fear of failure. They observed that non-cognitive skills profoundly influence cognitive skills, particularly when factors like personality traits and personal preferences are considered. Extensive psychological research has consistently shown that personality traits significantly impact academic performance, often seen as a reflection of cognitive ability (Li & Zhang, 2015). For instance, individuals with a strong sense of rigor are more likely to exhibit high levels of commitment, responsibility, and self-discipline, which leads to above-average academic achievements. This phenomenon relates to the idea that self-discipline has a more pronounced effect on academic performance variations, especially when combined with differences in intellectual ability. The influence of rigor remains significant even when considering factors like IQ and GPA (Duckworth & Seligman, 2005). Additionally, self-discipline has been found to substantially reduce incidents of academic dishonesty (Giluk & Postlethwaite, 2015). Richardson and Abraham (2009) further explored the role of rigor in education and found that it significantly enhances motivation and the process of motivational transformation.

Zheng and Qing (2016) investigated the relationship between non-cognitive skills and gender wage disparity concluding that non-cognitive skills substantially affect academic and career achievements, which in turn influence income levels at the workforce. Supporting this, Heckman (2000) noted that individuals who leave high school early and possess lower non-cognitive skills, even with a GED, tend to find lower-quality jobs compared to high school graduates with similar cognitive abilities. Heckman and Corbin (2016) also emphasized that non-cognitive skills can play a crucial role in shaping an individual's educational choices and achievements and underscored their importance in overall educational success.

Non-cognitive skills directly influence human capital

These skills encompass more than just psychological aspects: they also include skill-based and cognitive components, such as educational achievements and training, as noted by Kautz et al. (2014). Thiel and Thomsen (2013) have emphasized the importance of integrating non-cognitive skills from psychology into economic studies, recognizing their critical role in determining human capital.

The influence of non-cognitive skills on professional performance has increasingly become a focus of scholarly attention. This shift has led to the recognition of non-cognitive skills as a distinct and direct contributor to human capital, which attracted global academic interest. This research direction was initially driven by Heckman (2000) in response to the limitations of traditional human capital theory. To address these shortcomings, Heckman et al. (2006) suggested the development of a new human capital theory, centred on an individual's capabilities, divided into cognitive and non-cognitive skills. This approach also highlighted the need to understand the unique impact of non-cognitive skills, as distinct from cognitive skills.

Li and Zeng (2012) proposed an alternative to traditional human capital theory, focusing on the broader context of "capabilities" and emphasizing non-cognitive skills. Their research underscores the multifaceted nature of human capital formation, influenced by both personal traits and external factors like environmental conditions and early interventions. The study by Ma and Wang (2014) supports this view, showing that factors such as education, training, and health are integral to the development and acquisition of human capital, which also depends on institutional frameworks, incentives, and financial resources.

Zhou (2015) expanded the concept of human capital to include its economic value and the investment in non-cognitive skills, challenging the standard assumptions of the "Vallas model". This expanded view considers human capital in terms of investment and returns, including education, training, and health, and future benefits (Heckman, 2000). However, this approach also critiques the traditional Walrasian model's assumptions, like unbalanced economic growth and incomplete contracts, to recognize the broader value of human capital beyond mere production capabilities. This includes not only an individual's productive capacity but also their level of effort and potential future earnings. As Bowles et al. (2001) discussed, the assessment of human capital encompasses both productive abilities and effort level, challenging traditional views on wealth disparities. Zhou's (2015) research shows the importance of investing in both cognitive and non-cognitive skills as essential components of workforce human capital.

Building on these findings, Heckman and Corbin (2016) developed the "dynamic complementarity model of skills", drawing on neurological research about human capabilities. This model suggests a mutual reinforcement between non-cognitive and cognitive skills (Cunha & Heckman, 2008). Heckman and Corbin (2016) further analysed the factors determining individual success, categorizing them into socio-emotional ability, cognitive skills, and health. Socio-emotional abilities include traits like personality, patience, trust, emotional management, and perseverance, while cognitive skills involve intelligence and problem-solving abilities. The health dimension covers physical, mental, and overall well-being (Guo & Qu, 2019).

4. Research on leisure time allocation and human capital accumulation

The concept of a leisure economy has garnered significant recognition among academic researchers in recent years. There is a consensus in scholarly literature that active engagement in leisure activities offers numerous benefits. These include not only the enhancement of physical and mental health but also the development of knowledge and personal characteristics (Yu, 2002; Wang & Ye, 2005). Furthermore, research has suggested that participating in high-intensity leisure activities can positively impact various aspects of an individual's personality, including spirituality and creativity (Mannell, 2007; Wei & Yu, 2011). This study explores the effects of how leisure time is allocated on human capital development, utilizing the framework of the new human capital theory. This theory particularly focuses on understanding how leisure time allocation influences both cognitive and non-cognitive skills.

The role of leisure time in shaping cognitive abilities within human capital has evolved in perception

Historically, leisure was seen as a period where human capital was not involved in productive activities, contributing little to production efficiency. However, the significance of leisure time in relation to human capital and labour productivity has gained recognition in economic studies, as evidenced in the research on the leisure economy (Rojek, 2000; James, 2010). The effect of leisure time on cognitive abilities can be examined from both direct and

indirect perspectives. Various studies have provided empirical evidence supporting the idea that leisure time positively influences cognitive function. Activities like sports, reading, and socializing have shown beneficial impacts on learning effectiveness and performance, potentially leading to improved educational and training outcomes (Wei, 2018a). Regular engagement in sports and physical activities not only improves physical well-being but also demonstrates the direct influence of leisure time on human capital.

Regular participation in active leisure activities like sports and exercise are known to have favourable effects on both mental and physical health (de Bloom et al., 2012). Moreover, involvement in active recreational activities can enhance social interaction and cooperative skills, thereby improving professional effectiveness (Monte, 2008; Rooth, 2011).

Leisure time allocation can indirectly affect an individual's general well-being and emotional state, which in turn impacts learning and work performance. Engaging in leisure activities can help individuals alleviate stress, anxiety, and strain from demanding work roles, thereby improving overall welfare. Activities promoting mental and emotional peace are particularly beneficial. Psychologists suggest that leisure activities can foster a state of positive mental well-being and reduce resource depletion caused by negative emotional states and enhancing societal efficiency (Wei, 2005). Lu and Hu (2005) argue that leisure activities requiring higher skill and effort, like competitive sports, can improve workers' productivity in terms of capital output. Research in psychology, neuroscience, and management supports the idea that cognitive performance and productivity are boosted by well-being and positive emotions (Rothbard & Wilk, 2011).

The effect of leisure time allocation on the non-cognitive skills of human capital

As Wang et al. (2020) have identified, engaging in leisure activities positively impacts non-cognitive abilities of human capital, and particularly affects traits like personality and emotions. Echoing Cao (2007) it is proposed that involvement in leisure activities such as travel, socializing, and physical fitness can enhance human capital attributes including willpower, responsibility, and creativity. Gunter's (1987) research on leisure experiences highlights that participation in active sports and health-promoting activities can stimulate innovative and exploratory thinking. This effect is attributed to the psychological concepts of 'Flow' and 'Peak Experience', experienced during challenging leisure pursuits, which can notably enhance an individual's creativity in the workplace.

The impact of leisure activities on non-cognitive skills has also garnered interest in educational research. Engaging in enriching leisure activities, which include learning new things and relaxing the mind, can improve individuals' cognitive and volitional capacities. As noted by Wei & Yu (2011), these activities positively influence spiritual and volitional aspects, thus fostering human capital development. Furthermore, the broader societal effects of engaging in enjoyable leisure activities are widely recognized. Activities that enhance self-control and creativity significantly contribute to societal progress in innovation and technology (Wei, 2018b; Xia et al., 2021).

Knudsen et al. (2006) provide evidence that early positive interventions can modify neural circuitry, thereby improving genetic aspects of human personality. This underscores the importance of early intervention strategies, like engaging in enjoyable and exploratory leisure activities during childhood and adolescence, in shaping personality traits and non-cognitive skills.

The intersection of fields such as behavioural economics, psychology, and management has provided economists with valuable insights into how leisure time allocation affects human capital. Understanding human capital accumulation involves considering how time is allocated to education, work, and training. Additionally, active engagement in leisure activities can beneficially influence both cognitive and non-cognitive skills associated with human capital, through direct and indirect means.

Creating New Human Capital During Leisure Time

Traditional human capital theory focuses on the formation of human capital through education, on-the-job training, and health, often overlooking the accumulation of human capital during leisure time. This is primarily because economic research is usually rooted in a specific historical context, and the classical theory of human capital emerged during the

industrial society. Caballé and Santos (1993) were among the first to address the concept of time in discussing the transitional dynamics of the Lucas model but still treated leisure time as a substitute for work time. These studies typically incorporate “work-leisure choice” (i.e., labour supply) into endogenous growth models, treating leisure as an independent variable unrelated to human capital accumulation, referred to as “Raw Time” or “Unqualified Leisure” (Ortigueira, 2000). In contrast, Quality Leisure is leisure time related to the accumulation of human capital (Ortigueira, 2000; Gómez, 2008). Socio-economists, differing from traditional economists, were the first to notice that the accumulation of human capital increasingly relies on informal education during leisure, such as interest learning, broadening horizons, and character shaping. They discovered that the value of leisure lies not in itself but in what it can accomplish. Consequently, traditional “Unqualified Leisure” has been replaced by “Quality Leisure” (Ortigueira, 2000). Interdisciplinary research from sociology, psychology, and management studies confirms the existence and effectiveness of Quality Leisure. Health and active leisure activities can make individuals highly engaged, feel fulfilled, forget the passage of time, and stimulate creativity, a sense of exploration, and a spirit of adventure (Gunter, 1987). Like work and educational activities, leisure activities become an integral part of an individual’s qualities, especially in modern society, where meaningful learning is most likely to occur during leisure experiences (Csikszentmihalyi, 1981). The enhancement of non-cognitive qualities through leisure is referred to as the “Learning by Playing” effect (LBP) (Wei & Pang, 2012).

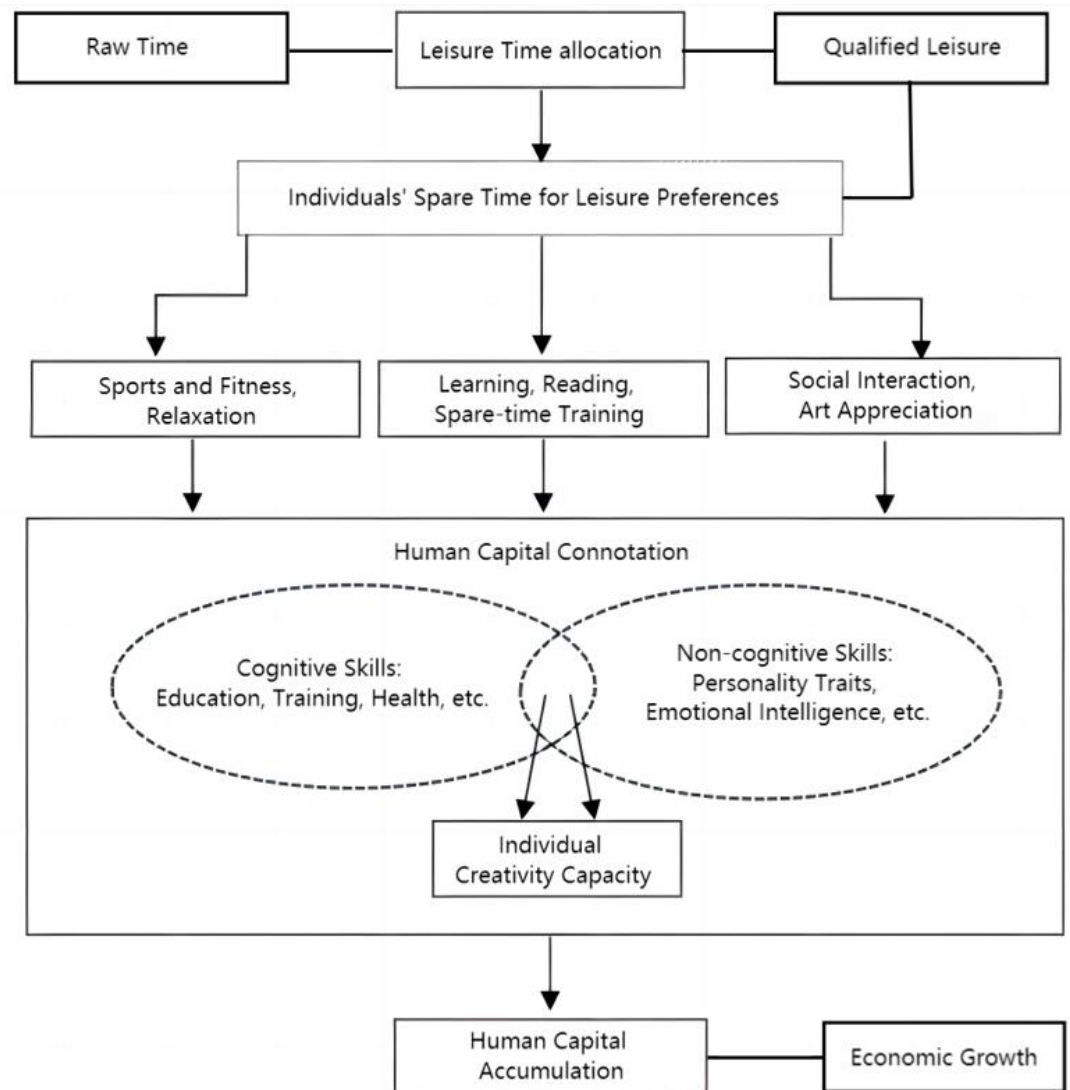


Figure 1. Mechanism of leisure time allocation and human capital accumulation. *Source: Author's own development*

The positive relationship between leisure and economic growth has not been sufficiently recognized due to the weak understanding of new human capital in leisure. Lucas (1988) divided the role of human capital into internal and external effects. The former refers to an individual's human capital improving their own productivity and earnings, while the latter means that the average level of human capital can enhance the productivity of all factors of production. However, this distinction overlooks an important issue: activities during leisure time also have similar internal and external effects on the formation and accumulation of human capital. Therefore, it is necessary to consider the role of leisure in economic growth models. Economic historians observed that from 1860 to 1990, the leisure time of American workers increased by about 25 hours per week, mainly spent on activities like watching TV and visiting libraries. However, these leisure hours were not included in official national economic statistics, which led to an underestimation of economic growth (Fogel, 2000). To explain and explore this underestimated growth, economists began to recognize that human capital factors were inherent in leisure, and attempted to incorporate leisure time, as an exogenous variable affecting the quality of human capital, into endogenous economic growth models (Ortigueira, 2000). Research finds that the new human capital formed through leisure learning is particularly important in modern economic society and may become the main pathway for future human capital accumulation. Unfortunately, related research has not yet internalized leisure to clarify its causal relationship in human capital accumulation. To address this gap, this study not only considers leisure and human capital as a "combination" but also explores the path of internalizing leisure in the accumulation of human capital.

The study also presents an overview of the mechanism by which the distribution of leisure time influences cognitive and non-cognitive skills, as well as the accumulation of human capital, as shown in Figure 1.

5. Conclusions

The difficulties faced by traditional human capital theory should not be seen as signs of its ineffectiveness or outdatedness. Rather, these challenges and questions act as vital drivers for the thorough review and reshaping of conventional human capital theory. Additionally, the fresh viewpoints and ideas emerging from these challenges provide important additional contributions to current human capital theory. These issues and inquiries have acted as impetuses for the progress of human capital theory, leading to significant research that contributes to its further evolution.

The emphasis and recognition of non-cognitive skills within human capital theory mark a crucial progress in understanding its dynamics

The importance of non-cognitive skills, such as personality traits and preferences, has been highlighted and recognized as a vital component of human capital, alongside traditional cognitive skills like education and training, as noted by Li and Zeng (2012) and Heckman and Kautz (2013). Heckman and Rubinstein's (2001) research demonstrated a significant link between non-cognitive skills and individuals' educational achievements and income levels. This is especially pronounced in those with limited cognitive capabilities, where non-cognitive skills have a more substantial impact on earnings and job stability. Li and Zeng (2012) further contributed to this field by introducing an innovative human capital theory that integrates both cognitive and non-cognitive skills under a broader concept of capabilities. This holistic approach underscores the multifaceted nature of human capital, acknowledging that a blend of both cognitive and non-cognitive skills is essential for individual success and development.

Proponents of human capital theory now acknowledge personality traits as distinct and integral components

Heckman and Kautz (2013) suggested that viewing an individual's personality as an ability, rather than merely a trait, is a more fitting conceptualization. Personality abilities, akin to cognitive and practical skills often gained through formal education and knowledge acquisition, have the unique capacity to independently confer benefits to individuals. In this modern understanding, human capital encompasses a blend of knowledge, skills, personality

traits, and physical well-being. Researchers in this domain have identified key personality elements such as responsibility, self-discipline, loyalty, and social skills. Studies, including those by Xia et al. (2021) and Lleras (2008), have found a strong link between positive personality traits and various outcomes like educational success, labour market performance, health status, and criminal behaviour rates. These traits, unlike knowledge skills typically acquired through formal education and training, are primarily developed through life experiences and personal growth. Moreover, the influence of family, educational, and social environments on personality development has been emphasized, with early childhood education being particularly highlighted for its cost-effectiveness in fostering character development. Lleras (2008) used various leisure behaviours, such as participation in sports, academic groups, and artistic activities, as proxies for character levels. The findings from this study showed a significant association between a robust personality and higher levels of future life achievements and cognitive skills, compared to individuals with lower levels of personality traits. These insights underscore the multifaceted nature of human capital, where cognitive skills, knowledge acquisition, and personality development collectively contribute to an individual's overall capabilities and potential.

Indeed, global research acknowledges the positive impact of leisure time on human capital development

Yang (2003) suggests that individuals can enhance their human capital by using leisure time to engage in activities that foster knowledge acquisition and develop physical health. This concept aligns with the idea of return on investment, where younger individuals often prioritize knowledge enhancement, while older people tend to focus on health-related hobbies. The relationship between leisure time and regional economic growth has been substantiated through empirical studies by Wei (2005) and Yu (2002). These studies show that leisure time can boost regional economic growth by enhancing individual labour productivity through the cultivation of human capital. Chen (2010) further supports this view, arguing that participation in active and healthy leisure activities positively impacts sustained economic growth. This is attributed to the fact that such leisure activities contribute significantly to both physical well-being and educational development. James (2010) explores the effect of changes in how residents allocate their time, emphasizing that a shift towards more leisure and travel can positively influence a nation's economic growth. His analysis reveals that an increased proportion of time devoted to leisure and travel correlates with improved efficiency in producing social goods and services. This research collectively underscores the value of leisure time not only for personal human capital development but also for broader economic and societal benefits.

The concept that human capital acquisition is closely tied to how individuals allocate their time is a significant aspect of modern economic theory

Arrow's seminal work in 1962 laid the groundwork by asserting that knowledge acquisition is heavily dependent on real-world experiences. He emphasized that technological progress and productivity improvements stem largely from practical knowledge gained through experience, particularly highlighting the role of "Learning by Doing" in enhancing the workforce's skills, a key component of human capital.

Lucas (1988) further developed this concept within the endogenous growth model framework and introduced the idea of "Learning by Schooling" as a critical driver of human capital acquisition. According to Lucas, the rate at which human capital is acquired is directly related to the time invested in educational pursuits. He postulated that human capital accumulation is constant, regardless of changes in working hours. However, the "Learning by Doing" model suggests that human capital accumulation is significantly influenced by the number of hours spent working.

In a subsequent study, Lucas (1990) differentiated between intrinsic and extrinsic effects in human capital development. The intrinsic effect is linked to time spent on formal education, while the extrinsic effect encompasses the "Learning by Doing" aspect derived from practical work experience. The internal impact of human capital formation hinges on time allocated to formal education, and the external impact is tied to the acquisition of practical experience through employment. In the context of the shift towards a "Post-industrial Society,"

the importance of balancing time between work, personal life, and leisure activities has become more pronounced. This societal shift, characterized by an emphasis on individualized lifestyles, blurs the traditional lines between labour and leisure. Consequently, the value of non-work time, or leisure time, along with informal education, is increasingly recognized as vital sources of creativity and contributors to human capital. Wang et al. (2020) encapsulate this idea as “Learning by Playing,” highlighting the significance of leisure time in the human capital acquisition process. Thus, the acquisition of human capital is contingent upon how individuals allocate their time across various activities such as education, employment, and leisure. Different allocations of time lead to varying levels of human capital and influence the effectiveness of human capital’s accumulation.

Promoting the high integration of culture, tourism, sports, and entertainment for exploring new pathways for human capital accumulation

The “Learning by Playing” effect’s contribution to economic growth opens up possibilities of exploring different pathways of human capital accumulation. New business models created by informal education are vital carriers for the formation of new human capital. Informal education activities like online education, home entertainment, sports recreation, and art appreciation conducted during leisure time become effective means to break through conventional educational methods and form new types of human capital. For this purpose, as a start, optimizing the talent cultivation system is essential. Education departments should prioritize the role of informal education in accumulating human capital. In educational practice, establishing a dynamic talent cultivation system with good resilience and social adaptability is crucial to ensuring the effective connection and coordination between formal and informal education, thereby collectively enhancing the quality of individual human capital. Secondly, it is important to vigorously promote the integration of industries and to explore the establishment of leisure complexes integrating culture, tourism, sports, and entertainment. An important pathway for informal education to impact human capital accumulation is to realize the “Learning by Playing” effect during leisure time, and the highly integrated formats of culture, tourism, sports, as well as entertainment and leisure venues are the main carriers for the formation of new human capital.

Advancing the “Work-Leisure Balance” to break through the development bottlenecks of new human capital

A work-leisure balance helps reduce worker stress, makes work more enjoyable, and increases job satisfaction. Ultimately, only by achieving a good balance between work and leisure can people have the desire and ability to seek the development and accumulation of new human capital, breaking through development limits. From an international perspective, many feasible policies can help citizens achieve a work-leisure balance and are worth considering. Specifically, it is advisable to resist the culture of excessive overtime that depletes resources, it is advisable to create “Family-Friendly” work environments and encourage large enterprises with a capacity to introduce policies like “Childcare Strategy”. It is likewise important to enhance citizens’ leisure purchasing power and thereby improve the quality of leisure activities. Establishing “Family-Friendly” work environments and attempting to implement “Childcare Strategies” not only fully leverage the value of leisure time in enhancing human capital but also significantly improve the “Work-Leisure Balance” situation, which thereby increases life satisfaction.

6. Future research perspectives

The most recent developments in human capital theory have mostly concentrated on two key domains: the integration of non-cognitive skills into the prevailing framework, and the exploration of how the distribution of leisure time impacts both cognitive and non-cognitive skills within the realm of human capital. The objective of these advancements is to clarify the fundamental elements that contribute to the development of human capital, a process that has traditionally been viewed as intricate and obscure. Additional investigation is necessary to substantiate the impacts of the allocation of leisure time on the cognitive and non-cognitive

skills of individuals' human capital. This preliminary inquiry highlights the need for more research that incorporates relevant perspectives from the disciplines of economics, psychology, and management. The examination of the impact of how individuals allocate their leisure time on the development of human capital necessitates a micro-level analysis. Moreover, it is crucial to obtain accurate data pertaining to the impact of leisure time distribution on human capital through the utilisation of insights derived from psychological studies.

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