Федеральное государственное автономное образовательное учреждение высшего образования «Уральский федеральный университет имени первого Президента России Б. Н. Ельцина»
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На правах рукописи

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ПОВЫШЕНИЕ ПРОИЗВОДИТЕЛЬНОСТИ ТРУДА ПОСРЕДСТВОМ РАЗВИТИЯ ПРЕДПРИНИМАТЕЛЬСКИХ КОМПЕТЕНЦИЙ СОТРУДНИКОВ

5.2.3 Региональная и отраслевая экономика

(экономика народонаселения и экономика труда)

ДИССЕРТАЦИЯ

на соискание ученой степени кандидата

экономических наук

Научный руководитель:
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As a manuscript

Zuo Wenjun

INCREASE LABOR PRODUCTIVITY THROUGH THE DEVELOPMENT OF EMPLOYEES' ENTREPRENEURIAL COMPETENCIES

5.2.3 Regional and sectoral economics

(population and labor economics)

DISSERTATION

for the degree of candidate of

economic sciences

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INTRODUCTION

Relevance of the research topic. The emergence of a new stage of neo-capitalism marks the beginning of the post-labor era [229], which is characterized by a decrease in job stability, an increase in expectations of continuous professional activity and a widening wage gap [252]. In the post-employment era, the role of the qualitative characteristics of labor resources increases significantly, since it is the high quality of personnel that allows organizations to achieve entrepreneurial goals and adapt to the changing dynamics of the labor market.

An important factor in maintaining market positions and competitiveness of labor resources in the modern economic landscape is the development of methods of generating new knowledge and production methods based on entrepreneurial principles [268], which is unachievable without the formation of entrepreneurial competencies of employees.

The new profit model, in contrast to the one based on economies of scale, is based on maintaining competitiveness through entrepreneurial orientation, innovation and proactive intrapreneurial behavior. Commercial organizations, seeking to increase labor productivity, develop the entrepreneurial competencies of employees, support the creation of new intra-company businesses, stimulate organizational transformations and updates [283].

In addition, in the current economic environment of ongoing technological progress and the pervasive impact of digital transformation, there is a need for a critical reassessment of the category of labor productivity and the characteristic of labor relations [10]. For employees striving for self-realization in the workplace, the possibility of realizing the "entrepreneurial self" in the labor process is also important [166]. Considering the changes taking place in the labor market involves an awareness of the need to develop entrepreneurial professional competencies of employees that meet the goals of the organization [148], the requirements of consumers [298], as well as the growth of the welfare of society.

Thus, understanding the nature and dynamics of the formation of qualitative

characteristics of labor resources, such as entrepreneurial competencies, constitutes a critical component of an effective human resource development system aimed at enhancing labor productivity.

The degree of scientific development of the problem. The dissertation identifies three major directions in the scientific development of the research problem. First, the theoretical foundations of the dissertation's subject area are examined, including labor productivity theory, studies on the qualitative characteristics of labor resources, the conceptual framework of entrepreneurial competency development, the evolution of the notion of employee intrapreneurship, theories of entrepreneurial orientation, and research on the interplay between creativity, innovation, and productivity in human resource development, etc. Second, empirical research on the dissertation's topic is addressed, encompassing case studies on employees' entrepreneurial competencies, findings from sociological studies that reveal correlations between labor productivity and employee intrapreneurship, as well as between entrepreneurial orientation and intrapreneurial behavior, and results from comprehensive labor market analyses under contemporary conditions. Third, the dissertation explores methodological approaches, including quantitative techniques for measuring the impact of labor resource characteristics on productivity and organizational competitiveness, qualitative methods for analyzing the dynamics of employees' entrepreneurial behavior, and mixed-method research designs to assess the role of competency-based employee traits in organizational development.

Entrepreneurial competencies as qualitative characteristics of labor resources were studied in the works initiated by Mitchelmore S., Sánchez, Z., Bird B., Troshina E.P, Trusova L.A., Pervakova E.E., Safronova G.V., Anokhin S.A., etc.; The evolution of intrapreneurship as a human resource development practice was studied in their works initiated by Hisrich R.D., Parker S.K., Antoncic B., Elert N., Stenkula M., Carrier C., Wennekers S. and De Jong J., Gündoğdu M., Pinchot G., Chistyakova. O. V. Guskova I.V., Anisimov. Yu. P., Manchuk E.P., etc.; the theory of entrepreneurial orientation at different levels was studied by Covin J. G. and Slevin D.P., Miller V. D., Lumpkin G. T. and Dess G., Clark D. R., Shirokova. G. V., Bogatyreva. K. A.,

Poznyakov. V. P., etc.; the interplay between creativity, innovation, and productivity in the field of human resources development was theorized by Schumpeter J.'s theory on economic development, Von Mises's Australia economic traditions and his theory on profit, loss, human action, Reich R. B.'s proposition on labor well-being and productivity in the new economy, Paul Romer's endogenous growth theory's emphasis on the driving role of human capital, innovation, and knowledge in economic growth, knowledge spillover theory of Entrepreneurship, Teresa Amabile's componential theory of creativity, and her contribution on how individual creativity contributes to organizational innovation and productivity, Nekhoda E. V., Nedospasova O. P., Bagirova. A. P., Kelchevskaya. N.R., Antropov V. A., Kozlova. O. A., Panikarova S. V., and others' research on the role of human capital in economic performance at national, regional and organizational level. The patterns of the relationship between labor behavior and productivity have been analyzed through principal-agent theory in institutional economics, trait activation theory by Tett R.P. and Guterman H.A, social information processing theory by Salancik G.R. and Pfeffer J., theory of planned behavior by Ajzen I., Social identity theory by Ashforth F. and Mael B.E., as well as studies on employee motivation, competencies, and work behavior conducted by Koulkova I. A., Ryzhikova M.I., Pletnev. D. A., Isaev. A. P., etc.

Case studies on intrapreneurship were studied by Skovvang C. K., Badoiu G. A., Alireza F. S., Azis P., Cerón Ríos, Smith L., Deprez J., Islamov A. I., etc. Surveys investigating the correlation between labor productivity and intrapreneurship were so far done by Akaev A. A. and Sadovnichii V. A., Probst T. M., Liu L., Hayton J. C., Kelley D. J., Rauch A., Foss K., Brush C. G., Zhang Z., Cardon M. S., Kim K. C., Shakhovskaya L. S., Bubenyok E. A., etc. The relationship between entrepreneurial orientation and intrapreneurship were so far done by Kraus S., Bouchard V., Rigtering C., Perez J. P., etc. Comparative analyses across different sectors, regions or countries were done by Carrier C., Antoncic B., Bosma N. S., Balasi A., Urbano D., etc.

Measurement method, questionaries design, and the employment of research methodology in this thesis was insight by works such as Nunnally J., Bernstein I., Podsakoff P. M., Hinkin T. R., Parameswaran R., Yaprak A. Data preprocessing and

initial exploration was potentially referred to the works by Bedeian A. G., Yu X. Y. Specific hypothesis testing method and data processing was referred to Hayes A. F., Edwards J. R., Parry M. E., Bernerth J. B., Aguinis H., Hair J. F., Fornell C., Larcker D. F., Garson G. D.

The relevance of this research problem, coupled with the scarcity of scientific studies examining the role of employees' entrepreneurial competencies in enhancing labor productivity, has driven the selection of this research direction. The significance of the topic has served as the foundation for defining the study's objectives and research questions, as well as for establishing the subject and object of the dissertation.

The purpose and objectives of the study. The purpose of this dissertation study is to identify the factors and substantiate the pathways for enhancing labor productivity within organizations through the development and strengthening of entrepreneurial competency characteristics among the labor resources. To achieve this general goal, the study sets the following tasks:

1. To substantiate the theoretical foundations of the concept for developing employees' entrepreneurial competencies as a strategic reserve for enhancing labor productivity in modern organizations.
2. To develop a methodological approach for investigating entrepreneurial competencies and assessing their contribution to the formation of a competitive workforce in the contemporary economy.
3. To identify patterns in the dynamics of employee efficiency and labor productivity in the context of the influence of entrepreneurial competencies.
4. To formulate policy directions for human resource development through the cultivation of entrepreneurial competencies, aimed at improving labor productivity and enhancing the competitiveness of employees in modern organizations.

The object of study. The object of this study is the process of changes in labor productivity influenced by the development of employees' entrepreneurial competencies.

The subject of the study. The subject of the study is the socio-labor relations that arise during the formation of entrepreneurial competency characteristics, aimed at

enhancing productivity and efficiency within organizations.

Research site. The study employed a sample of employees from commercial enterprises in the People's Republic of China (PRC). The stage of China's economic development can be considered as in the transition from a labor-intensive economy to an innovative one. Since 2015, the government has been implementing the policy of "Mass Entrepreneurship and Innovation", which identifies the development of entrepreneurial competencies in the labor force as a key objective, and in 2024, the concept of a "new type of productivity" was proposed[1], shifting focus toward innovation-driven productivity reserves, as opposed to traditional models of growth and development.

Research Area. This dissertation research is carried out in specialty "5.2.3 – Regional and sectoral economics (population and labor economics)" of the Passport of Scientific Specialties VAK (Economic Sciences) within the scope of research area in the following sections:

8.13. Quantitative and qualitative characteristics of labor resources. Human capital and its characteristics.

8.15. Labor productivity and efficiency: essence, dynamics, measurement methods, factors and growth reserves. Employee incentives and compensation.

8.16. Issues of professional competence formation, training, retraining and advanced training of personnel. The formation of employee competitiveness. Professional orientation of the population.

The theoretical and methodological foundation. The theoretical and methodological foundation of the study is the provisions of the theories of labor economics, the theory of entrepreneurship in terms of the study of entrepreneurial competencies and organizational entrepreneurship, human capital theory, as well as the results of fundamental and applied research on human resource management, productivity and intrapreneurship. The study is based on existing and new methodological approaches. To test hypotheses, sociological surveys with

[1] Full text: Resolution of CPC Central Committee on further deepening reform comprehensively to advance C hinese modernization [Electronic resource]. URL: https://english.www.gov.cn/policies/latestreleases/202407/21/cont ent_WS669d0255c6d0868f4e8e94f8.html (accessed: 26.11.2024).

questionnaires based on recognized scales were used. Data analysis includes correlation analysis, regression analysis, ANOVA, mediation effect and nonlinear relationship tests using MPLUS 8.3 and SPSS 26.0 software products.

Information Base of the Dissertation Research. The information base of the study includes official statistical data of the National Bureau of Statistics of China, data from international analytical and information agencies, publications in scientific periodicals and conference proceedings, monographs of scientists. The dissertation includes one preliminary study and two separate series of empirical studies, each based on independently collected data. For the preliminary study, 170 valid responses (with a valid response rate of 86.29%) were received between August and September 2024 through the paid data collection platform Credamo. The first series of studies included 261 valid responses (with a valid response rate of 93.89%) obtained primarily from small and medium-sized enterprises in Shanghai and Shenzhen between January and March 2023. The second series of studies is based on 292 valid responses (with a valid response rate of 82.71%) from Chinese private sector workers collected between June and July 2023 through an online survey distributed through the social media platforms WeChat and Douban, as well as using the Tencent Survey survey tool.

Scientific Novelty of the Dissertation Research. scientific novelty lies in the development and supplementation of theoretical, methodological and practical approaches to increasing labor productivity in commercial organizations through the formation and development of entrepreneurial competencies of employees, namely: Firstly, on the basis of the author's decomposition of entrepreneurial competencies expressed through the entrepreneurial orientation of the individual and organizational levels and intrapreneurial behavior to create strategic organizational renewals and new business projects, a quantitative methodology for assessing the impact of entrepreneurial competencies on labor productivity has been developed and tested. Secondly, the factors of the formation of entrepreneurial competencies are identified and the patterns of their mutual influence and development are revealed, which made it possible to formulate recommendations for increasing the competitiveness of labor resources both at the micro and macro levels of the economy.

The obtained results broaden the scholarly understanding of the contribution of labor force qualitative characteristics to labor productivity and organizational effectiveness. In contrast to existing studies, the author's approach enables a comprehensive investigation of the role of entrepreneurial competencies in labor productivity and reveals patterns in their development. These findings provide a basis for designing evidence-based interventions aimed at enhancing employee competitiveness and productivity within dynamically evolving labor market conditions.

The provisions of the dissertation work for defense:

1. The parameters of qualitative characteristics of human resources have been expanded by incorporating employees' entrepreneurial competencies—specifically, individual and organizational entrepreneurial orientation, as well as intrapreneurial behavior (intrapreneurship). It is substantiated that the level of professional entrepreneurial competence and the extent of its application in work activities lead to increased labor productivity and improved organizational efficiency (p. 8.13 and 8.15).

2. A methodological framework has been developed for modeling the influence of entrepreneurial competencies on labor productivity and organizational effectiveness. This framework extends existing methods for analyzing the qualitative characteristics of human resources and enables the identification of potential reserves for enhancing competitiveness through the stimulation of entrepreneurial orientation and intrapreneurial behavior among employees (p. 8.13 and 8.16).

3. The patterns of the formation of entrepreneurial orientation in the context of demographic and socio-psychological factors have been identified. These findings deepen the understanding of the transformation of professional qualitative characteristics of labor resources in the modern economy and complement existing knowledge about the development of positive work attitudes and intrapreneurial behavior in terms of employee competitiveness (p. 8.15 and 8.16).

4. Directions for increasing labor productivity have been developed through the formation and development of entrepreneurial competency characteristics within the workforce. These strategies consider the patterns of interaction and mutual influence of the three core components of entrepreneurial competencies: organizational

and individual entrepreneurial orientation, and intrapreneurship, contributing to the enhancement of workforce competitiveness (p. 8.15 and 8.16).

The theoretical significance of the study consists in filling the gap in the study of the contribution of qualitative characteristics of labor resources, namely entrepreneurial competencies, to labor productivity and organizational efficiency of commercial organizations. An interdisciplinary theoretical approach to the study of entrepreneurial competencies and their role in increasing productivity and competitiveness of the economy is proposed.

The practical significance of the study lies in: 1) the development of recommendations for identifying endogenous resources for increasing labor productivity through the development of entrepreneurial competencies of employees, stimulating intrapreneurship and entrepreneurial orientation; 2) in the development of recommendations for state and municipal government bodies participating in the formation and implementation of economic policy; 3) the materials of the dissertation research can be used in the educational process of universities in the training of bachelors, specialists and masters in the areas of "Economics".

Degree of reliability. The reliability of the research results is confirmed by the consistency of the obtained results with the conclusions of previous studies, positive approbation of the research results at relevant conferences and publication of articles in rating journals, use of theoretical and statistical data from reliable sources. The measurement tools used are based on well-established scales with proven reliability and validity. To ensure the data's suitability for hypothesis testing, composite reliability, convergent validity, and discriminant validity were assessed according to Hair's recommendations [130]. Demographic variables such as age, gender, education, and income were controlled [45]. Subject matter experts conducted peer reviews of the evaluation design, data collection, and analysis methods, providing critical feedback that enhanced the study's rigor. The reliability of the study is also confirmed by comparison and discussion of the results obtained with the finding of previous research on the topic of the dissertation, positive approbation of research results at relevant conferences and publishing articles in rating journals.

Approbation of Research Results. The results of the thesis were presented and positively approbated at the following international scientific conferences: XXII International Conference of Young Scientists “Development of territorial socio-economic systems: issues of theory and practice”, Ekaterinburg, Russian, 2025; XIX International Conference "Russian Regions in the Focus of Change” (session: PhD Research Pitch competition), Ekaterinburg, Russian, 2024; XIX International Conference "Russian Regions in the Focus of Change” (session: New Challenges for Management in Times of Uncertainty), Ekaterinburg, Russian, 2024; XII International Conferences “New Economic Reality: The Economic Consequences of Social and Demographic Transition”, Bijeljina, Bosnia and Herzegovina, 2024; IX International Scientific and Practical Conference “Strategies for the Development of Social Communities, Institutions and Territories”, Ekaterinburg, Russian, 2023.

This dissertation work is conducted under the grant from the China Scholarship Council for the project "Labor Productivity and Creativity in the New Economy: An Intrapreneurship Perspective" (2023-2025, project № 202310100005). The results of the dissertation are utilized in the educational process of Ural Federal University named after the first President of Russia B.N. Yeltsin.

Publications of research results. The main provisions and conclusions of the dissertation research are reflected in 10 scientific publications, of which 8 articles were published in peer-reviewed scientific journals determined by the Higher Attestation Commission of the Russian Federation and the Attestation Council of UrFU, including 3 articles published in journals indexed in the Web of Science or Scopus database. The total volume of publications is 8,37 printed sheets, of which 5,04 are author's printed sheets.

The personal contribution of the candidate consists in advancing the conceptualization of employees' entrepreneurial competencies as an integrative construct combining entrepreneurial orientation and intrapreneurship within the framework of labor resource qualitative characteristics research; demonstrating their substantive role in labor productivity enhancement; and developing and validating analytical methodologies for assessing the impact of entrepreneurial competencies on

work performance outcomes. These methodologies enable the identification of systematic patterns and the formulation of evidence-based recommendations for developing professional competencies in labor resources aligned with contemporary economic requirements.

Dissertation Structure. The dissertation consists of an introduction, three chapters, a conclusion, a bibliography of 318 references, and 5 appendixes. The main content of this candidate thesis is presented on 198 pages (150 pages excluding the reference and appendix pages) and includes 19 figures and 42 tables.

The introduction outlines the relevance of the topic, the degree of scientific exploration in the area, the purpose and objectives of the study, the research object and subject, the scope of the investigation, theoretical and methodological foundations, the information base, as well as the scientific novelty and the theoretical and practical significance of the dissertation.

The first chapter expands the parameters of the qualitative characteristics of labor resources through the including of entrepreneurial competencies in terms of entrepreneurial orientation and employee entrepreneurship and approbates their role as growth reserves for labor productivity and efficiency through empirical study. The implementation of the proposed theoretical approach makes it possible to analyze and evaluate the impact of employees' entrepreneurial competencies on labor productivity.

The second chapter presents the methodological and empirical results of the development of employees' entrepreneurial competencies in terms of employee intrapreneurship and entrepreneurial orientation. It includes two series of study: individual entrepreneurial orientation as a professional orientation, its incentivization and role in the development of employee intrapreneurship; interaction between organizational entrepreneurial orientation and individual entrepreneurial orientation and its impact on employee intrapreneurship.

The third chapter develops a human resource development system with recommendations for increasing labor productivity by stimulating intrapreneurship and entrepreneurial orientation at the micro and macro levels of the labor market.

The conclusion synthesizes the key background, research questions and findings

of the study. It also offers recommendations and discusses avenues for future investigation.

CHAPTER 1. THEORETICAL FOUNDATIONS OF RESEARCH ON EMPLOYEES' ENTREPRENEURIAL COMPETENCIES AS A RESERVE FOR LABOR PRODUCTIVITY GROWTH

1.1 The transformation of the characteristics of labor resources and the role of entrepreneurial competencies in the modern economy

The purpose of Section 1.1 is to justify the need to include entrepreneurial competencies in the composition of qualitative characteristics of labor resources to improve the efficiency of their use. The objective determined the need to solve the following tasks: (1) to consider the factors of labor resources efficiency and their quantitative and qualitative characteristics in modern economy; (2) to expand the parameters of qualitative characteristics of labor resources determining labor productivity by including entrepreneurial competences in their composition; (3) to define entrepreneurial orientation and intrapreneurship of employees, respectively, as content and behavioral aspects of entrepreneurial competences.

The quantitative and qualitative characteristics of labor resources to their effective utilization has changed significantly in modern economy [171]. The classical economic perspective, dating back to Adam Smith [278] and David Ricard [253], conceptualized labor as a key factor of production alongside capital and land. Smith emphasized labor productivity as the driver of wealth creation, while Ricardo's theory of comparative advantage underscored the significance of labor specialization in economic growth. Building on classical foundations, Karl Marx [199] introduced a labor-centered view, arguing that labor is the primary source of value in the economy, with wages determined by social and economic power dynamics. Later, John Maynard Keynes [160] shifted the focus to labor demand, employment levels, and aggregate economic stability, highlighting the necessity of government intervention in labor markets. In the modern economy, labor resources are analyzed not only through traditional economic perspectives but also through Becker G. S.'s human capital theory [41], and Romer P. M.'s endogenous growth models [257]. These approaches emphasize the increasing importance of growing significance of qualitative labor

attributes as determinants of long-term economic growth and labor market efficiency [5].

Labor resources are characterized by a dynamic interplay between quantity (size of the workforce) and quality (competency composition, adaptability, and productivity) [132]. Quantitative characteristics of labor resources are critical in assessing the size and availability of labor in an economy. These indicators determine the overall supply of labor, which affects employment levels, economic output, and growth potential. Beyond numerical indicators, the quality of labor resources has become a defining factor in determining a country's economic competitiveness. Key qualitative attributes include competency, education, adaptability, innovation potential, and health conditions. Labor resources are central to economic performance, but their importance extends beyond sheer numbers. The modern economy requires an optimal balance between quantity and quality in labor resources. While emerging economies may focus on increasing labor force participation and employment levels, advanced economies emphasize enhancing productivity through competency development, education and innovation. The challenge lies in ensuring that labor markets remain inclusive and adaptable, addressing both demographic shifts and technological disruptions by cultivating qualitative characteristics such as soft skills [4] and interdisciplinary competencies [1]. The literature suggests that human capital investments are the key bridge between quantity and quality [183]. Countries with shrinking labor pools compensate through automation, artificial intelligence, and productivity-enhancing strategies, while economies with expanding labor forces face the challenge of converting human capital potential into high-quality employment opportunities.

Especially, the concept of entrepreneurial competency as qualitative characteristics of labor resources in the workforce has evolved significantly, particularly as labor markets shift from industrial-based employment toward service- and knowledge-based industries [47]. The heightened emphasis on cultivating entrepreneurial competencies among organizational workforces is evidenced by the expanding scholarly attention and proliferation of academic publications within the employee intrapreneurship literature in recent years. For example, Farrukh and

Ghazzawi [110] summarized the publishing pattern in intrapreneurship research (see Figure 1.1). Their results show that the first publication in this area was in 1982, according to the Scopus database, and the number of publications has gradually risen per year since then. Especially, 2023 with 92 publications was the most productive year in terms of publications.

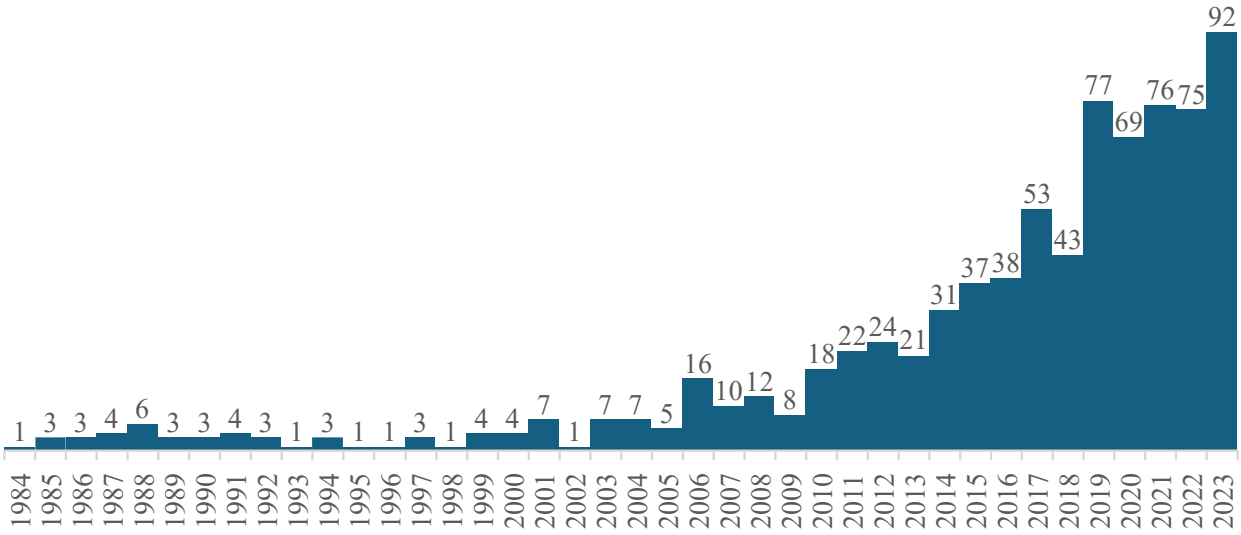


Figure 1.1 – The heightened emphasis on employee entrepreneurial competencies reflected in the pattern of labor relations research publications since the 1980s

Taking China as an example: according to the latest China Enterprise Innovation Survey Yearbook 2024 released by the National Bureau of Statistics of China (NBS)[2]: 36.9% of above-scale enterprises have established detailed innovation strategic objectives, among which 47.1% believe that increasing innovation investment is essential to enhance corporate competitiveness. Additionally, 90.5% of entrepreneurs acknowledge that innovation plays a significant or moderate role in enterprise production. Among above-scale enterprises, the lack of talent and brain drain are identified by entrepreneurs as the most critical factors hindering internal innovation. Meanwhile, survey results on the factors influencing successful innovation reveal that: High-quality talent (49.1% of respondents); Entrepreneurs with an innovative spirit (41.5%); Employees' sense of identification with the enterprise (28.6%); Internal incentive mechanisms (21.4%) are considered crucial factors for successful corporate

[2] Data source: Department of Social, Science, Technology and Culture Statistics, National Bureau of Statistics of China. China Enterprise Innovation Survey Yearbook. 2024 / Department of Social, Science, Technology and Culture Statistics, National Bureau of Statistics of China. — Beijing: China Statistics Press, 2024.

innovation and entrepreneurship. Moreover, its overall labor supply has continuously declined since 2015, and the labor market is facing severe skill mismatches. The employment share of the primary and secondary industry has declined significantly over the past decade[3], while the demand for high-skilled positions in the digital economy has grown annually. These official statistics highlight the substantial demand for a highly skilled and innovation-driven workforce with entrepreneurial competencies and indicate that Chinese enterprises urgently need to increase labor productivity through the development of employees' entrepreneurial competencies.

Early economic theories, such as those of Schumpeter J. A. [268], positioned entrepreneurship as the driver of economic progress through innovation and "creative destruction." However, more recent scholarship highlights that entrepreneurial characteristics are no longer confined to business owners; they are now expected within traditional employment settings [6]. Workers who demonstrate entrepreneurial competencies contribute to firm-level innovation, enhance productivity, and create value by adapting to market disruptions [269, 299]. Drucker P. F. was among the first to highlight the role of entrepreneurial thinking in organizations, arguing that the ability to innovate, be proactive, and take risks should be cultivated not only among entrepreneurs but also among employees [94]. This perspective laid the foundation for the concept of employee intrapreneurship, where workers behave entrepreneurially within corporate structures [243]. The increasing demand for entrepreneurial workers stems from the Fourth Industrial Revolution, characterized by automation, artificial intelligence, and the digital economy. Workers who possess innovative thinking, proactiveness, and risk-taking abilities are more adaptable to technological shifts and more capable of contributing to business transformation [254].

This shift can be attributed, in part, to the changing quantitative characteristics of labor resources in the modern economy. As labor forces become more dynamic, diverse, and technology-driven, the demand for entrepreneurial skills has intensified [53]. The changing demographics of the labor force are one of the most significant

[3] Data source: Department of Population and employment statistics. China Labor Statistical Yearbook. 2023 / Department of Population and employment statistics, National Bureau of Statistics of China, department of planning and finance, ministry of human resources and social security. — Beijing: China Statistics Press, 2023.

quantitative transformations impacting labor markets. A global trend of aging populations, particularly in developed countries, has altered the overall composition of the labor force, and brought pressure to maintain economic growth and productivity [196]. As the proportion of older workers increases, there is a rising need for workforce policies that encourage lifelong learning, skill development, and entrepreneurial behavior among all age groups [62]. Another key quantitative transformation in labor markets is the shift from full-time, permanent employment to more flexible, contingent, and gig-based work. The rise of platform and digital economies has created a significant shift in employment patterns, making traditional labor models increasingly obsolete [200]. This transformation reflects a broader trend where workers must be more entrepreneurial in their approach to employment, not only in terms of task execution but also in career development and personal branding.

The increasing demand for entrepreneurial competencies in the employment setting is also closely tied to the shifts brought by postmodernity and supermodernity, including the rise of the knowledge economy, flexible work arrangements, and changes in labor relations in the digital era [8]. These changes have fostered environments that support autonomy creativity, and employment flexibility [9], contrasting with the rigid hierarchical structures of the modern and pre-modern eras that previously neglected employee initiative. Additionally, theories like Karl Marx's alienation potentially highlight the need for employee intrapreneurship to empower workers and enhance innovation within organizations. Overall, the increasing demand for entrepreneurial competencies in the employment setting responds to the evolving nature of work by promoting employee engagement and organizational productivity in a rapidly changing economic landscape. Especially, Reich R. [252] in his propositions and analyses delves into the evolving nature of the characteristics of labor resources, well-being, and productivity in what he terms the "new economy." In his proposition of the new economy, there are two basic principles. The first principle is that choices are widening, and it’s becoming ever easier for buyers to switch and get a better deal. The second principle is that such breadth of choice and ease of switching is rendering all sellers less secure and more vulnerable to competitors - thus spurring innovation. In one word,

the economy is shifting out of stable large-scale production toward continuous innovation. Among the process, new technologies of communication, transportation, and information are the major driving forces. Under this background, Reich R. emphasizes the importance of skill development, adaptability and job design in the future of work, which is relevant to the need of entrepreneurial competencies from labor resources.

Entrepreneurial competencies are increasingly regarded as crucial parameters of the qualitative characteristic of labor resource and its individual characteristic and behavioral aspects [12]. The concept of "professional competency" has been extensively discussed in literature concerning human capital characteristics. A key focus of competency research is identifying enduring individual traits that contribute to success or performance in a job, and subsequently, within an organization [290]. Individual competencies refer to distinct sets or combinations of traits, including knowledge, skills, and personality characteristics, which are directed toward specific activities, processes, or outcomes [139]. Therefore, understanding the concept of "professional competency" requires examining two primary components: (1) individual characteristics and (2) observable behaviors in a given context. These components are closely interconnected, as individuals with specific traits are more likely to exhibit the expected behaviors in relevant situations. However, it is important to note that even individuals with certain traits may not always display these behaviors, as situational factors can influence the actual expression of expected behaviors.

Under this definition, Bird [47] suggests that entrepreneurial competencies are defined as underlying characteristics such as specific knowledge, motives, traits, self-images, social roles and skills which result in venture birth, survival and/or growth. Similarly, Mole and Dawson [212] propose three level approaches to study entrepreneurial competencies in the context examining the influence of entrepreneurial competencies on small firm performance: input (precedents based on individual characteristics to the competencies); processes (task or behaviors which lead to the competencies); results (levels of competency reached in functional areas, as indicated by labor productivity indicators). In the context of this dissertation, entrepreneurial

orientation, employee intrapreneurship can be understood as the input, and behavior aspect of entrepreneurial competency respectively.

Table 1.1 – Classification of entrepreneurial competencies as parameters of qualitative characteristics of labor resources

Classifications	Definition	Example	Authors
Traits based approach	The inherent qualities and psychological characteristics of entrepreneurs/intrapreneurs.	Innovativeness Proactiveness Risk-taking	Gartner [121], Kerr et al. [168], and Baum & Locke [40]
Orientation based approach	The strategic mindset and tendencies of entrepreneurs/intrapreneurs reflecting their approach to innovation, risk, and opportunity.	Individual entrepreneurial orientation with dimensions such as innovativeness, proactiveness, risk-taking	Covin & Slevin [76], Lumpkin & Dess [188], and Covin & Miles [74]
Behavioral based approach	The concrete actions and behaviors of entrepreneurs/intrapreneurs in the process of building and running a business.	Strategical renewal behavior Venture creating behavior	Ireland et al. [151], Gawke et al. [123]
Process based approach	The dynamic, stage-based journey, highlighting the evolving nature of entrepreneurial competencies across different phases.	The process from entrepreneurial orientation/traits to behavior; Venture stages of the entrepreneurial journey	Baron [36], Lyu et al. [191], and Bennett & Chatterji [44]
Context based approach	The competencies manifested in intrapreneurs or entrepreneurs	Entrepreneurship. Intrapreneurship/ corporate entrepreneurship	Hisrich [140] and Parker[238]

Scholars usually organize entrepreneurial competencies into five distinct approaches, each with its own definition and supported by relevant scholarly works (Table 1.1). The traits-based approach focuses on the inherent qualities and psychological characteristics of entrepreneurs and intrapreneurs, as highlighted by Gartner [121], Kerr et al. [168], and Baum & Locke [40]. The orientation-based approach emphasizes the strategic mindset and tendencies of entrepreneurs and usually encompasses the crucial entrepreneurial traits, particularly their approach to innovation, risk, and opportunity, as discussed by Covin & Slevin [76], Lumpkin & Dess [188], and Covin & Miles [74]. The behavioral-based approach examines the concrete actions and behaviors of entrepreneurs in building and managing businesses, with contributions from Ireland et al. [151], Gawke et al. [123]. The process-based approach, emphasizing the transition from entrepreneurial orientation/traits to behavior, views entrepreneurial competencies as dynamic and evolving across different stages of the entrepreneurial journey, as explored by Baron [36], Lyu et al. [191], and Bennett &

Chatterji [44]. Finally, the context-based approach considers how these competencies manifest in specific contexts, such as employee intrapreneurship and individual entrepreneurship, as noted by Hisrich [140] and Parker [238]. Together, these approaches provide a multidimensional framework for understanding the diverse and evolving nature of entrepreneurial competencies.

These classifications are not mutually conflicting because (1) the orientation-based approach inherently encompasses the general traits emphasized by the traits-based approach, as entrepreneurial orientation is shaped by underlying individual characteristics of labor resources. Therefore, these two aspects can be combined as the content aspect of entrepreneurial competencies; (2) the behavioral-based approach focuses on the ultimate expression of these entrepreneurial traits or orientation through concrete actions, which is the final manifestation of competencies; (3) this progression from entrepreneurial traits or orientation to behaviors aligns precisely with the dynamic, stage-based perspective highlighted by the process-based approach; and (4) while intrapreneurs (employee intrapreneurship) and independent entrepreneurs (individual entrepreneurship) face different contexts for demonstrating their abilities, they share fundamental competency traits, with variations mainly in the specific tasks they undertake.

Especially, entrepreneurial competencies, as a subset of professional competencies, can be considered within the framework of procedural and contextual approaches. This dissertation primarily examines the entrepreneurial competencies in the corporate and employment context. Specifically, there are both similarities and differences between employee intrapreneurship and individual entrepreneurship since they are both related to the creation and development of new ideas, products, and services. However, the main difference is that intrapreneurship is carried out within an established organization, whereas entrepreneurship involves the creation of a new venture from scratch. One similarity between the two is the need for creativity and innovation to identify and capitalize on new opportunities. Both intrapreneurs and entrepreneurs need to be able to think outside the box, take risks, and come up with new solutions to problems. Another similarity is the importance of being able to

manage resources effectively. Intrapreneurs and entrepreneurs need to be able to allocate resources such as time, money, and personnel to achieve their goals. However, there are also some notable differences. Intrapreneurs work within an existing organizational structure and have access to resources and support that entrepreneurs may not have. They may also have to navigate existing bureaucratic processes and procedures, which can be a challenge. Entrepreneurs, on the other hand, have complete control over their venture and can make decisions quickly without having to go through a chain of command. However, they may also have to secure funding and build a customer base from scratch, which can be a daunting task. Overall, while there are some similarities between intrapreneurship and entrepreneurship, the differences lie in the context and environment in which they operate. A summarization of the differences and similarities between intrapreneurship, traditional managers and entrepreneurship is done by Hisrich [32] (see table 1.2)

Table 1.2 – A comparison between employee intrapreneurship, traditional managers and individual entrepreneurship

Trait	Traditional managers	Entrepreneurs	Intrapreneurs
Primary motives	Promotion and other traditional corporate rewards, such as office, staff, and power.	Independence, opportunity to create, and money.	Independence and ability to advance in the corporate setting receiving the corporate rewards.
Time orientation	Short run--meeting quotas and budgets, weekly, monthly, quarterly, and the annual planning horizons.	Survival and achieving 5 to 10-year growth of business.	Between entrepreneurial and traditional managers depending on urgency to meet self-imposed and corporate timetables.
Activity	Delegates and supervises more than direct involvement.	Direct involvement.	Direct involvement more than delegation.
Risk Status	Careful. Concerned about status symbols.	Moderate risk taker. No concern about status symbols.	Moderate risk taker. Not concerned about traditional corporate status symbols--- desires independence.
Failure and mistakes	Tries to avoid mistakes and surprises.	Deals with mistakes and failures.	Attempts to hide risky projects from view until ready.
Decisions	Usually agrees with those in upper management positions,	Follows dream with decisions.	Able to get others to agree to help achieve dream.
Who serves	Others	Self and customers.	Self, customers, and sponsors.
Family history	Family members worked for large organizations.	Entrepreneurial small business, professional, or farm background.	Entrepreneurial small business, professional, or farm background.
Relationship with others	Hierarchy as basic relationship.	Transactions and deal making as basic relationship.	Transactions within hierarchy.

Sources: based on the work of Hisrich [140]

Adopting the process-based approach of entrepreneurial competencies and the widely accepted definition of "professional competencies", this dissertation conceptualizes employees' entrepreneurial competencies as the dynamic process from the underlying individual characteristics of being entrepreneurially oriented (entrepreneurial orientation) to intrapreneurial behaviors (employee intrapreneurship) in the organizational context. Consequently, to comprehensively understand entrepreneurial competencies as a qualitative characteristic of labor resources—beyond their impact on labor productivity—it is essential to examine two core components and their dynamic interplay:

— Underlying individual characteristics of entrepreneurial competencies. The foundation of entrepreneurial competencies lies in individual-level attributes, including knowledge, skills, and personality traits. These attributes influence an individual's capacity to identify opportunities, take initiative, and manage risks in dynamic labor markets. In literature, there is a growing awareness to treat entrepreneurial orientation (EO) as an important indicator of the combination of individual characteristics since this construct captures the key entrepreneurial traits, including innovativeness, proactiveness, and risk-taking [67].

In this dissertation, entrepreneurial orientation is defined as the content or characteristic aspect of entrepreneurial competency with the presence of key entrepreneurial characteristics, including innovativeness, proactiveness, and risk-taking [67]. It is usually composed of three core dimensions [209]: innovativeness – the ability to generate and implement new ideas; proactiveness – the tendency to anticipate and respond to opportunities; risk-taking – the willingness to engage in uncertain but potentially rewarding activities. Research indicates that workers with strong entrepreneurial orientation demonstrate greater labor market adaptability, enabling them to: transition between industries and roles in response to economic changes [249]; engage in self-employment and gig work, thus reducing unemployment risks [166]; increase employability in knowledge-based economies, where problem-solving and innovation are critical [179]. This adaptability is particularly relevant in an

era of technological disruptions and automation, where workers must continuously reskill and reposition themselves in the labor market [166].

Entrepreneurial orientation can be observed at two levels: organizational and individual. Organizational entrepreneurial orientation refers to the collective characteristics of these traits within the organization, while individual entrepreneurial orientation reflects the individual characteristics of innovativeness, proactiveness, and risk-taking at the employee level. Rooted in the work of Miller [209], who introduced the concept of an entrepreneurial strategic orientation, EO has been embraced by both the strategic management and entrepreneurship literatures. Especially, Shirokova and Bogatyreva [274] have delineated the evolution of EO theory into four distinct phases. The first phase, spanning from the 1970s to the early 1980s, involves the establishment of foundational prerequisites for the development of the EO concept. The second phase, from the early 1980s to the mid-1990s, is characterized by the conceptualization of EO, during which the theoretical framework began to take shape. The third phase, occurring from the late 1990s to the mid-2000s, represents the institutionalization of EO theory. This period is notable for the creation of specialized research environments, the allocation of essential resources for EO studies, the advancement of communication studies within the EO framework, and the observation of tangible outcomes within firms influenced by EO practices. The fourth and current phase, starting from the late 2000s to the present, is defined by the contextualization of EO theory. This stage has seen the rise of contextual and cross-national comparative research on EO, driven by inquiries into the cross-cultural adaptability of EO frameworks and the varying perceptions and adaptations of these concepts across different contexts.

Until now, within the realm of organizational research, the investigation of EO has yielded two distinct focal points: the individual level [67, 72, 181] and the corporate level [279, 305, 308]. Implementing EO within a corporation represents a comprehensive approach aimed at sustaining its competitive advantage [150]. Within such entrepreneurial enterprises, individuals possessing an entrepreneurial orientation constitute a crucial human resource, essential for the pursuit of corporate objectives [81]. Organizational entrepreneurial orientation (OEO) is characterized as the process

of formulating strategies that equip organizations with a foundation for entrepreneurial decisions and activities [249]. It is widely recognized as playing a crucial role in bolstering a firm's performance by stimulating companies to proactively introduce product innovations, explore potential opportunities, and prioritize the development of new product [186]. Consequently, firms demonstrating this corporate attribute are typically perceived as dynamic, adaptable entities poised to capitalize on emerging prospects [175]. According to Clark et al. [67], individual entrepreneurial orientation (IEO) is described as the "autonomous, proactive, innovative, competitive, and risk-taking dispositions and behaviors than individuals exhibit when pursuing value-creating opportunities." For an enterprise focused on entrepreneurial pursuits, the incorporation of individual entrepreneurial capacities within the corporate framework is pivotal for driving innovation and achieving the objectives of corporate entrepreneurship [177]. Apart from its relevance in the internal labor market, scholarly discourse has recognized the prevalence of entrepreneurial individuals as a widespread labor phenomenon, highlighting their significance as a vital soft skill for navigating the increasingly volatile economic landscape. Specifically, scholarly discourse suggests that EO could extend to encompass a prevalent disposition within the workforce, implying that individuals such as corporate innovators [95], managerial figures [77], and employees [146] are inclined towards organizational entrepreneurship. In general, entrepreneurially oriented individuals are characterized as independent and self-reliant individuals who hold entrepreneurial beliefs than are reflected in their daily activities [241]. However, they may not necessarily conform to the traditional definition of an entrepreneur who initiates a business venture [67].

— Its behavioral aspects—the actual actions, practices that reflect these individual characteristics of labor resources. While individual characteristics shape entrepreneurial competencies, they must be expressed through behavior to have an economic impact. The behavioral dimension of entrepreneurial competencies refers to observable workplace actions and practices that reflect innovation, proactiveness, and problem-solving. For example, entrepreneurial competencies can manifest through intrapreneurial behavior or employee intrapreneurship (EI), where employees identify

opportunities, develop new initiatives, and improve processes within an organization [243].

In this dissertation, employee intrapreneurship is defined using a behavior-based approach, characterized by employees' proactive actions, including venture behavior and strategic renewal behavior. This approach clarifies the distinction between intrapreneurship and entrepreneurial orientation: entrepreneurial orientation, as the focus of this study, represents a behavioral tendency due to the equipped characteristics, while intrapreneurship signifies the resulting actions. Based on the empirical work of Gawke et al. [123] and to explore intrapreneurship as an economic phenomenon at the labor level, current dissertation emphasizes employees' perspectives, defining intrapreneurship as strategic renewal behavior and venture-creating behavior driven by labor characteristics and effective human resource management [49, 73, 128]. Strategic renewal behavior involves actions to enhance competitive advantage through significant changes in strategies, products, or business models [151]. Venturing-creating behavior focuses on creating and integrating new businesses or segments via equity investments, potentially forming semi-autonomous entities [223].

Intrapreneurship, defined as entrepreneurship within a firm, combines "intra" (within) and "entrepreneurship" (creating new ventures). Coined in the 1970s by Pinchot III and popularized by his 1985 book [243], it focuses on fostering an entrepreneurial culture inside large corporations. Early research used various terms like "corporate entrepreneurship" and "organizational entrepreneurship," reflecting initial definitional inconsistencies, but all shared an interest in entrepreneurial activities within organizations. Emerging in the 1980s as a subfield of entrepreneurship, intrapreneurship has expanded entrepreneurship theory to include innovation within established firms, contributing to organizational learning, strategic management, and labor economic theories. In labor economics, intrapreneurship research highlights the role of human resource development and employee creativity in driving corporate innovation [301]. Intrapreneurs are viewed as sustainable human capital that enhances organizational growth and performance [182]. Studies also explore how digital transformation affects intrapreneurship and labor productivity [64], and how incentive

structures influence employee engagement and creativity through intrapreneurship [106, 162, 235]. Additionally, intrapreneurial activities are seen as driven by profit-driven motives, with profits reinvested into entrepreneurial ventures to sustain growth [24, 109]. This area continues to attract academic interest, advancing entrepreneurship-related theories and research [152].

This dissertation differentiates entrepreneurial orientation and intrapreneurship as a behavioral tendency (entrepreneurial orientation) versus behavioral outcomes (employee intrapreneurship). According to the theory of planned behavior, organizations and employees with a strong entrepreneurial orientation are more likely to engage in intrapreneurial behaviors.

1.2 Entrepreneurial competencies in terms of employee intrapreneurship and entrepreneurial orientation as parameters of the qualitative characteristics of labor resources

This purpose of section 1.2 is to develop a theoretical framework to conceptually understand the role of employee's entrepreneurial competencies in terms of entrepreneurial orientation (EO) and employee intrapreneurship (EI) in improving labor productivity in the organizational context. The goal determined the need to (1) to examine entrepreneurial orientation as characteristics for both organization and its labor resources, its interaction and role in manifesting employee intrapreneurship; (2) to use an entrepreneurial competency approach to theoretically establish the relationship between entrepreneurial orientation, employee intrapreneurship and labor productivity in terms of employee and organizational performance.

Entrepreneurial orientation, as the characteristic aspect of entrepreneurial competencies, is an imperative characteristic, identity and competence for both organization and employee in today's economic landscape. According to resource-based view, firms achieve sustained advantage through unique resources and capabilities. EO at the organizational level in this context can be understood as a key intangible resource that can differentiate firms in the marketplace. Consequently, EO enables firms to leverage opportunities and navigate uncertainties which are critical for maintaining competitiveness in today's dynamic economic landscape. Additionally, in

today’s rapidly changing global economy, EO becomes crucial as it embodies the willingness and capability to innovate, take risks, and act proactively to disrupt the equilibrium through innovation, creating new products, processes, and markets, thereby fueling economic growth as per the Schumpeter's Theory of Economic Development. What’s more, EO also can be an imperative identity for the internal labor market. Contemporary economy relies on entrepreneurial adaptability to identify societal inefficiencies, facilitating efficient resource allocation for consumer needs [268]. This aligns with the “sovereignty of the buying public” concept from Austrian economics, motivating entrepreneurs to innovate for consumer well-being [298]. This shift in the economic landscape also promotes increased competition among workers, ultimately resulting in a post-employment era characterized by job instability, wage disparities [252], and the dominance of “neo-liberal hegemony” [203]. To thrive, waged labor must adopt an “entrepreneurial self,” aligning with consumer preferences [166]. This trend is supported by labor research on digital nomadic entrepreneurship, employee innovation, intrapreneurship, creative labor market, and the gig economy, among others. As an result, the entrepreneurial orientation, is not only associated with individual entrepreneurs and entrepreneurially-oriented organizations, but also now is seen as essential for waged labor in a neo-liberal economy [148].

Entrepreneurial orientation at the organizational level and at the individual level interact continuously. This interaction arises from differences in entrepreneurial orientation levels between the organization and the employee (e.g., the organization may be highly entrepreneurial, while the employee’s orientation is low). Therefore, the interaction between organizational and individual entrepreneurial orientations can be defined as the dynamic relationship resulting from the alignment or misalignment of entrepreneurial orientation levels between the organization and the employee. To further illustrate this interaction, at least three important theories can be used to explain it: social identity theory, personal-organizational fit theory, and social information processing theory. Social identity theory suggests that the categorization of self and others into distinct social groups is essential in shaping an individual’s identity. This identity plays a crucial role in addressing self-perception within an organizational

setting. In the realm of organizational identity, EO is increasingly recognized as a vital component of organizational identity, significantly influencing competitive edge and performance. For the entrepreneurially oriented organizations, the identity that employees embrace plays a vital role in shaping the entrepreneurial framework of an organization. The recognition and acceptance of the organizational identity such as EO from the employee side is an interactive process, influenced by the organization's identity, institutional factors, and individual behavioral tendencies. From another side, the personal-organizational fit theory posits that individuals are more satisfied and perform better when there is a high degree of compatibility between their personal characteristics and the attributes of the organization. For entrepreneurial orientation, this means that individuals with a natural inclination towards entrepreneurship are more likely to thrive in and be attracted to organizations that value and support entrepreneurial behaviors. This alignment enhances the overall entrepreneurial orientation of the organization as individuals feel that their personal entrepreneurial capabilities are being utilized and valued, thereby contributing to a stronger, more effective entrepreneurial environment. What's more, social information processing theory suggests that individuals absorb and interpret information from their social environment to inform their own behaviors and attitudes. In organizations with a pronounced entrepreneurial orientation, the continuous flow of entrepreneurial behaviors, success stories, and leadership practices shapes individuals' perceptions of what is valued and expected. As employees observe and process these cues, they adjust their own behaviors to align with these entrepreneurial norms, creating a feedback loop that perpetuates and enhances the entrepreneurial orientation at both the individual and organizational levels.

What's more, based on process-based approach on entrepreneurial competencies, entrepreneurial orientation at both employee and organizational level as characteristic aspect of entrepreneurial competencies potentially contribute to the manifestation of employee intrapreneurship, defined through the behavioral based approach of entrepreneurial competencies. The contributing role of individual entrepreneurial orientation on the manifestation of employee's intrapreneurial behavior is justified

based on the rationale that individual cognition plays a pivotal role in shaping intrapreneurial behavior. Specifically, individual cognition can be closely associated with what is commonly referred to as an entrepreneurial orientation, or more broadly, individual entrepreneurial orientation, within the domain of entrepreneurship research. Previous studies have established a positive correlation between individual entrepreneurial orientation and employee intrapreneurial behavior. It is well-established that employees with a heightened level of IEO are inclined to engage in exploratory activities, which serve as the foundation for intrapreneurial processes [174]. Additionally, various other individual cognitive factors hold the potential to influence an employee's intrapreneurial behavior. For instance, Kraus et al. [174] have identified the concept of "locomotion" as a moderating variable in the relationship between IEO and intrapreneurial activities. Locomotion, defined as an individual's capacity to transition between states without a predetermined direction or destination [30], underscores our proposition that intrapreneurial behavior can be attributed to individual cognitive processes. Furthermore, it is noteworthy to mention the significant role of the "big five" personality traits in driving intrapreneurial behavior. The "big five" personality traits, a fundamental construct in psychological studies, are employed to assess an individual's predispositions and characteristics [57]. Mahmoud et al. [197] have demonstrated that three of these "big five" traits, namely conscientiousness, disagreeableness, and emotional stability, directly impact intrapreneurial behavior.

Comparing the concept of OEO and employee intrapreneurship, Neessen et al. [224] posit that the studies on OEO is focusing on ‘climate’ of intrapreneurship, while intrapreneurship is a bottom-up, multilevel process of implementing new ideas and innovations. Based on this rationale, OEO plays a pivotal role in enhancing individual employee intrapreneurship since OEO as the potential climate of intrapreneurship is closely linked to certain organizational factors, i.e., management support, reward/reinforcements and resources. These organizational factors have identified to be positive contributing factor of EI and its outcomes [309]. The implementation of OEO as a corporate strategy is critically dependent on the role of intrapreneurs and their intrapreneurial practices. Kuratko et al. [178] describe intrapreneurship as the

independent strategic actions of employees to capitalize on business opportunities. Amo [20] synthesizes the constructs of corporate entrepreneurship and intrapreneurship, suggesting that both are critical in promoting innovative behaviors within employees. These behaviors are key components in the gradual processes of organizational renewal facilitated through initiatives led by employees. The dynamics of these processes are significantly shaped by the characteristics and contextual framework of the organization, alongside the innovative behaviors exhibited by the workforce. These elements are, in turn, influenced by individual preferences, attitudes, and perceptions, all of which play pivotal roles in driving organizational innovation—an indispensable factor for organizational sustainability. Consequently, OEO, a hallmark of entrepreneurial organizations, is fundamentally linked with the EI of employees, thereby propelling innovation and organizational growth.

Hypothesis 1. Individual entrepreneurial orientation positively contributes to employee intrapreneurship.

Hypothesis 2. Organizational entrepreneurial orientation positively contributes to employee intrapreneurship.

Human-related drivers are important growth reserves of organizational efficiency [244]. In the realm of intrapreneurship, recent empirical studies have demonstrated compelling evidence underscoring the intricate interplay between creativity, innovation, and productivity. Notably, research within this domain has illuminated the positive correlation between intrapreneurial activities and employee productivity at the individual level. This relationship is manifested through enhanced job engagement, favorable work attitudes, superior in-role performance, and elevated creative work behavior. For example, Gawke et al. [122] corroborated that intrapreneurship among employees is positively associated with work engagement, particularly for those with a high sensitivity to rewards, which in turn fosters greater innovativeness and improved in-role performance. However, their study also revealed a more nuanced outcome, indicating that intrapreneurship might lead to heightened exhaustion among employees with a high sensitivity to punishment, thereby promoting work avoidance and diminishing in-role performance. These findings suggest that the

influence of intrapreneurship on job performance is multifaceted, capable of yielding both beneficial and adverse effects concurrently. Furthermore, research investigating the relationship between intrapreneurship and employee creativity has yielded similar insights. Kang et al. [162] identified intrapreneurship as a critical pathway to achieving heightened job engagement, which subsequently enhances creative performance in the workplace. Additionally, Pandey et al. [235] highlighted the role of intrapreneurship in bolstering psychological capital, thereby exerting a positive influence on employee work engagement. Given that work engagement has long been recognized as a crucial antecedent of employee job performance [71], it can be tentatively concluded that intrapreneurship generally exerts a favorable influence on employee job performance, although this effect is contingent upon specific contextual factors. Kulkova I.A., Nikolaev N.A. [7] explored how shifting to entrepreneurial-oriented labor relations enhances employee efficiency in industrial organizations. They emphasized the importance of fostering such relations at both the employee-employer and individual employee levels to boost productivity and overall efficiency in industrial settings.

Current research on intrapreneurship also identified the correlation of employee intrapreneurship on the organizational productivity, which can be reflected on its positive impact on the financial performance, profitability and growth in an organization encouraging employee intrapreneurship. Augusto Felício's [29] theoretical model has established the significant impact of intrapreneurship on corporate performance. This model conceptualizes intrapreneurship as a multidimensional construct, encompassing innovation, risk-taking in the face of new challenges and uncertainties, competitive drive, proactivity, and autonomy. Felício's empirical findings confirm the positive relationship between this multidimensional understanding of intrapreneurship and various aspects of organizational performance, including financial outcomes, company productivity, and growth. Further research corroborates these findings. Dung and Giang [97] examined the role of intrapreneurship in enhancing the performance of small and medium-sized enterprises (SMEs) within the international business context. Their study reveals that strategic renewal behaviors and new business venture activities—key components of

international intrapreneurship—significantly boost SMEs' export performance. Similarly, Asiaei et al. [25] explored the impact of intrapreneurship on a firm's financial performance, demonstrating that intrapreneurship leverages intellectual capital to drive firm success. Lastly, Atallah et al. [26] highlighted the crucial role of prior intrapreneurial experience in the decision to launch a startup, with their research indicating that such experience leads to higher levels of innovation and entrepreneurial success.

At the societal level, researchers have also confirmed the significant role of intrapreneurship in promoting social, sustainable, and economic development. Aparicio et al. [22] conceptualize intrapreneurship as a catalyst for these forms of change, particularly by integrating institutions at the national, regional, and organizational levels. They argue that intrapreneurship, as a distinct form of entrepreneurship, can positively contribute to the growth of firms and the broader goals of societal, sustainable, and economic development. Similarly, Elert and Stenkula [106] propose a taxonomy illustrating how the interaction between societal and corporate rules influences various intrapreneurial outcomes. According to their taxonomy, full productive intrapreneurship occurs when intrapreneurial activities benefit both the firm and the economy, particularly when these activities align with rules that serve the interests of both society and the firm. This scenario is exemplified by innovations that are successfully transformed into marketable products or services. Additionally, Nafari et al. [221] examine the potential of universities to generate local and global impacts through digitally-enabled academic social intrapreneurship. They present a model of academic social intrapreneurship, emphasizing the role of digitalization in addressing complex societal challenges and fostering social impact within the context of academic intrapreneurship.

Hypotheses 3. Employee intrapreneurship positively contributes to employee performance.

Hypotheses 4. Employee intrapreneurship positively contributes to organizational performance.

A mediation relationship explains how or why a certain effect or relationship

between two variables occurs by introducing a third variable, known as the mediator. In this relationship, the independent variable influences the mediator, which in turn affects the dependent variable. Employee intrapreneurship serves as a vital mechanism that bridges the connection between entrepreneurial orientation at both the individual and organizational levels and labor productivity outcomes, specifically employee and organizational performance. Individual entrepreneurial orientation – an employee's inclination toward innovation, risk-taking, and proactivity – can enhance personal performance when supported by an intrapreneurial environment. In such a context, employees can leverage their entrepreneurial tendencies more effectively, transforming them into tangible performance improvements. Similarly, organizational entrepreneurial orientation – the organization's collective attitude toward entrepreneurial activities – can inspire employees to embrace intrapreneurial behaviors, motivating them to go beyond formal job roles. Thus, employee intrapreneurship mediates these orientations by providing the necessary framework and support for entrepreneurial behaviors to directly influence employee performance.

Moreover, intrapreneurship enables the alignment of both individual and organizational orientations with broader organizational goals, thereby impacting overall organizational performance. For instance, employees with a strong IEO who engage in intrapreneurship contribute ideas and innovations that extend beyond individual productivity, impacting organizational effectiveness. Similarly, an organization with a high OEO fosters an environment that encourages employees to contribute to the company's broader performance metrics, such as innovation, market responsiveness, and customer satisfaction. In this way, intrapreneurship mediates the influence of both IEO and OEO on labor productivity at both the individual and organizational levels, ensuring that entrepreneurial behaviors within the organization align with and enhance its collective productivity and performance.

Hypothesis 5. Employee intrapreneurship mediates the relationship between entrepreneurial orientation at two levels and labor productivity at two levels. Specifically: H5a. Employee intrapreneurship mediates the relationship between individual entrepreneurial orientation and employee performance. H5b. Employee

intrapreneurship mediates the relationship between organizational entrepreneurial orientation and employee performance. H5c. Employee intrapreneurship mediates the relationship between individual entrepreneurial orientation and organizational performance. H5d. Employee intrapreneurship mediates the relationship between organizational entrepreneurial orientation and organizational performance.

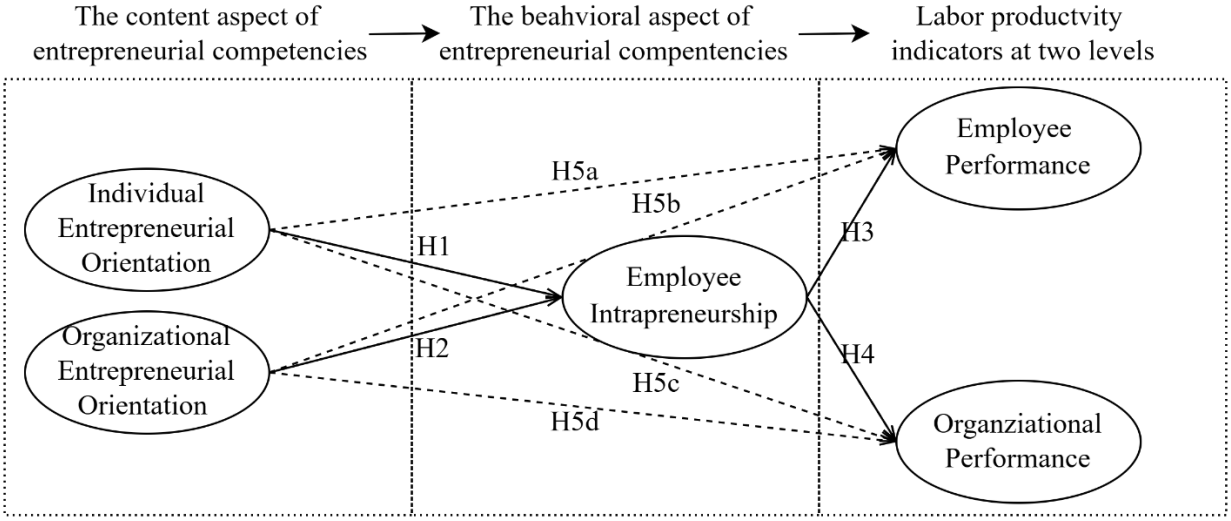


Figure 1.2 – An entrepreneurial competency approach to relationships between dual-level entrepreneurial orientation, employee intrapreneurship, and dual-level labor productivity

Note: H1, H2, H3, H4 (the solid lines) represent direct hypotheses; H5a, H5b, H5c, H5d (the dashed lines) represent mediating hypotheses.

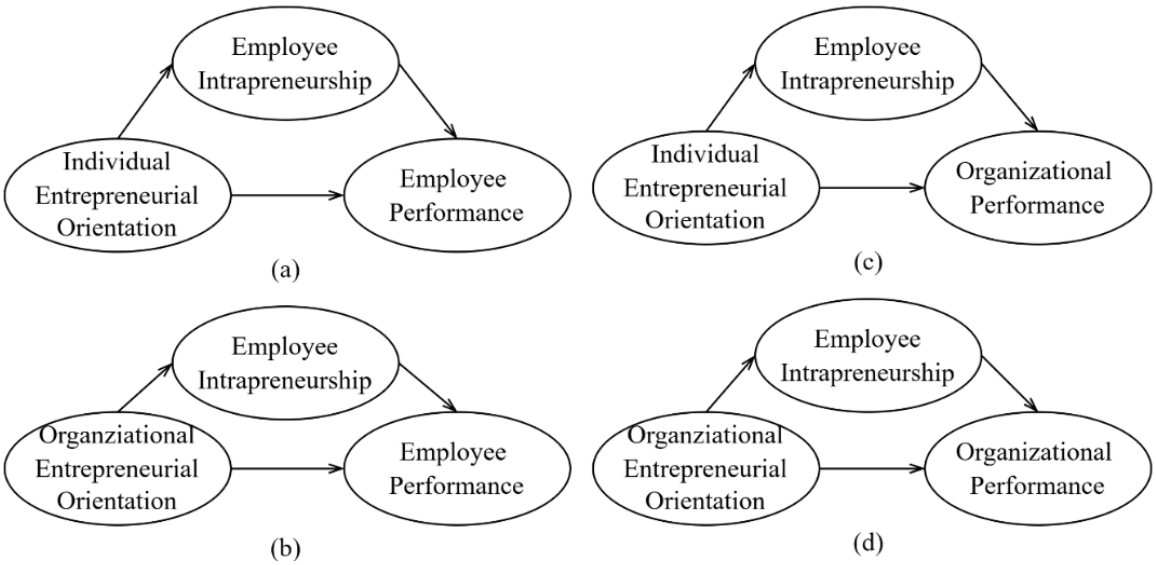


Figure 1.3 – The visual depiction of the mediating hypotheses proposed in the relationship between entrepreneurial orientation and labor productivity indicators

Building on the above literature review, a foundational integrative model based on the entrepreneurial competencies approach has been developed to examine the relationship between entrepreneurial orientation, employee intrapreneurship, and labor productivity (see figure 1.2 and 1.3). This model emphasizes the intricate interaction

between individual and organizational entrepreneurial orientations in promoting employee intrapreneurship and labor productivity, as indicated by employee and organizational performance. By recognizing these pathways, organizations can design incentive systems that support innovation and entrepreneurial behaviors among their workforces. Additionally, this model offers a framework for future empirical studies to validate these relationships.

The model is structured around five core hypotheses and five elements: individual entrepreneurial orientation, organizational entrepreneurial orientation, employee intrapreneurship, and two indicators of labor productivity—employee performance and organizational performance. The five main propositions are as follows: (1) Employee intrapreneurship positively contributes to employee performance; (2) Employee intrapreneurship positively contributes to organizational performance; (3) Individual entrepreneurial orientation positively contributes to employee intrapreneurship; (4) Organizational entrepreneurial orientation positively contributes to employee intrapreneurship; (5) Employee intrapreneurship mediates the relationship between entrepreneurial orientation at two level and labor productivity at two levels.

1.3 Analysis of the impact of employees' entrepreneurial competencies on labor productivity[4]

The purpose of section 1.3 is to empirically justify the role of developing entrepreneurial competencies of employees in terms of entrepreneurial orientation (EO) and employee intrapreneurship (EI) in increasing productivity by increasing both employee and organizational performance, theoretically established in section 1.2. This empirical approbation holds its significance as it lays the justification in chapter 2 to empirically elaborate patterns to the development of entrepreneurial orientation and employee intrapreneurship as growth reserves for labor productivity and efficiency.

[4] The results of section 1.3 are adopted from author's peer-reviewed publications. For details: (1) Вэньцзюнь Ц. Производительность труда через развитие интрапренерства и предпринимательской ориентации: медиативная модель / Вэньцзюнь Ц. // Социальные и экономические системы – 2024. – Т. 61 – № 11 – Стр.175-193; (2) Вэньцзюнь Ц. Измерение производительности труда с точки зрения эффективности сотрудников и организации для развития человеческих ресурсов / Вэньцзюнь Ц. // Социально-экономическое управление: теория и практика. – 2024. – Т. 20 – № 4 – Стр. 64–71.

This section is organized to present the methodology, findings, discussion, and limitations in a sequential way.

Table 1.3 – Labor productivity in terms of employee and organizational performance metrics

Indicators	Measuring aspects	Explanation
Employee performance	Individual task proficiency, adaptivity, proactivity	A high performance in these aspects indicate employee's core tasks are completed properly; employee adjusts to new equipment, process, or procedures in core tasks; employee initiates better way of doing core tasks.
	Team member proficiency, adaptivity, proactivity	A high performance in these aspects indicate employee coordinates work with team members; employee responds constructively to team changes (e.g., new members); employee develops new methods to help team perform well
	Organizational member proficiency, adaptivity, proactivity	A high performance in these aspects indicate employee talks about the organization in positive way, employee copes with changes in the way the organization operates; employee makes suggestions to improve the overall efficiency of the organization.
Organizational performance	Organizational performance within the organization	Quality of products, services, or programs; Development of new products, services, or programs; Ability to attract essential employees; Ability to retain essential employees; Satisfaction of customers or clients; Relation between management and other employee; Relations among employees in general
	Organizational performance outside the organization	Marketing; Growth in sales; Profitability; Market share

Source: adopted from the works of Griffin [125] and Delaney & Huselid [89].

During the data collection process for this approbation, the Credamo platform, a widely recognized online survey service in China, was utilized. Credamo operates similarly to Qualtrics, an online survey platform commonly used in the United States. Its data quality has been validated by international academic journals and research institutions [88, 158]. The sample for this study was restricted to corporate managers (including junior, middle, and senior-level managers) who were currently employed. This restriction is essential, as performance data has historically been viewed as more accessible and transparent to corporate managers [89]. Out of an initial pool of 197 participants, 27 were excluded for not meeting the inclusion criteria, resulting in a final sample of 170 valid responses, yielding an effective response rate of 86.29%. Of the valid respondents, 122 were male, and 48 were female. Regarding educational background, 2 participants had a middle school or vocational school education, 110 held undergraduate or junior college degrees, and 58 had attained a master's or PhD degree. Income distribution among the participants was as follows: 23 reported earning

less than 6,000 CNY per month, 54 earned between 6,000 and 9,000 CNY, 72 earned between 9,000 and 12,000 CNY, and 21 reported incomes exceeding 12,000 CNY. In terms of age, 60 participants were between 18 and 30 years old, 72 were between 30 and 40 years old, 34 were between 40 and 50 years old, and 4 were over the age of 50.

The data analysis draws on the following measurement instruments: the individual entrepreneurial orientation scale developed by Covin et al. [72], the organizational entrepreneurial orientation scale initially introduced by Covin and Slevin [76] and adapted into Chinese by Hu and Zhang [144], the employee intrapreneurship scale created by Gawke et al. [123], the employee performance scale established by Griffin [125], and the organizational performance scale formulated by Delaney and Huselid [89]. To ensure linguistic consistency and accuracy, the original English-language scales were translated into Chinese using the back-translation method, following the guidelines outlined by Parameswaran and Yaprak [237]. Especially, this analysis measures two-level labor productivity with employee performance and organizational performance (see table 1.3). Following this approach, organizations can identify gaps between individual efforts and organizational outcomes, ensuring that employee capabilities are aligned with strategic goals [27, 51, 141]. Therefore, to provide empirical evidence that intrapreneurship can serve as a predictive indicator of labor productivity, this study adopts a dual approach, measuring labor productivity in organizational context at both the micro-level (employee performance) and macro-level (organizational performance). Measuring items and sources are detailed in Appendix 1.

Prior to testing the hypotheses, the reliability and validity of the data were assessed and discussed. Cronbach's Alpha was calculated to evaluate the basic reliability of the measures. Additionally, the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity were employed to assess the validity of the study and to determine the appropriateness of conducting factor analysis. Descriptive and confirmatory factor analyses were subsequently performed to further examine the validity and reliability of the study. To test the four primary hypotheses and one mediating hypothesis in this study, path analysis and indirect effect analysis were

performed using the statistical software Mplus 8.3. Path analysis enables simultaneous modeling of relationships among constructs, including entrepreneurial orientation, employee intrapreneurship, employee performance, and organizational performance, offering a comprehensive perspective on their interactions [35]. Mediating hypotheses, in particular, necessitate advanced statistical approaches to determine whether the influence of one variable on another operates through a third variable, known as the mediator. Indirect effect analysis is crucial for evaluating these mediating mechanisms, such as whether employee intrapreneurship mediates the relationship between entrepreneurial orientation and performance outcomes [218]. Mplus 8.3 is particularly well-suited for such analyses, as it provides robust tools for estimating both direct and indirect effects and is capable of handling complex relationships between variables with high precision [219].

The present study first utilizes SPSS (version 26) to conduct basic reliability and validity analyses. For the reliability assessment, Cronbach's Alpha statistics were employed to evaluate internal consistency. As presented in Table 1.4.a (in Appendix 3), the results indicate that the Individual Entrepreneurial Orientation (IEO) construct, with a Cronbach's Alpha of 0.621, meets the acceptable threshold, following the criterion that values above 0.6 are acceptable and those of 0.7 or higher reflect high reliability [48, 112]. The remaining constructs—Organizational Entrepreneurial Orientation (OEO) (0.777), Employee Intrapreneurship (EI) (0.842), Employee Performance (EP) (0.919), and Organizational Performance (OP) (0.842)—demonstrate high reliability, as their alpha values exceed 0.7. These findings confirm that the items within each construct are consistent and accurately capture the underlying concepts, reinforcing the robustness of the measurement instruments employed in this study.

The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity were applied to evaluate the validity of the study and determine the suitability of conducting factor analysis [201]. The outcomes of the KMO measure and Bartlett's test are summarized in Table 1.5.a (in Appendix 3). A KMO value of 0.8 or higher is generally considered favorable, with values approaching 1.0 regarded as optimal. Conversely, a

KMO value below 0.5 indicates that the factor analysis may not be appropriate. Additionally, Bartlett's test of sphericity must yield a p-value less than 0.05 for the factor analysis to be deemed acceptable. A KMO value above 0.5 and a Bartlett's test significance level below 0.05 suggest sufficient inter-item correlation within the dataset [147]. As shown in Table 1.3.a, the KMO value obtained for this study is 0.846, exceeding the 0.80 threshold, which confirms the data's adequacy for factor analysis. Furthermore, the Bartlett's test of sphericity yielded a p-value of 0.000, well below the 0.05 threshold, affirming the strong construct validity and appropriateness of the proposed factor model. In summary, the results indicate that the data exhibit good structural validity, supporting the suitability of the model for subsequent analyses.

Confirmatory factors analysis (CFA) is conducted to further evaluate reliability and validity and model fit statistics. The reliability and validity of the measurement model were assessed using composite reliability (CR), average variance extracted (AVE) (Table 1.6.a, in Appendix 3). For IEO, the AVE was 0.167, below the lenient threshold of 0.4, indicating insufficient convergent validity; however, the CR value of 0.594 was close to the acceptable threshold of 0.6, suggesting marginal reliability. For OEO, the AVE was 0.322, approaching the lenient threshold, and the CR value of 0.788 indicated acceptable reliability. The EI construct demonstrated acceptable convergent validity (AVE = 0.403) and good reliability (CR = 0.842). Both EP (AVE = 0.535, CR = 0.911) and OP (AVE = 0.753, CR = 0.857) exhibited excellent convergent validity and reliability, exceeding the recommended thresholds.

The discriminant validity of the constructs was assessed using the Fornell-Larcker criterion and correlation coefficients (Table 1.7.a, in Appendix 3). Under a lenient standard (correlation < 0.7), the discriminant validity of most constructs was acceptable, although some constructs (e.g., IEO, EI, OP) showed higher correlations with other constructs than their AVE square roots. For example, the correlation between IEO and OEO (0.45) exceeded the square root of IEO's AVE (0.409), and the correlation between EI and EP (0.67) exceeded the square root of EI's AVE (0.635). However, considering the theoretical relevance between these constructs (e.g., IEO, EI, and EP are all related to employees' entrepreneurial behavior) and the correlation

coefficients are in acceptable range, the discriminant validity can be considered acceptable under a lenient standard. Future studies can consider refining the measurement model to further improve discriminant validity.

What's more, as shown in Table 1.7.a (in Appendix 3), individual entrepreneurial orientation and organizational entrepreneurial orientation are highly correlated, and this correlation extends to both employee performance and organizational performance. However, since the focus of this study is not on the relationship between employee performance and organizational performance, we do not include this relationship in the research framework. Additionally, individual entrepreneurial orientation and organizational entrepreneurial orientation are key focuses in the later stages of this dissertation work. The inability of the CFA to assess interactions between these variables indicates that it is not suitable for fully relying on the CFA results in this case [33]. This further explains why CFA is not fully appropriate for this approbation: the conceptual framework contains variables that are correlated and may even interact with one another [172]. Furthermore, entrepreneurial orientation at both the employee and organizational levels is positively correlated with employee entrepreneurial behavior, and employee entrepreneurial behavior shows a positive correlation with both employee performance and organizational performance. This preliminarily suggests that the development of employee entrepreneurial capabilities is beneficial for enhancing labor productivity. What's more, these results indicate using a more lenient standard to evaluate the model based on the results of CFA.

The model fit indicators suggest an acceptable to good fit for the research model (table 1.8.a, in Appendix 3). The Chi-square statistic ($\chi^2 = 197.096$, df = 86) yields a χ^2/DF ratio of 2.292, which falls within the acceptable range of 1 to 3. The CFI (0.925) and TLI (0.909) both exceed the threshold of 0.90, indicating a good fit, while the SRMR (0.061) is well below the cutoff of 0.08, further supporting model adequacy. Although the RMSEA (0.087) slightly exceeds the stricter threshold of 0.08, it remains below 0.10, indicating an acceptable fit under more lenient standards. Overall, the model demonstrates reasonable fit, with minor room for improvement, particularly in reducing the RMSEA value through potential refinements such as removing low-

loading items or allowing correlated error terms. However, given that this model does not include the interaction relationship between OEO and IEO, EP and OP due to the inability of CFA in detecting these effects, this model is acceptable.

This study utilizes well-established scales that have been extensively validated in prior research. Given that the internal consistency, as measured by Cronbach's Alpha, meets widely accepted thresholds [130], this study primarily adopts this metric to assess the general reliability trends of the relevant constructs rather than relying solely on confirmatory factor analysis (CFA) results [228]. This approach aligns with methodological precedents in comparable studies [314]. Furthermore, although the confirmatory factor analysis results for this conceptual framework are statistically acceptable, it is imperative to critically evaluate the appropriateness of applying CFA in this approbation context: (1) CFA assumes a linear relationship between measurement variables and latent variables, whereas actual measurement data may not adhere to this assumption [172]. Specifically, in the constructs studied, employee performance consists of individual task performance, team task performance, and organizational citizenship performance, and there is no strict collinearity among these three types of performance in practice. Similarly, organizational performance is composed of operational and market performance, which are correlated but not guarantee perfectly collinear. (2) The aim of this study is to explore the general trends in organizational and individual performance, and their relationship with both employee and organizational entrepreneurial orientation and employee entrepreneurship. The empirical goal of this study is to approbate the role of entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship in increase of labor productivity. The focus is on determining the overall effect of entrepreneurial orientation and employee entrepreneurship on enhancing production efficiency, rather than analyzing their impact on any specific performance metric. (3) CFA assumes no collinearity or interaction between observed variables, whereas in this study, employee performance and organizational performance, as well as individual and organizational entrepreneurial orientations, are theoretically correlated (as discussed in Section 1.2), and these interactions are a key

focus of the research. For example, Richard P. Bagozzi, Youjae Yi and Lynn W. Phillips [33], has extensively discussed that there are two potential shortcomings are identified with the CFA method: the confounding of random error with measure-specific variance and the inability to test for interactions between traits and methods.

Before proceeding with the hypotheses testing, the potential for common method bias (CMB) was also evaluated. As this study relied on a single questionnaire for data collection, the possibility of CMB could not be ruled out. To address this concern, Harman's Single-Factor Test was applied. Exploratory factor analysis (EFA) with varimax rotation was utilized to conduct the test [118]. The analysis showed that the one-factor solution explained only 25.208% of the total variance, with no individual factor loading exceeding 50% for any variable. These results suggest that common method bias is unlikely to have substantially influenced the outcomes of this study.

Table 1.9 – The direct relationships among entrepreneurial orientation, employee intrapreneurship, and labor productivity indicators

IV	DV	Est.	S.E.	Est./S.E.	P-Value	R Square	Hypo
EI	EP	0.763	0.043	17.677	0.000	0.581	Support
EI	OP	0.680	0.057	11.989	0.000	0.462	Support
IEO	EI	0.497	0.061	8.095	0.000	0.559	Support
OEO	EI	0.378	0.065	5.840	0.000		Support

Note: IV — Independent Variable; DV — Dependent Variable; S.E — Standard Error; IEO — Individual Entrepreneurial Orientation; OEO — Organizational Entrepreneurial Orientation; EI — Employee Intrapreneurship; EP — Employee Performance; OP — Organizational Performance.

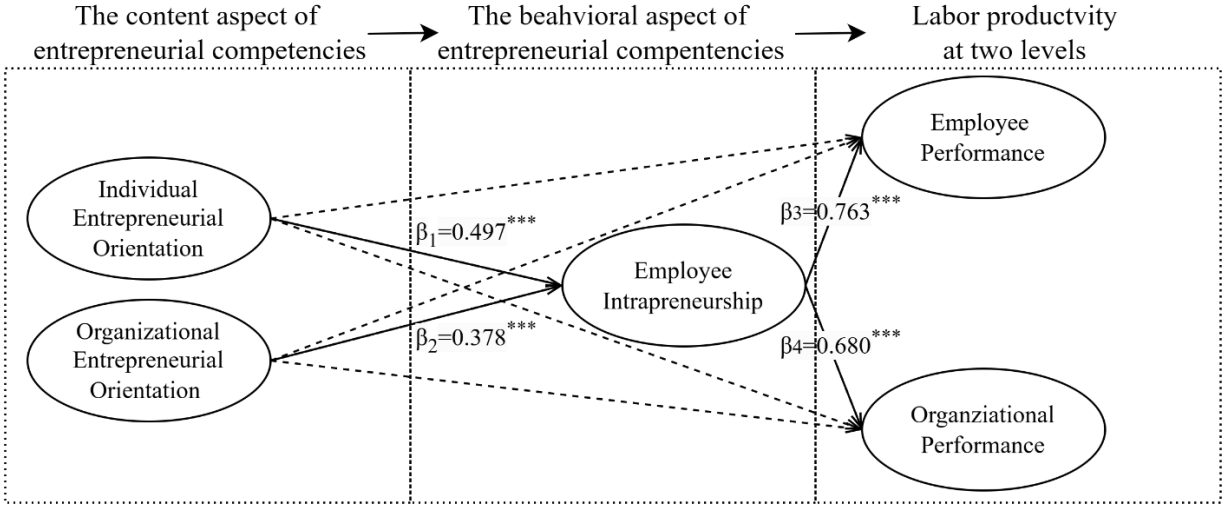


Figure 1.4 – Path analysis results on the direct relationships among entrepreneurial orientation, employee intrapreneurship, and labor productivity indicators

Note: Significant at: * — $p < 0.05$, **— $p < 0.01$, *** — $p < 0.001$

This approbation adopted path analysis to test the four core hypotheses formulated in this study, with the results summarized in Table 1.9 and Figure 1.4.

Hypothesis 1 posits that individual entrepreneurial orientation (IEO) positively influences employee intrapreneurship, emphasizing the role of employees' personal initiative, innovation, and risk-taking behaviors. The path analysis results confirm a significant positive relationship between IEO and employee intrapreneurship (β = 0.497, SE = 0.061, $p < 0.001$), providing strong empirical support for Hypothesis 1. This finding suggests that employees who demonstrate higher entrepreneurial traits at the individual level are more likely to engage in intrapreneurial activities. Hypothesis 2 explores the impact of organizational entrepreneurial orientation (OEO) on employee intrapreneurship, focusing on how organizational structures, processes, and culture encourage entrepreneurial behavior among employees. The path analysis indicates that OEO also has a significant positive effect on employee intrapreneurship ($\beta = 0.378$, SE = 0.065, $p < 0.001$), thereby supporting Hypothesis 2. These results highlight the importance of fostering an entrepreneurial environment at organizational level, as it enables employees to actively pursue intrapreneurial initiatives.

Hypothesis 3 posits that employee intrapreneurship has a positive effect on employee performance. The results confirm this hypothesis, showing that employee intrapreneurship significantly and positively influences employee performance (β = 0.763, SE = 0.043, $p < 0.001$). Similarly, Hypothesis 4 suggests that employee intrapreneurship contributes positively to organizational performance. The empirical findings support this hypothesis, demonstrating a significant and positive relationship between employee intrapreneurship and organizational performance ($\beta = 0.680$, SE = 0.057, $p < 0.001$).

Furthermore, mediation analysis was conducted to examine whether employee intrapreneurship accounts for the relationship between entrepreneurial orientation at two levels and labor productivity at two levels (see table 1.10). Hypothesis H5a posits that employee intrapreneurship mediates the link between individual entrepreneurial orientation and employee performance. The findings revealed a significant indirect effect of individual entrepreneurial orientation on employee performance through employee intrapreneurship, b = 0.568, 95% CI [0.391, 0.797], confirming the mediating role of employee intrapreneurship in this relationship. Furthermore, the

direct effect of individual entrepreneurial orientation on employee performance was non-significant, b = − 0.101, p=0.370, indicating that employee intrapreneurship fully mediates the relationship. Thus, the influence of individual entrepreneurial orientation on employee performance is entirely transmitted through the mediator, employee intrapreneurship.

Table 1.10 – Mediated relationships between employee intrapreneurship, entrepreneurial orientation and labor productivity indicators

Hypo	Effect	Estimate	Standard Error (S.E)	95% Confidence Interval (CI)		P-value
				Lower 2.5%	Upper 2.5%	
H5a	Direct Effect (IEO → EP)	-0.101	0.113	-0.304	0.137	0.370
	Indirect Effect (IEO → EI → EP)	0.568***	0.105	0.391	0.797	0.000
	Total Effect (IEO → EP)	0.467***	0.080	0.303	0.612	0.000
H5b	Direct Effect (OEO → EP)	0.124	0.091	-0.046	0.310	0.170
	Indirect Effect (OEO → EI → EP)	0.399***	0.078	0.278	0.593	0.000
	Total Effect (OEO → EP)	0.523***	0.074	0.367	0.657	0.000
H5c	Direct Effect (IEO → OP)	-0.077	0.129	-0.334	0.178	0.548
	Indirect Effect (IEO → EI → OP)	0.489***	0.099	0.327	0.729	0.000
	Total Effect (IEO → OP)	0.412***	0.089	0.217	0.572	0.000
H5d	Direct Effect (OEO → OP)	0.297**	0.113	0.088	0.533	0.009
	Indirect Effect (OEO → EI → OP)	0.281***	0.075	0.153	0.449	0.000
	Total Effect (OEO → OP)	0.578***	0.080	0.408	0.722	0.000

Note: Hypo — Hypothesis; S.E — Standard Error; IEO — Individual Entrepreneurial Orientation; OEO — Organizational Entrepreneurial Orientation; EI — Employee Intrapreneurship; EP — Employee Performance; OP — Organizational Performance. * — $p < 0.05$, ** — $p < 0.01$, *** — $p < 0.001$.

H5b posits that organizational entrepreneurial orientation (OEO) has a positive impact on employee performance through employee intrapreneurship. The findings reveal a significant indirect effect of OEO on employee performance through employee intrapreneurship, b = 0.399, 95% CI [0.278, 0.593]. These results suggest that employee intrapreneurship serves as a mediator in the relationship between OEO and employee performance. Furthermore, the direct effect of OEO on employee performance is non-significant, b = 0.124, p = 0.170, indicating that employee intrapreneurship fully mediates this relationship. In other words, the entire effect of OEO on employee performance operates through the mediating role of employee intrapreneurship.

H5c posits that employee intrapreneurship mediates the relationship between individual entrepreneurial orientation and organizational performance. The findings reveal a significant indirect effect of individual entrepreneurial orientation on organizational performance through employee intrapreneurship, b = 0.489, 95% CI [0.327, 0.729], confirming the mediating role of employee intrapreneurship in this relationship. Furthermore, the direct effect of individual entrepreneurial orientation on organizational performance is non-significant, b = - 0.077, p = 0.548, indicating that employee intrapreneurship fully mediates the relationship. These results suggest that the influence of individual entrepreneurial orientation on organizational performance operates entirely through the mediator, employee intrapreneurship.

Hypothesis H5d posits that employee intrapreneurship mediates the relationship between organizational entrepreneurial orientation and organizational performance. The findings reveal a significant indirect effect of organizational entrepreneurial orientation on organizational performance through employee intrapreneurship (b = 0.281, 95% CI [0.153, 0.449]), indicating that employee intrapreneurship serves as a mediator in this relationship. However, the direct effect of organizational entrepreneurial orientation on organizational performance is also statistically significant (b = 0.297, p = 0.009), suggesting that the mediation is partial. Thus, while employee intrapreneurship transmits part of the effect, not all of the impact of organizational entrepreneurial orientation on organizational performance occurs through this mediator.

Section 1.3 tests four core hypotheses on the relationships between entrepreneurial orientation at two levels, employee intrapreneurship, and labor productivity at two levels, identifying employee intrapreneurship as a mediator. Our findings indicate that entrepreneurial orientation at both organizational and individual levels significantly and positively influences employee intrapreneurship, consistent with studies on the value of fostering an entrepreneurial culture within organizations [188]. Organizational entrepreneurial orientation (OEO), conceptualized as an organizational "climate," facilitates intrapreneurship through social learning mechanisms [224], helping achieve outcomes like innovation performance [286],

employee retention [307], and creativity [190]. Individual entrepreneurial orientation (IEO) also plays a critical role in promoting intrapreneurial behavior, as employees with higher IEO generate new ideas, identify opportunities, and engage in innovation projects (e.g., [127, 188]).

Findings further demonstrate that employee intrapreneurship enhances both individual and organizational performance, aligning with the Resource-Based View, which posits that intrapreneurial activities foster organizational competitiveness by leveraging employee creativity and initiative [116]. For individuals, intrapreneurship correlates with increased autonomy, adaptability, and proactivity, consistent with research linking autonomy to job satisfaction and productivity [159, 311]. At the organizational level, employee-driven innovation supports profitability, market share, and growth, as evidenced by Opland et al. [231].

This analysis confirms that employee intrapreneurship mediates the relationship between entrepreneurial orientation at both individual and organizational levels and labor productivity, bridging entrepreneurial orientation with measurable productivity outcomes [226]. Individual entrepreneurial orientation impacts employee performance more effectively when paired with intrapreneurial activity, highlighting the importance of an environment fostering autonomy and innovation [108, 251]. Organizational entrepreneurial orientation similarly enhances performance, particularly when employee intrapreneurship is supported, showing that entrepreneurial strategies need practical translation into innovations [280].

Finally, this analysis suggests that employee intrapreneurship partially mediates the link between OEO and organizational performance, indicating that while intrapreneurship is instrumental, other factors—such as leadership [226], innovation processes [153], and market conditions [83, 149]—also drive performance. This partial mediation underscores intrapreneurship as a significant, though not singular, pathway for realizing the benefits of organizational entrepreneurial orientation.

This approbation is not without limitations, which offer valuable avenues for future research. While the primary objective of this analysis was to examine the hypothesized relationships regarding the role of entrepreneurial competencies—

specifically entrepreneurial orientation and employee intrapreneurship—in enhancing labor productivity, it did not aim to develop a comprehensive model capturing all potential relationships between the constructs. For instance, theoretical interactions between individual and organizational entrepreneurial orientation, as well as between employee performance and organizational performance, were not explored. Future research should aim to establish a more robust and stable model that incorporates these and other potential relationships. Additionally, adjustments to the sample size and measurement model are recommended to enhance the stability and reliability of the findings. Furthermore, future studies are encouraged to test this model across diverse contexts, including variations in industry, culture, and demographic backgrounds, to provide further validation and generalizability of the results.

The objective of Section 1.3 is to validate the fundamental framework of the current dissertation. To achieve this objective, path analysis and mediating analysis are conducted using structural equation modeling with Mplus 8.3 to test the hypotheses formulated for this study. The findings indicate that entrepreneurial orientation, at both the individual and organizational levels, has a positive and significant influence on employee intrapreneurship. Additionally, the results confirm the positive relationship between employee intrapreneurship and labor productivity at two levels, measured by employee performance and organizational performance. Moreover, the analysis demonstrates that employee intrapreneurship mediates the relationship between entrepreneurial orientation at both levels and labor productivity across these two levels. The results obtained confirm that the formation of employees' entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship in an organization in modern economic conditions can be considered as a reserve for increasing organizational efficiency and labor productivity.

CONCLUSIONS OF CHAPTER 1

This chapter expands the parameters of qualitative characteristics of human resources by including entrepreneurial competencies of employees - namely, individual

and organizational entrepreneurial orientation, as well as intrapreneurial behavior (initiating strategic renewal in the organization and creating business projects), and substantiates their role in increasing productivity in the modern economy. Key conclusions:

1. The necessity to expand the parameters of qualitative characteristics of labor resources to include entrepreneurial competencies as a set of intentions (entrepreneurial orientation) and activities (employee intrapreneurship) was substantiated to increase the competitiveness of the labor force and labor productivity.

2. Based on a review of academic literature, a theoretical approach was developed to link entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship to explain the effective use of human resources by linking them to performance measures (i.e., employee and organizational performance) in an organizational context.

3. The role of developing entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship in enhancing labor productivity and organizational efficiency was empirically approbated. Approbation of the proposed theoretical approach justifies the need to develop measures to increase labor productivity through the development of entrepreneurial competencies.

CHAPTER 2. THE DEVELOPMENT OF EMPLOYEES' ENTREPRENEURIAL COMPETENCES IN TERMS OF ENTREPRENEURIAL ORIENTATION AND EMPLOYEE INTRAPRENEURSHIP

2.1 Research methodology on the development of employees' entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship

The purpose of section 2.1 is to describe the research objectives and hypotheses testing strategy, measurement design and its sources, data collection, sampling method and characteristics, hypothesis testing strategy and its mathematical expression. The importance of the development of employees' entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship in increasing the productivity and competitiveness of labor resources gives rise to two related problems: (1) substantiation of tools for stimulating individual entrepreneurial orientation and employee intrapreneurship in the practice of human resource development of the organization; (2) identification of patterns of interaction between the levels of entrepreneurial orientation (organizational orientation is not always consistent with individual orientation), and their impact on labor results. Considering the lack of methodological studies on these issues, the author proposed a methodology for analyzing the parameters of intrapreneurship and entrepreneurial orientation (Table 2.1). Section 2.1 is structured in a way that the abovementioned methodology elements are disclosed firstly for the first series of study and then for the second series of study.

Chapter 2 aims to explore the development of employees' entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship as growth reserves for labor productivity and efficiency. The first series of study consists of three specific research objectives or analyses to explore the formation of individual entrepreneurial orientation and employee intrapreneurship (see Table 2.1):

—Stage 1.1. The objective of analysis at stage 1.1 was to identify the influence of socio-demographic characteristics of labor resources on the entrepreneurial

orientation of employees. Specifically, this study sought to identify the demographic variations associated with entrepreneurial orientation within this context. To address this objective, this analysis employed t-tests and analysis of variance (ANOVA) techniques.

Table 2.1 – The analytical stages, empirical goals and corresponding analytical strategies

	Empirical Objectives	Analytical strategies
The first series of study	Stage 1.1: To identify the influence of socio-demographic characteristics of labor resources on the entrepreneurial orientation of employees	T-test and ANOVA techniques
	Stage 1.2. To identify the influence of individual entrepreneurial orientation of employees on their inclusion in the intrapreneurship system	Group regression and hierarchical regression
	Stage 1.3. To analyze the expression of individual entrepreneurial orientation by integrating socio-psychological factors	Structural equation modeling
The second series of studies	Stage 2.1. To reveal the alignment between organizational entrepreneurial orientation and individual entrepreneurial orientation and its impact on employees' positive work attitudes	Polynomial regression with surface response analysis
	Stage 2.2. To reveal the alignment between organizational entrepreneurial orientation and individual entrepreneurial orientation and its impact on employees' intrapreneurial behavior	Polynomial regression with surface response analysis
	Stage 2.3. To reveal the transition path from an organizational entrepreneurial orientation to an employee's intrapreneurial behavior	A mediation model based on the Process Hayes analysis tool model 4

—Stage 1.2. Analysis at stage 1.2 extended investigation into the relationship between employee's individual entrepreneurial orientation and employee intrapreneurship in the organizational context. Specifically, this extension aimed to explore the interactions between significant demographic variables observed in analysis at stage 1.1 and individual entrepreneurial orientation, and their impact on employee intrapreneurship, including strategic renewal behavior and venture creating behavior. For this extended analysis, this analysis utilized grouped regression and hierarchical regression techniques. This approach was appropriate given that demographic variables are categorical (e.g., gender and income) while the independent variables are continuous. As recommended by Cohen et al. [69], grouped regression is suitable for examining the impact of categorical demographic variables on the causal relationships between continuous variables in this context.

—Stage 1.3. After the preliminary exploration of the relationship between individual entrepreneurial orientation and employee intrapreneurship, analysis at stage 1.3 constructed a model based on structural equation theory to analyze the impact of certain important social-psychological factors, namely psychological safety and work engagement, on employees' entrepreneurial orientation and intrapreneurial behaviors. The rationale for using structural equation modeling is that it systematically describes the relationships between observed variables and latent variables. This approach is necessary for testing the hypothesized model based on theoretical frameworks and existing empirical research. Scholars argue that structural equation modeling addresses limitations of traditional statistical methods, such as hierarchical regression analysis, by simultaneously analyzing the complex relationships between multiple dependent variables and independent variables.

Overall, this series of studies measured the following constructs related to the internal labor market: employees' individual entrepreneurial orientation, psychological safety, work engagement, and employee intrapreneurship (including strategic renewal behaviors and venture-creating activities). Additionally, this study collected demographic information on employed workers, including age, gender, income, and education level. This study series aims to model key demographic and socio-psychological variables relevant to employees' entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship and to test hypothesized relationships among latent variables related to employees' entrepreneurial orientation and intrapreneurial behaviors. Based on existing theories and prior scholarly work, this study established these constructs as the foundation for research hypotheses and theoretical model. These constructs, their corresponding measurement items and sources for this study are detailed in Appendix 1.

—Employees' individual entrepreneurial orientation. The individual entrepreneurial orientation (IEO) was assessed using the College Students' Entrepreneurial Mindset Scale (CS-EMS), a recently developed and validated instrument by Jung and Lee [161]. The study employed a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree) to assess 19 items within the CS-EMS,

categorized into five dimensions: innovativeness (6 items), need for achievement (4 items), risk-taking (3 items), autonomy (3 items), and proactiveness (3 items). Reliability assessments, as documented in prior research (Jung & Lee), demonstrated strong internal consistency, with Cronbach's α values of 0.88 (innovativeness), 0.83 (need for achievement), 0.88 (risk-taking), 0.77 (autonomy), and 0.80 (proactiveness). The composite scale also exhibited high reliability (α = 0.94).

—Employee intrapreneurship. The measurement of employee intrapreneurship was based on the Employee Intrapreneurship Scale (EIS) developed by Gawke et al. [123]. The original EIS comprised eight items designed to assess two dimensions of employee intrapreneurship: strategic renewal behavior and venture behavior. In their study, the Cronbach's α values for these two dimensions were 0.91 and 0.87, respectively, demonstrating the scale's strong internal consistency and reliability in measuring employee intrapreneurship.

— Psychological safety. The present study adopts Edmondson's [101] seminal tripartite scale for measuring psychological safety. The scale includes three primary items measuring organizational dynamics: (1) the degree to which members feel comfortable raising problems and difficult topics, (2) the perceived safety of taking risks within the organization, and (3) the ease with which members can seek assistance from their peers. The resulting composite construct demonstrated a reliability coefficient of 0.801, confirming the robustness of this scale as a reliable measure of psychological safety.

— Work engagement. This study employed the UWES-3, a shortened version of the Utrecht Work Engagement Scale, to measure work engagement across its three dimensions: vigor, dedication, and absorption. These dimensions are consistent with those found in the longer versions of the scale, such as the UWES-17 [266] and the UWES-9 [267]. The use of the abbreviated scale was intended to reduce the response burden on participants. Carmona-Halty et al. [58], through an analysis of five national samples, demonstrated that the UWES-3 is highly correlated with the UWES-9, accounting for 86–92% of the variance in the longer version.

Considering that this is an exploratory study [126] and in light of the

confidentiality policies concerning human resources of the surveyed companies [18], this study's sample was collected using convenient channels. The researchers collected the study's sample in Shanghai and Shenzhen, two major economic hubs in China with vibrant labor markets and a high concentration of entrepreneurial ventures, due to the researchers' background convenience and social networks. Data collection occurred between January and March 2023, primarily from small and medium-sized enterprises.

Specifically, study series 1 employed the hybrid sampling method combining the characteristics of both conveniency and snowball sampling method to gather the permission from department heads to the distribution of the research survey, a sampling technique based on convenient social network relationships [220]. This method is particularly suitable for research contexts where the target population is hidden or difficult to access through traditional sampling frames for the researchers. Given that the initial subjects of this study are managers from specific functional departments and the existing convenient sampling frames from the researchers social backgrounds and networks are inadequate, snowball sampling allowed for the expansion of the research scope through the chain-referral process of initial samples, effectively reaching the target population [46]. The researchers, utilizing their social network resources and the convenience of data collection, selected initial seed samples through convenient sampling. These seed samples were aimed at department heads, and their professional qualifications were validated through further communication. Since the initial sample size was insufficient to support the expected data analysis, the researcher implemented the snowball sampling technique. During the snowball sampling process, the department heads who showed initial willingness to assist with the distribution questionnaire were asked to recommend other individuals who met the study criteria. Further communication with the recommended individuals is conducted to ensure their willingness to participate in this research. Overall, the initial sampling framework was derived from three primary sources: (1) the social networks of the researchers themselves, (2) the social networks of the researchers' acquaintances, and (3) the social networks of the initial seed participants. To minimize social desirability bias and reduce sample attrition, the study employed anonymization: the research invitation clearly

stated that data would be anonymized, with only the interested surveying questions recorded rather than specific sensitive information. In total, the study invited 30 department heads showing willingness to participate in the distribution of the research survey to assist in data collection. These department heads, upon agreement to participate, distributed the online questionnaire link via social media profiles, resulting in 278 returned questionnaires.

To ensure data reliability, a quality control question was implemented, which resulted in the exclusion of 17 responses. Consequently, 261 valid responses were available for analysis. The sample size selection was influenced by response rates, research limitations, comparability with other studies, and the need for robust statistical analysis. Additionally, Roscoe [258] suggests that sample sizes for most behavioral research should fall between 30 and 500.

Table 2.2.a (in Appendix 3) presents a detailed breakdown of respondent demographics. The demographic characteristics of the sample are described as follows: (1) Male workers comprised 17.6% of the respondents, while female workers constituted 82.4%. (2) The majority of respondents (90%) were aged between 18 and 30 years, with 9.6% in the 31 to 40-year age group, and 0.4% in the 41 to 50-year age group. (3) In terms of educational attainment, 73.9% of the respondents had received college or university education, while 26% had obtained a master's or doctoral degree. (4) Regarding income levels, 39.1% of respondents earned below 4000 CNY (approximately 564.58 USD), 41.8% earned between 4000 and 8000 CNY (approximately 564.58-1129.16 USD), 12.3% earned between 8000 and 12000 CNY (approximately 1129.16-1693.74 USD), and 6.9% earned above 12000 CNY (approximately 1693.74 USD).

After elucidating the research objectives and the rationale behind the chosen hypothesis testing strategies, this section will focus on a detailed presentation of each hypothesis testing approach and the process of model development. When presenting the models, their mathematical expressions are presented for potential reference. For methods commonly used in the academic field, a brief report is provided.

—Analysis at Stage 1.1. Firstly, to identify the influence of socio-demographic

characteristics of labor resources on the entrepreneurial orientation of employees, this study utilized independent sample t-tests to compare the means of two distinct demographic groups. This method is appropriate for our research as it assesses whether there are significant differences in the means of a continuous dependent variable between two groups. The simplicity and effectiveness of this approach in such comparisons are well-documented [210]. For comparing means across multiple groups, this study employed one-way analysis of variance (ANOVA), which is well-suited for examining the impact of a single independent variable on a continuous dependent variable across three or more groups. This choice is supported by its proven efficiency in identifying significant differences between group means [292].

In research in the field of social science, the independent samples t-test is a widely used statistical method for comparing the means of two distinct groups to determine if there is a significant difference between them. The mathematical expression for the independent samples t-test is as follows:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{s_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \tag{2.1}$$

In this context, n_1 and n_2 represent the sample sizes of the two groups of data, while $\overline{X}_1$ and $\overline{X}_2$ denote the sample means of these respective groups. Specifically, s_p^2 refers to the pooled variance, which is computed from the sample variances s_1^2 and s_2^2 of the two groups. The formula for calculating the pooled variance is given by:

$$s_p^2 = \frac{(n_1 - 1)\, s_1^2 + (n_2 - 1)\, s_2^2}{n_1 + n_2 - 2} \tag{2.2}$$

Additionally, the t-value follows a t-distribution with a specified number of degrees of freedom ($n_1 + n_2 - 2$). Based on a predetermined significance level (e.g., 0.05), one can determine the critical value using a t-distribution table or computational tools. The computed t-value is then compared to this critical value. If the absolute value of the t-value exceeds the critical value, the null hypothesis is rejected, indicating a significant difference between the means of the two groups. Conversely, if the absolute value of the t-value does not exceed the critical value, the null hypothesis cannot be rejected, suggesting that the difference between the group means is not statistically

significant. In this study, statistical software SPSS 26 was employed to calculate these values, comparing individual entrepreneurial orientations within the internal labor market of enterprises, specifically examining differences based on gender and age.

For comparing means across multiple demographic groups, we employed one-way Analysis of Variance (ANOVA), which is particularly suited for examining the effect of a single independent variable on a continuous dependent variable across three or more groups. Suppose we have k independent samples, each with sample size n_i $(i = 1,2,...,k)$, and the population means of these groups are $\mu_1,\mu_2,\ldots,\mu_k$, with the overall population mean denoted as μ. Based on this setup, the mathematical formulation of one-way ANOVA can be decomposed into several key components:

Sum of Squares Between Groups (SSB): This term quantifies the variation between the means of different groups and the overall mean of the population.

$$SSB = \sum_{i=1}^{k} n_i (\overline{Y}_i - \overline{Y})^2 \tag{2.3}$$

Here, $\overline{Y}_i$ is the mean of the i -th group, and $\overline{Y}$ is the overall mean of all samples.

Sum of Squares Within Groups (SSW): This metric captures the variation among individuals within each group.

$$SSW = \sum_{i=1}^{k} \sum_{j=1}^{n_i} (Y_{ij} - \overline{Y}_i)^2 \tag{2.4}$$

Here, Y_{ij} represents the j -th observation in the i - th group.

Total Sum of Squares (SST): This is the total variation in the data, which can be decomposed into the sum of SSB and SSW.

$$SST = SSB + SSW = \sum_{i=1}^{k} \sum_{j=1}^{n_i} (Y_{ij} - \overline{Y})^2 \tag{2.5}$$

Mean Squares:

- Mean Square Between Groups (MSB):

$$MSB = \frac{SSB}{k-1} \tag{2.6}$$

- Mean Square Within Groups (MSW):

$$MSW = \frac{SSW}{N-k} \tag{2.7}$$

Here, N is the total number of observations, and k is the number of groups.

F-Statistic: This statistic is used to test whether there are significant differences between group means.

$$F = \frac{MSB}{MSW} \tag{2.8}$$

The fundamental principle of one-way analysis of variance (ANOVA) is to partition the total variation into two components: between-group variation and within-group variation. By comparing the magnitude of between-group variation to within-group variation, we can determine whether there are significant differences among the group means. Specifically, if the between-group variation is significantly greater than the within-group variation (i.e., a large F-value), it indicates that there are significant differences among the group means. Conversely, if the F-value is small, it suggests that the differences among the group means are not significant. In the context of dissertation research, this method can be employed to analyze differences in entrepreneurial orientation among the workforce across different income levels and educational backgrounds. What's more, statistical software SPSS 26 was employed to conduct the t-test and one-way analysis of variance analysis.

—Analysis at stage 1.2. Subsequently, this study employs hierarchical regression analysis to test the first two hypotheses of the second research objective. These hypotheses pertain to the impact of employees' entrepreneurial orientation on their intrapreneurial behaviors. The analytical procedure is conducted in two steps: first, categorical variables, age, and education level are included in the regression equation through dummy variable coding; second, entrepreneurial orientation is introduced into the regression equation.

Group regression is utilized to estimate regression models within distinct groups, such as age cohorts, gender, regions, etc., to discern variations in relationships across these groups. Suppose the existence of the following linear regression model:

$$Y_i = \alpha_j + \beta_j X_i + \varepsilon_i,\ j = 1, 2, \ldots, G \tag{2.9}$$

Group regression analysis involves the estimation of different intercepts and slopes for distinct subgroups within the data. Let Y_i represent the dependent variable, X_i the independent variable, α_j the intercept, β_j the slope for the j -th group, ε_i the error term, and G the number of groups. The principle of group regression is to

perform separate regressions for each group to estimate group-specific coefficients. By comparing the coefficients across different groups, one can investigate how the impact of the independent variable varies between groups.

Hierarchical regression, also known as stepwise regression, is typically employed to examine the incremental changes in a model's explanatory power as new variables or groups of variables are introduced. The model is usually estimated by progressively adding variables. This method is used to test the latter two hypotheses of the second study. These hypotheses pertain to the moderating effects of gender and income on the relationship between entrepreneurial orientation and intrapreneurial behavior. Suppose the existence of two models:

Base Model:

$$Y=\beta_0+\beta_1X_1+\varepsilon \tag{2.10}$$

Extended Model:

$$Y=\beta_0+\beta_1X_1+\beta_2X_2+\varepsilon \tag{2.11}$$

Base Model incorporates the fundamental variables, while Extended Model builds upon Base Model by including additional variables. The essence of hierarchical regression lies in assessing whether the inclusion of new variables significantly enhances the explanatory power of the model, which is typically evaluated through changes in the coefficient of determination (ΔR^2). Similarly, statistical software SPSS 26 was employed to conduct grouped regression and hierarchical regression analysis.

—Analysis at stage 1.3. Finally, this study proceeds to formally test structural model. This model needs to account for the relationships among multiple dependent variables. Specifically, this study design incorporates mediating variables and chain mediation, as this study employs Structural Equation Modeling (SEM) to validate the research hypotheses. SEM is a multivariate statistical analysis method used to test hypothesized relationships among observed and latent variables. This method allows the researcher to use the collected data to test the hypothesized model based on theoretical foundations. In accordance with existing theories and research, the path model for the structural equation is illustrated in Figure 2.1 (refer to Chapter 2, Section 2.2 for details). The mathematical representation of the model is as follows:

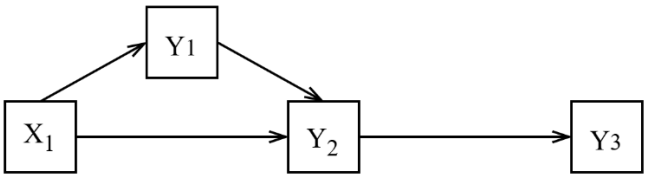


Figure 2.1 – The structural equation model for analysis 1.3 in the dissertation work

To comprehensively describe the assumptions of the Structural Equation Model (SEM), the corresponding mathematical expressions for each hypothesis can be enumerated:

Hypothesis 1 (H_1): Psychological safety (X_1) positively contributes to work engagements (Y_1).

$$Y_1 = \beta_1 \times X_1 + \varepsilon_1 \quad (2.12)$$

Hypothesis 2 (H_2): Psychological safety (X_1) contributes to individual entrepreneurial Orientation (Y_2).

$$Y_2 = \beta_2 \times X_1 + \varepsilon_2 \quad (2.13)$$

Hypothesis 3 (H_3): Work engagement (Y_1) positively contributes to individual entrepreneurial Orientation (Y_2).

$$Y_2 = \beta_3 \times Y_1 + \varepsilon_3 \quad (2.14)$$

Hypothesis 4 (H_4): Individual entrepreneurial orientation (Y_2) positively contributes to employee intrapreneurship (Y_3).

$$Y_3 = \beta_4 \times Y_2 + \varepsilon_4 \quad (2.15)$$

Hypothesis 5 (H_5): Psychological safety (X_1) has a positive indirect effect on employee intrapreneurship (Y_3), through employee's individual entrepreneurial orientation (Y_2).

Indirect path through individual entrepreneurial orientation:

$$Y_3 = \beta_4 \times (\beta_2 \times X_1 + \varepsilon_2) + \varepsilon_4 \quad (2.16)$$

Simplified to:

$$Y_3 = \beta_4 \times \beta_2 \times X_1 + \beta_4 \times \varepsilon_2 + \varepsilon_4 \quad (2.17)$$

Hypothesis 6 (H_6): Work engagement (Y_1) has a positive indirect effect on employee intrapreneurship (Y_3), through employee's individual entrepreneurial orientation (Y_2).

$$Y_2 = \beta_3 \times Y_1 + \varepsilon_3 \quad (2.18)$$

$$Y_3 = \beta_4 \times (\beta_3 \times Y_1 + \varepsilon_3) + \varepsilon_4 \quad (2.19)$$

Simplified to:

$$Y_3 = \beta_4 \times \beta_3 \times Y_1 + \beta_4 \times \varepsilon_3 + \varepsilon_4 \quad (2.20)$$

Hypothesis 7 (H_7): Psychological safety (X_1) has a positive serial indirect effect

on employee intrapreneurship (Y_3), through employee's work engagement (Y_1) and individual entrepreneurial orientation (Y_2).

Continuous indirect path through work engagement (Y_1) and individual entrepreneurial orientation (Y_2):

$$Y_1 = \beta_1 \times X_1 + \varepsilon_1 \quad (2.21)$$

$$Y_2 = \beta_3 \times (\beta_1 \times X_1 + \varepsilon_1) + \varepsilon_3 \quad (3.22)$$

$$Y_3 = \beta_4 \times (\beta_3 \times (\beta_1 \times X_1 + \varepsilon_1) + \varepsilon_3) + \varepsilon_4 \quad (2.23)$$

Simplified to:

$$Y_2 = \beta_3 \times \beta_1 \times X_1 + \beta_3 \times \varepsilon_1 + \varepsilon_3 \quad (2.24)$$

$$Y_3 = \beta_4 \times (\beta_3 \times \beta_1 \times X_1 + \beta_3 \times \varepsilon_1 + \varepsilon_3) + \varepsilon_4 \quad (2.25)$$

Finally, it can be simplified to:

$$Y_3 = \beta_4 \times \beta_3 \times \beta_1 \times X_1 + \beta_4 \times \beta_3 \times \varepsilon_1 + \beta_4 \times \varepsilon_3 + \varepsilon_4 \quad (2.26)$$

These expressions clearly demonstrate the relationship between each hypothesis, as well as the respective indirect and direct paths. To examine these hypotheses, statistical software Mplus 8.3 is employed.

Entrepreneurial orientation could also be a characteristic for existing organizations. Especially, in section 1.2, the interaction between entrepreneurial orientation at the organizational and individual level has been theoretically justified with theories on organizational behavior and motivation such as social identity theory, personal-organizational fit theory, and social information processing theory. Building on this foundation, the second series of study aim to explore the relationship between the interaction of entrepreneurial orientation at both employee and organization level and its impact on employee intrapreneurship. To achieve this objective, three specific research objectives or analyses have been outlined (see Table 2.1):

—Stage 2.1. Analysis at stage 2.1 involves analyzing the interaction between organizational and individual entrepreneurial orientations and its impact on employees' proactive work attitudes. For this purpose, a combination of polynomial regression models and response surface analysis is employed. This analytical approach is chosen for its ability to provide a detailed perspective on the relationship between two predictor variables (organizational and individual entrepreneurial orientations) and outcome variables (organizational identification and affective commitment). The relationship can be visualized by plotting the results of polynomial regression analysis

in three-dimensional space [105].

—Stage 2.2. Analysis at stage 2.2 involves analyzing the interaction between organizational and individual entrepreneurial orientations and its impact on employee intrapreneurship. Similar to analysis at stage 2.1, a combination of polynomial regression models and response surface analysis is employed. This analytical approach is chosen for its ability to provide a detailed perspective on the relationship between two predictor variables (organizational and individual entrepreneurial orientations) and outcome variables (employee intrapreneurship). The relationship can also be visualized by plotting the results of polynomial regression analysis in three-dimensional space [105].

—Stage 2.3. Analysis at stage 2.3 integrates organizational entrepreneurial orientation with employees' positive work attitudes and intrapreneurial behavior. Specifically, drawing on social identity theory, the research conceptualizes organizational and individual entrepreneurial orientations as typical identities under new economic conditions for organizations and their employees, respectively. Thus, the employee's organizational identification is used as a mediating variable to explore the sequence of relationships among organizational entrepreneurial orientation identity, employee identity recognition, and intrapreneurial behavior. For this second goal, the analysis employs the mediation model from PROCESS macro version 4 within SPSS. This method is selected to examine the relationship between organizational entrepreneurial orientation and employees' intrapreneurial behavior with organizational identification as a mediating variable. The PROCESS model 4 is effective in elucidating complex causal relationships by providing statistical estimates of direct, indirect, and total effects. This approach helps to clearly delineate the causal pathways and underlying mechanisms involved in the relationship between organizational entrepreneurial orientation and intrapreneurial behavior.

The second series of studies measure different constructs related to the internal labor market: employees' individual entrepreneurial orientation, organizational entrepreneurial orientation, two positive work attitudes of employees (including affective commitment and organizational identification), and employee

intrapreneurship (including strategic renewal behaviors and venture-creating behaviors). Demographic information on employed workers, including age, gender, income, and education level, was also collected. This series primarily examined the impact of the interaction between the two levels of entrepreneurial orientation on intrapreneurial behaviors within the internal labor market. Additionally, the measurement scales and sources for the constructs used in this dissertation are summarized in the appendix for reference (refer to Appendix 1 for details).

—Organizational entrepreneurial orientation. The OEO scale, derived from the foundational works of Lumpkin and Dess [189] and Covin and Slevin [75], serves as a key assessment tool in this research, measuring three core dimensions: risk-taking, innovativeness, and proactiveness. Previous studies, such as those by Ferreras-Méndez et al. [111], employed this scale to explore the relationship between OEO and small-to-medium enterprises' (SMEs) performance in new product development. The Cronbach's α coefficient of 0.83 in their study indicates a high level of internal consistency for the scale.

—Employees' individual entrepreneurial orientation. The IEO was similarly assessed using the dimensions of risk-taking, innovativeness, and proactiveness. This measure was adapted from the work of Langkamp Bolton and Lane [181], with all items achieving a Cronbach's α greater than 0.7. This surpasses the reliability threshold of 0.7 recommended by Nunnally and Bernstein [228], ensuring strong internal consistency for this scale.

—Affective commitment. Affective commitment was measured using a Chinese-adapted version of the AC scale developed by Tang et al. [288], which is based on the original scales designed by Meyer et al. [208] and Ko et al. [173]. Tang et al. [288] reported a Cronbach's α of 0.85 for this adapted scale, confirming its reliability for use in this study.

—Organizational identification. The OI construct was evaluated using a Chinese-adapted scale originally developed by Smidts et al. [277] and translated by Zhonghua and Chen [316]. This scale demonstrated strong reliability, with an internal consistency score of 0.84. Furthermore, the discriminant validity of this scale was verified through

confirmatory factor analysis.

Given the exploratory nature of the current study, the sample was collected via convenience sampling through appropriate online channels [126]. Specifically, an online survey was administered to individuals identified as "employed" within the Chinese private sector, utilizing various distribution platforms such as social media channels including WeChat and Douban, as well as survey tools like Tencent Surveys. The questionnaire included an initial screening question on their employment status as an employee of a private company. Respondents who affirmed their employment in the private sector were permitted to continue, while those who responded negatively were disqualified from further participation. Respondents meeting these criteria were offered a nominal incentive of 2 RMB (approximately 0.3 USD).

This distribution method yielded a total of 352 completed surveys. The web-based survey was designed to prevent the submission of incomplete responses, thereby ensuring that the sample collected was free from missing data (see, for example, Valentijn et al., [294]). To ensure data integrity, this research implemented rigorous measures, including specific screening questions and a minimum completion time of 120 seconds. Adhering to these stringent standards, this study retained 292 valid responses from the initial 352 submissions, resulting in a retention rate of 82.71%. Due to inherent challenges in tracking the number of individuals who received or viewed the survey invitation and the uncertainty associated with click rates in our online distribution, this study reported retention rates rather than response rates (see, for example, Bufquin et al., [56]; Zhang et al., [313]). Detailed demographic information for the respondents is provided in Table 2.3.a. (in Appendix 3).

After elucidating the research objectives and the rationale behind the chosen hypothesis testing strategies, this section focusses on a detailed presentation of each hypothesis testing approach and the process of model development. When presenting the models, their mathematical expressions are provided for reference.

—Analysis at stage 2.1 and 2.2. This analysis employs polynomial regression combined with response surface analysis to test the proposed hypotheses based on statistical software SPSS 26. This methodology is considered a progressive technique,

offering a detailed perspective on the relationships between combinations of two predictor variables and an outcome variable. These relationships can be visualized by plotting the results of the polynomial regression analysis in a three-dimensional space, as described by Edwards and Parry [105]. Notably, the integration of polynomial regression with response surface analysis is increasingly utilized in organizational research. This approach facilitates the exploration of various aspects of value congruence, such as job satisfaction [28], work engagement [248], employee creativity [184], and innovative performance [59]. The general formula representing the relationships tested using this polynomial method is as follows:

$$Z = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + \varepsilon \quad (2.31)$$

In Equation (1), Z represents the dependent variable, while X and Y serve as predictors. Within the framework of polynomial regression, Z is regressed on the two primary predictor variables X and Y, their interaction term XY, as well as the squared terms for each predictor. Following the guidelines established by Cohen et al. [68], both IEO and OEO were treated in a centralized manner. Demographic variables were also controlled within the regression model. Additionally, the effects of value consistency and inconsistency on the outcome variable were described through two subsequent equations.

$$Z = b_0 + (b_1 + b_2)X + (b_3 + b_4 + b_5)X^2 + \varepsilon \quad (2.32)$$

$$Z = b_0 + (b_1 - b_2)X + (b_3 - b_4 + b_5)X^2 + \varepsilon \quad (2.33)$$

Equation (2) captures the statistical nuances of the consistency line, while Equation (3) elucidates information related to the inconsistency line. In Equation (2), the terms $b_1 + b_2$ and $b_3 + b_4 + b_5$ represent the slope and curvature of the consistency line, respectively. A positive value for $b_1 + b_2$ indicates an upward trajectory of the consistency line, which may have a positive contribution to the outcome variable, whereas a positive value for $b_3 + b_4 + b_5$ signifies convexity. Similarly, the terms $b_1 - b_2$ and $b_3 - b_4 + b_5$ in Equation (3) can be interpreted in a comparable manner. In the present study, the dependent variables include two positive work-related attitudes: organizational identification (OI) and affective commitment (AC) at stage 2.1, two elements of intrapreneurial behavior: strategic renewal behavior (SRB) and venture-

creating behavior (VB) at stage 2.2. The primary independent variables under consideration are organizational entrepreneurial orientation (OEO) and individual entrepreneurial orientation (IEO). The foundational polynomial regression equations for these work attitudes are as follows:

$$AC = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + \varepsilon \quad (2.34)$$

$$OI = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + \varepsilon \quad (2.35)$$

$$SRB = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + \varepsilon \quad (2.36)$$

$$VB = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + \varepsilon \quad (2.37)$$

—Analysis at stage 2.3. The study employs Model 4 of the PROCESS macro within SPSS [138] to examine the mediating role of organizational identification (OI) in the relationships between organizational entrepreneurial orientation (OEO) and various dimensions of employee intrapreneurship (EI). The significance of the indirect mediation effect on the outcome variable was determined using a bootstrapping method with 5000 samples within a 95% confidence interval [138]. Following the guidelines proposed by Bernerth and Aguinis [45], method controls for demographic factors such as age, gender, education level, and income were incorporated into the regression analysis to minimize potential confounding effects from socio-demographic variables. The classic mediation model is outlined in Figure 2.2, represented through three regression equations.

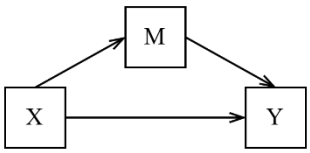


Figure 2.2 – The mediation model in the dissertation work

$$Y = b_0 + b_1X \quad (2.38)$$

$$M_e = b_2 + b_3X + \varepsilon \quad (2.39)$$

$$Y = b_4 + b_5X + b_6M_e \quad (2.40)$$

In this study, Y represents two components of employee intrapreneurial behavior: strategic renewal behavior and entrepreneurial creation behavior; X denotes organizational entrepreneurial orientation; and M signifies the mediating variable, organizational identification. The classical mediation analysis proposed by Baron and Kenny [37] is one of the most widely used methods for assessing mediation, primarily employing distributional regression to test mediation effects (see the diagram above).

The fundamental procedure is as follows: first, the relationship between the independent variable and the dependent variable is tested; second, the relationship between the independent variable and the mediating variable is examined; and finally, the mediating variable is included in the regression analysis of the relationship between the independent and dependent variables. If the relationship between the independent and dependent variables remains significantly correlated but is notably weakened, this indicates partial mediation. Conversely, if the significant relationship between the independent and dependent variables disappears, this suggests full mediation. Partial mediation does not imply that the data are imperfect; it may indicate that the effect of the independent variable on the dependent variable is mediated by more than one pathway. Additionally, PROCESS is a tool for testing mediation effects, providing estimates of direct and indirect effects as well as Bootstrap confidence intervals, beyond the conventional regression results. This study employs the PROCESS tool for mediation testing.

2.2 The formation of individual entrepreneurial orientation and its impact on employee intrapreneurship

The purpose of Section 2.2 is to elaborate on the empirical findings and their discussion based on previous empirical and theoretical works — in relation to the three empirical objectives of the first series of studies. The developed methodology, combined with the collected data, enables the first series of studies to address its three empirical objectives. This section is structured as follows: first, the empirical results regarding the role of entrepreneurial orientation as a labor characteristic are presented, contextualized within the demographic characteristics of labor resources; second, the empirical findings on the influence of individual entrepreneurial orientation on employee intrapreneurship are discussed, accounting for the moderating effects of demographic differences; third, the empirical results on the expression of individual entrepreneurial orientation are examined, integrating organizational and labor factors such as psychological safety and employee work engagement. The presentation of empirical results follows a systematic approach: first, to provide a clear understanding of the research background, particularly the research gap, and to outline the core

research concerns; second, to present empirical results involved in each analysis; and third, to discuss the hypothesis testing results in relation to prior empirical and theoretical work. Before proceeding to the next analysis, a summary of the identified patterns from the preceding analysis is provided. At end of the section, a discussion for the limitations and future research for the first series of study is also provided.

Analysis at stage 1.1 is to analyze individual entrepreneurial orientation such as innovativeness, need for achievement, risk-taking, autonomy, and proactiveness considering the employees' socio-demographic differences[5].

Despite significant research efforts that highlight the role of individual entrepreneurial orientation as a crucial labor characteristic in improving the employment outcomes of wage laborers [179], there is still a notable lack of scholarly attention regarding the influence of demographic variables on the formation of individual entrepreneurial orientation among employees [177]. Moreover, within the context of a neoliberal economy—characterized by a focus on market-driven forces and diminished state intervention—understanding how individuals utilize their distinct characteristics to succeed becomes increasingly vital [240]. This gap in literature, alongside the prevailing emphasis on personal initiative, underscores the need for further exploration of emerging market dynamics through the lens of the social-demographic characteristics of labor resources.

In this analysis, China is utilized as a case study to explore public perceptions of entrepreneurship since the market-oriented transformation initiated in the late 1970s. The widespread global proliferation of neoliberalism post-1980 [134] triggered the emergence of various liberal policies in China [55]. The advent of market-driven reforms brought about significant alterations in China's economic framework, prompting considerable shifts in the labor market. Notably, the entrepreneurial role in the history of People's Republic of China[6] has evolved from near nonexistence during

[5] The results of analysis 1.1 are adopted from author's peer-reviewed publications. For details: Wenjun Z. Working in the "Neo-Liberal Hegemony": An Investigation on Entrepreneurial Mindset of Internal Labor Market Based on Individual Differences / Wenjun Z., Panikarova S.V., Zhiyuan L., Qi Z. // Changing Societies & Personalities – 2023. – Vol. 7 – № 4 – pp. 47-70.

[6] In this dissertation, "China" refers to the People's Republic of China. This applies to every instance where the term "China" is mentioned.

earlier periods to becoming a pivotal driver of economic growth and innovation in more recent times [145]. Additionally, China's labor market presents a distinctive environment shaped by unique social and cultural values, Confucian influences, and political specificities, which differ considerably from Western models [230, 306]. Therefore, this analysis makes a valuable contribution to the existing body of literature by providing a novel analysis of how individual differences within the Chinese labor market interact with the neoliberal economic context to influence emerging markets. Building on the foundational principle and addressing the identified academic gaps, this study is primarily focused on investigating the connection between individual entrepreneurial orientation within internal labor markets and various demographic factors. Specifically, this analysis explores how gender, income level, educational attainment, and age influence individual entrepreneurial orientation.

To ensure the robustness of this analysis, the guidelines for measurement validity as outlined by Straub and Gefen [284] were adhered, which include an assessment of content validity, convergent validity, and discriminant validity. Convergent validity was evaluated through the use of Average Variance Extracted (AVE), following the method proposed by Fornell and Larcker [114], to determine the proportion of variance captured by the constructs relative to the variance due to measurement error. The consistency of the constructs was assessed using Composite Reliability (CR), which accounts for varying indicator loadings as suggested by Hair [130]. Cronbach's alpha was utilized to measure the internal consistency of the scales, reflecting the intercorrelation among the scale items [284]. For discriminant validity, the loadings and cross-loadings were analyzed to confirm that each construct exhibited greater variance with its corresponding indicators than with other constructs [130]. Content validity was established by adapting constructs and items from established literature, which were then refined through a pilot survey to ensure they were clear and distinct [228].

Table 2.4.a (in Appendix 3) displays the calculated values for AVE, CR, and Cronbach’s alpha for each construct. In line with Raykov's recommendations [250],

item “I prefer acting based on my own decision” in the autonomy scale[7] was excluded to ensure internal reliability in the subsequent data analysis. The analysis indicates that the lowest CR value is 0.670, the smallest Cronbach’s alpha value is 0.688, and the minimum AVE value is 0.504. These results suggest high reliability and convergent validity for all constructs, exceeding the thresholds proposed by previous studies [114, 233]. Table 2.5.a (in Appendix 3) presents the factor analysis results, showing loadings (italicized and bolded) significantly higher than cross-loadings. This finding, consistent with the framework established by Straub and Gefen [284], confirms adequate discriminant validity and convergent validity for all constructs used in this research.

To ensure that common method bias did not significantly affect our findings, we utilized the common method variable technique. Specifically, this analysis conducted Harman's one-factor test using SPSS 26 to detect any potential biases within our study, as recommended by prior literature [133]. The analysis indicated that the total variance accounted for by a single factor was 45.901%, which is below the commonly accepted threshold of 50% [246]. Consequently, these results suggest that common method bias is unlikely to pose a substantial concern in this research.

After confirming the validity of the measurement model and ensuring the integrity of this data, this analysis proceeded with the analysis necessary for hypothesis testing. To compare the means between two distinct groups, an independent samples t-test was employeed. This statistical method is particularly suitable for this analysis as it allows us to assess whether there is a statistically significant difference in the means of a continuous dependent variable between the two groups. The method’s widespread use and reliability in such comparative analyses are well-established in the literature [210]. Additionally, when comparing means across multiple groups, this analysis opted for a one-way ANOVA. This approach is particularly effective for evaluating the impact of a single independent variable on a continuous dependent variable across three or more groups. Its efficacy in detecting significant differences among group means has been extensively documented [292].

Table 2.6 illustrates the results of an independent samples t-test, disaggregated

[7] For details, refer to Appendix 1. Questionnaire, and its sources.

by gender. The analysis reveals significant differences between male and female participants in terms of innovativeness, risk-taking, and autonomy. However, the data does not indicate any statistically significant differences in the need for achievement and proactiveness between the two groups. Specifically, the mean scores for innovativeness, risk-taking, and autonomy among male employees are reported as 5.348, 4.819, and 5.478, respectively. In contrast, female employees show lower mean scores for these dimensions, with values of 4.937, 4.321, and 4.854, respectively. These findings suggest that male employees generally exhibit a stronger individual entrepreneurial orientation, as evidenced by higher levels of innovativeness, risk-taking, and autonomy.

Table 2.6 – T-test results on the mean difference of individual entrepreneurial orientation dimensions grouped by gender

Constructs	Gender	n	Mean	SD	T	Sig. (2-tailed)
I	Male	46	5.3478	1.11115	2.604	0.010*
	Female	215	4.9372	0.9386	2.334	0.023*
NA	Male	46	5.1196	1.27991	0.567	0.571
	Female	215	5.0198	1.03666	0.495	0.622
RT	Male	46	4.8188	1.33834	2.446	0.015*
	Female	215	4.3209	1.23418	2.321	0.024*
A	Male	46	5.4783	1.27348	3.315	0.001***
	Female	215	4.8535	1.13491	3.076	0.003**
P	Male	46	5.2754	1.26355	1.39	0.166
	Female	215	5.0264	1.06576	1.245	0.218

Note. Significant level: * p<0.05; ** p<0.01; *** p<0.001; Source: Developed by Authors.

Table 2.7 – T-test results on the mean difference of individual entrepreneurial orientation dimensions grouped by age

Construct	Age	n	Mean	SD	T	Sig. (2-tailed)
I	18-32	235	5.0979	0.95064	-1.368	0.108
	31-40	25	5.3667	0.75615	-1.645	
NA	18-32	235	5.0287	1.1019	-0.356	0.148
	31-40	25	5.1100	0.90738	-0.416	
RT	18-32	235	4.3887	1.27406	-0.643	0.565
	31-40	25	4.5600	1.20077	-0.674	
A	18-32	235	5.0610	1.00595	-1.221	0.981
	31-40	25	5.3200	1.02956	-1.198	
P	18-32	235	5.0227	1.12616	-2.151	0.045*
	31-40	25	5.5200	0.78811	-2.86	

Note. Significant level: * p<0.05; ** p<0.01; *** p<0.001; The age group 40-50 was disregarded due to the lack of a sufficient sample; Source: Developed by Authors.

Table 2.7 presents the results of an independent samples t-test, which is stratified by age groups. The analysis reveals that, apart from proactiveness, there are no

significant differences in various dimensions of individual entrepreneurial orientation among workers across different age categories. These findings suggest that employees within the internal labor market, regardless of age differences, generally demonstrate an individual entrepreneurial orientation. However, it is noteworthy that employees aged 31 to 40 display a greater tendency towards proactive behavior in the workplace compared to their peers aged 18 to 30.

Similarly, Table 2.8 reports the outcomes of an independent samples t-test based on educational attainment. The results indicate that there are no substantial differences in the various aspects of individual entrepreneurial orientation among employees with differing levels of education. This emphasizes that individuals within the internal labor market tend to exhibit individual entrepreneurial orientation regardless of their educational qualifications.

Table 2.8 – T-test results on the mean difference of individual entrepreneurial orientation dimensions grouped by educational level

Constructs	Education	n	Mean	SD	T	Sig. (2-tailed)
I	Undergraduate	193	4.9845	1.02337	-0.696	0.487
	Graduate	68	5.0809	0.85458	-0.758	0.449
NA	Undergraduate	193	4.9935	1.03878	-1.104	0.271
	Graduate	68	5.1618	1.19371	-1.033	0.304
RT	Undergraduate	193	4.4076	1.28187	-0.023	0.981
	Graduate	68	4.4118	1.22457	-0.024	0.981
A	Undergraduate	193	4.9819	1.18186	0.42	0.675
	Graduate	68	4.9118	1.19058	0.418	0.676
P	Undergraduate	193	5.0518	1.06484	-0.453	0.651
	Graduate	68	5.1225	1.21749	-0.425	0.672

Note. Significant level: * $p<0.05$; ** $p<0.01$; *** $p<0.001$; Source: Developed by Authors.

Table 2.9 presents the results of a one-way ANOVA, which was conducted to analyze differences in individual entrepreneurial orientation dimensions across various wage tiers. The analysis reveals significant disparities among employees at different wage levels concerning all IEO dimensions, apart from autonomy. Overall, employees in higher wage brackets tend to score higher on our IEO scale compared to those in lower income categories. Further details on these disparities are provided by the post-hoc test results, which include multiple comparisons. According to these results, employees earning less than 4,000 CNY displayed average scores of 4.765, 4.777, and 4.801 for innovativeness, need for achievement, and proactiveness, respectively. In contrast, employees with earnings exceeding 12,000 CNY had average scores of 5.528,

5.500, and 5.556 for these same dimensions. These findings suggest that employees who exhibit entrepreneurial characteristics, such as innovativeness, the need for achievement, risk-taking, and proactiveness, tend to command higher wages.

Table 2.9 – ANOVA analysis results on the mean difference of individual entrepreneurial orientation dimensions grouped by Income

Items	Income	n	Mean	SD	F	Sig. (2-tailed)	Multi-comparisons
I	4000	102	4.766	1.026	4.699	0.003	1-4*
	4000-8000	109	5.094	0.978			
	8000-12000	32	5.211	0.793			
	12000	18	5.528	0.707			
NA	4000	102	4.777	1.219	3.89	0.01	1-4*
	4000-8000	109	5.154	0.951			
	8000-12000	32	5.211	1.002			
	12000	18	5.500	0.836			
RT	4000	102	4.160	1.292	2.877	0.037	-
	4000-8000	109	4.474	1.260			
	8000-12000	32	4.740	1.050			
	12000	18	4.833	1.290			
A	4000	102	4.887	1.115	0.258	0.855	-
	4000-8000	109	5.005	1.222			
	8000-12000	32	5.063	1.134			
	12000	18	4.972	1.450			
P	4000	102	4.801	1.220	4.073	0.008	1-4*
	4000-8000	109	5.180	1.017			
	8000-12000	32	5.281	0.947			
	12000	18	5.556	0.870			

Note. Significant level: * $p<0.05$; ** $p<0.01$; *** $p<0.001$; The mean difference between Group 1(4,000 CNY and below) and Group 4 (12,000 CNY and above) is significant at the $p < 0.05$ level; Multi-comparisons: This analysis is conducted by grouping the sample according to income levels (1 represents 4,000 CNY and below, 2 represents 4,000-8,000 CNY, 3 represents 8,000-12,000 CNY, and 4 represents 12,000 CNY and above). Source: Developed by Authors.

This analysis identified two key demographic factors—gender and income level—that significantly impact an employee's individual entrepreneurial orientation. Specifically, male employees and those with higher income levels tend to exhibit stronger IEO. However, the analysis did not reveal a significant difference in the "autonomy" dimension across varying income levels. This suggests that personal autonomy may not be a crucial factor for individuals who opt for traditional employment, as opposed to those who pursue self-employment or entrepreneurship. This finding aligns with the study by Nikolova et al. [227], which highlights that self-employed individuals or those in leadership positions experience greater work autonomy compared to those employed by others. In general, the literature consistently

indicates that self-employed workers enjoy higher levels of autonomy and control in their work environment than employees [227, 281].

This analysis indicates that individuals with higher income levels tend to exhibit a stronger propensity for adopting an entrepreneurial orientation. From an economic perspective, increased income provides individuals with greater financial resources, thereby offering a buffer that reduces the perceived risks associated with entrepreneurial activities. This relationship between income and entrepreneurial engagement is supported by Monsen et al. [213], who highlighted the role of profit-sharing in enhancing employee involvement in emerging ventures, taking into account moderating factors such as risk and effort. Similarly, Douglas and Fitzsimmons [92] reached a comparable conclusion, suggesting that a positive attitude toward income is linked with stronger entrepreneurial intentions. They argue that the favorable association between income and entrepreneurial intentions can be understood through the principles of basic economic theory, which posits that the pursuit of entrepreneurial activities is a strategy for individuals to achieve higher income levels, thereby satisfying their increased demand for goods and services. This perspective aligns with core economic theory, which emphasizes the maximization of financial utility as a key driver of individual behavior.

This analysis observed that male employees are more likely to exhibit individual entrepreneurial orientation within the workplace, particularly in areas such as risk-taking, autonomy, and innovativeness. This observation aligns with findings from previous studies [187]. However, it is crucial to consider the influence of societal gender role expectations and cultural factors when examining gender disparities in individual entrepreneurial orientation. Gender schema theory suggests that individuals tend to conform to the gender roles prescribed by their sociocultural context [42]. In Confucian cultures, long-standing traditional roles that emphasize masculinity might either suppress or amplify women's entrepreneurial involvement [306]. Furthermore, differences in risk-taking behavior could be partially explained by the concept of control behavior, which has been shown to vary by gender [167]. For example, Envick and Langford [107] found that female entrepreneurs are more likely to exhibit control

behavior, which might drive them to pursue less risky business ventures [167]. Additionally, the observed differences in autonomy may be attributed to the greater self-confidence typically displayed by male entrepreneurs [167]. Women, influenced by social expectations regarding gender roles as outlined in gender schema theory, may be more inclined to seek support from spouses, family, friends, and colleagues. Lastly, although Lim and Envick [187] noted gender differences in innovativeness, these differences do not suggest that female entrepreneurs are less innovative; rather, they may be constrained by a lack of resources due to social norms. Consequently, factors such as educational background, career opportunities, and societal expectations, which are shaped by social expectations, could significantly contribute to the understanding of gender differences in innovativeness.

Employees within the age range of 31 to 40 are generally observed to exhibit more proactive behaviors in the workplace compared to their counterparts aged 18 to 30. This trend may be attributable to factors such as increased experience, maturity, career responsibilities, and a stronger commitment to their professional roles. Nevertheless, this analysis indicates that age cohorts and educational attainment do not have a significant influence on most components of employees' IEO. Three potential explanations may account for these findings. Firstly, consistent with previous research findings [96], the lack of significant differences across age groups in this analysis could be related to the specific composition of our sample, wherein 90% of the respondents are within the 18–30 age group. This demographic largely represents the native generation of the neoliberal economy. As a result, caution is warranted when generalizing these conclusions to older generations that were born and raised before China's market reforms. Secondly, the potential qualities associated with entrepreneurial thinking may be cultivated and developed irrespective of age and educational background. Moreover, an individual’s IEO can be shaped by a variety of other factors, including personal experiences [154], exposure to entrepreneurial role models [142], and the surrounding organizational culture [272]. These findings suggest that age and educational level alone do not significantly influence an individual's IEO when compared to these other factors. Additionally, IEO may function more

pragmatically, offering work-related benefits to certain groups of individuals regardless of their age and educational level [204].

Cultural and contextual factors are critical in interpreting these findings, particularly when comparing China to other regions. The influence of Confucian values, which emphasize tradition, Renqing (reciprocity), face, discipline, and harmony, likely fosters a consistent entrepreneurial orientation across various age groups in China. As highlighted by Obschonka et al. [230], regions in China that place less emphasis on these Confucian values tend to exhibit a more dynamic entrepreneurial culture. The evolution of China's entrepreneurial landscape is closely linked to the nation's economic growth and the gradual relaxation of policies governing private enterprises since the late 1970s [185]. This period of economic liberalization, coupled with rapid economic expansion, has generated entrepreneurial opportunities that are increasingly independent of formal educational backgrounds. The observed disparities in IEO across different income levels reflect the broader economic inequalities within China, where higher income brackets afford better access to resources necessary for entrepreneurship [260]. Furthermore, gender disparities in entrepreneurship in China may be attributed to traditional societal roles, which are rooted in Confucian culture and often favor masculinity, thereby influencing women's participation in entrepreneurial activities [306]. In contrast, in many developed countries, there is typically a stronger correlation between educational attainment and IEO, largely due to the emphasis on developing entrepreneurial skills within educational systems [100]. However, in these Western contexts, high income levels also contribute to greater entrepreneurial activity by providing better access to resources [234]. While social welfare systems in these countries might reduce the need for survival-driven entrepreneurship [78], gender disparities in entrepreneurship persist globally, although they manifest in different forms and intensities across various contexts.

In a neoliberal economic context characterized by innovation and buyer-driven competition, employment and labor values have undergone significant changes. To thrive in this environment, it is essential to develop entrepreneurial orientation, which involves the proactive identification and pursuit of opportunities. This analysis

examines entrepreneurial orientation among China's native generation, who have experienced market reform and neoliberal transformation, with a particular focus on the internal labor market. The findings indicate that age and educational attainment have a limited influence on entrepreneurial orientation. However, notable differences are observed concerning income levels and gender, with higher-income individuals and males exhibiting a stronger inclination towards entrepreneurial orientation. Additionally, within China's native generation affected by market reform and globalization, employees aged 31–40 demonstrate greater proactivity compared to those in the 20–30 age range.

Analysis at stage 1.2 is to investigate the impact of individual entrepreneurial orientation on the development of intrapreneurial behavior, which includes strategic renewal behavior and venture-creating behavior. What's more, continuing with the finding in analysis 1.1 that gender and income significantly contribute to the manifestation of individual entrepreneurial orientation, this analysis also tries to identify how gender and income moderate the strength of this relationship[8].

Demographic characteristics play a crucial role in influencing employees' attitudes toward work, particularly their individual entrepreneurial orientation, as these characteristics significantly shape cognitive processes and employee's professional competencies and competitiveness [177, 256]. To gain a comprehensive understanding of how employees develop an individual entrepreneurial orientation and, in turn, exhibit intrapreneurial behavior, it is vital to examine the impact of demographic variables. Within the context of employees' individual entrepreneurial orientation, two demographic factors—gender and income levels—stand out due to their significant influence through societal gender norms and organizational incentive structures [90, 169, 270]. Although the importance of gender and income in shaping individual entrepreneurial competencies and fostering intrapreneurial behavior is well-recognized, there is still a notable gap in research regarding how these demographic factors affect the relationship between an employee's individual entrepreneurial orientation and their

[8] The results of analysis 1.2 are adopted from author's peer-reviewed publications. For details: Wenjun Z. Intrapreneutial Behavior in Employees: Influence of Entrepreneurial Mindset and Demographics / Wenjun Z., Panikarova S.V. // Beneficium – 2023. – № 4 – P.100–108.

intrapreneurial behaviors.

To address the existing gap in literature, analysis 2.2 aims to empirically investigate the relationship between an individual entrepreneurial orientation and intrapreneurial behaviors, specifically conceptualized as strategic renewal behavior and venture-creating behavior. This analysis incorporates two key demographic variables: gender and income levels. This research seeks to contribute to ongoing academic discussions by exploring whether the impact of an individual entrepreneurial orientation on intrapreneurial behaviors varies across different demographic groups, particularly those defined by gender and income levels. Additionally, the study examines whether gender and income levels act as moderating factors in the relationship between an individual entrepreneurial orientation and intrapreneurial behavior. The ultimate objective is to determine which demographic group—male versus female employees or low-income versus high-income earners—exhibits a stronger relationship in this context.

This analysis employs hierarchical regression analysis to test the relationship between individual entrepreneurial orientation and employee intrapreneurship, namely strategic renewal behavior and venture-creating behavior. In the initial stages of the analysis (Models 1.1 and 1.2), the dependent variable examined is strategic renewal behavior, while in the subsequent models (Models 1.3 and 1.4), the focus shifts to venture-creating behavior. The analytical approach is executed in two primary steps: first, categorical variables such as age and education are integrated into the regression model using dummy coding; second, the individual entrepreneurial orientation variable is incorporated into the regression model. The results of the hierarchical regression are presented in Table 2.10. In Model 1.1, the control variables explain 4.7% of the variance in strategic renewal behavior. Conversely, Model 1.2 reveals a statistically significant and positive relationship between the individual entrepreneurial orientation and strategic renewal behavior ($\beta = 0.706$, $P < 0.001$, $R^2 = 54.1\%$). In Model 1.3, the control variables account for 2.2% of the variance in venture creation behavior, while Model 1.4 demonstrates a significant positive association between the individual entrepreneurial orientation and venture-creating behavior ($\beta = 0.468$, $P < 0.001$, $R^2 =$

46.8%).

Table 2.10 – The hierarchical regression results of individual entrepreneurial orientation on employee intrapreneurship

Variables	Strategic Renewal Behavior		Venture-creating Behavior	
	Model 1.1	Model 1.2	Mode 1.3	Model 1.4
Age	0.205**	0.141**	0.130	0.069
Education	0.042	0.030	0.048	0.036
IEO		0.706***		0.671***
F	6.383**	100.871***	2.838	75.365***
R^2	0.047	0.541	0.022	0.468
ΔR^2	0.047**	0.541***	0.022	0.468***

Note. N = 261; Significant level: * p<0.05; ** p<0.01; *** p<0.001; Source: Developed by Authors.

In line with the guidelines proposed by Cohen et al. [69], it is recommended to employ grouped regression when examining moderating effects, particularly when the moderating variable is categorical and the independent variable is continuous. This analysis identifies two categorical moderators—gender and income level—while the individual entrepreneurial orientation serves as its continuous independent variable. Consequently, this analysis classified its sample into specific groups based on these moderators: male and female groups, as well as employees earning 8,000 CNY or less and those earning more than 8,000 CNY. Within these defined groups, this analysis performed hierarchical regression analysis, first introducing control variables into the regression model and subsequently adding the individual entrepreneurial orientation as a predictor. This analysis primarily focuses on two dependent variables that capture key aspects of employee intrapreneurship: employees' strategic renewal behavior and venture creation behavior.

Table 2.11 provides an analysis of the effect of the independent variable, "individual entrepreneurial orientation," on the explanatory power of strategic renewal behavior and venture-creating behavior, disaggregated by gender. For male employees, as observed in Model 2-2 related to strategic renewal behavior, there is a substantial increase of 72% in the explained variance, with a significant correlation coefficient of 0.831 (P<0.001). Similarly, among female employees, Model 2-4 indicates a notable 49% increase in explained variance, with a corresponding correlation coefficient of 0.664 (P<0.001) for strategic renewal behavior. Regarding venture-creating behavior, Model 2-6 for male employees shows a considerable 57.4% rise in explained variance

when the "individual entrepreneurial orientation" variable is included, along with a significant correlation coefficient of 0.739 (P<0.001). Conversely, for female employees, Model 2-8 demonstrates a 43.8% enhancement in explained variance, with a correlation coefficient of 0.637 (P<0.001) concerning venture-creating behavior. These results highlight a gender-based difference in the influence of individual entrepreneurial orientation on intrapreneurial behavior, with a stronger impact observed among male employees compared to their female counterparts. Moreover, the correlation between individual entrepreneurial orientation and intrapreneurial behavior is more pronounced in the male group. Consequently, gender differences appear to moderate the relationship between individual entrepreneurial orientation and intrapreneurial behavior.

Table 2.11 – Gender's moderating effect on the relationship between individual entrepreneurial orientation and employee intrapreneurship

Variables	Strategic Renewal Behavior				Venture-creating Behavior			
	Male		Female		Male		Female	
	M 2.1	M 2.2	M 2.3	M 2.4	M 2.5	M 2.6	M 2.7	M 2.8
Age	0.220	0.199*	0.206**	0.136**	0.116	0.097	0.147*	0.080
Edu	-0.227	-0.045	0.106	0.048	-0.250	-0.087	0.121	0.066
IEO		0.831***		0.664***		0.739***		0.637***
F	1.385	35.949***	6.628**	67.854***	1.198	18.877***	4.501*	54.761***
R^2	0.061	0.720	0.059	0.491	0.053	0.574	0.041	0.438***
ΔR^2	0.061	0.720***	0.059**	0.491***	0.053	0.574***	0.041*	0.438***

Note. N = 261; Significant level: * p<0.05; ** p<0.01; *** p<0.001; Source: Developed by Authors.

Table 2.12 presents the findings from this analysis that investigates the moderating effect of income on the relationship between individual entrepreneurial orientation and employee's intrapreneurial behavior. For employees earning less than 8,000 CNY, there is a notable increase of 51.8% in the explained variance proportion, with a strong correlation coefficient of 0.715 (P<0.001). This result highlights the significant influence of an individual entrepreneurial orientation in fostering strategic renewal behavior among lower-income employees. Similarly, for those earning above 80,000 CNY, Model 3.4 shows a 59.83% increase in explained variance and a correlation coefficient of 0.69 (P<0.001), further emphasizing the importance of individual entrepreneurial orientation in influencing strategic renewal behavior. Moreover, among employees earning 8,000 CNY or less, individual entrepreneurial orientation explains 47.2% of the variance in venture-creating behavior, with a

corresponding coefficient of 0.678 (P<0.001). In contrast, for employees earning more than 8,000 CNY, the individual entrepreneurial orientation accounts for 40.4% of the variance in venture-creating behavior, accompanied by a coefficient of 0.628 (P<0.001).

These results provide partial support that income moderates the relationship between individual entrepreneurial orientation and intrapreneurial behavior, with a stronger relationship observed among lower-income employees. However, variations exist in the proportion of explained variance in relation to strategic renewal behavior and venture-creating behavior. Specifically, for strategic renewal behavior, individual entrepreneurial orientation accounts for 59.3% of the variance among employees earning more than 8,000 CNY, compared to 51.8% among those earning less than 8,000 CNY. Regarding venture-creating behavior, the individual entrepreneurial orientation explains 47.2% of the variance among employees with incomes below 8,000 CNY, while it accounts for 40.4% among those with incomes exceeding 8,000 CNY.

Table 2.12 – Income's moderating effect on the relationship between individual entrepreneurial orientation and employee intrapreneurship

Variables	Strategic Renewal Behavior				Venture-creating Behavior			
	Below 8000 CNY		Above 8000 CNY		Below 8000 CNY		Above 8000 CNY	
	M 3.1	M 3.2	M 3.3	M 3.4	M 3.5	M 3.6	M 3.7	M 3.8
Age	0.087	0.052	0.293*	0.28**	0.112	0.079	0.092	0.080
Edu	-0.015	-0.015	0.140	0.186	0.032	0.031	0.041	0.083
IEO		0.715***		0.690***		0.678***		0.628***
F	0.818	74.264***	3.177	22.383***	1.409	61.684***	0.274	10.387***
R^2	0.008	0.518	0.119	0.593	0.013	0.472	0.012	0.404
ΔR^2	0.008	0.518***	0.119	0.593***	0.013	0.472***	0.012	0.404***

Note. N = 261; Significant level: * p<0.05; ** p<0.01; *** p<0.001; Source: Developed by Authors.

The concept of entrepreneurial orientation has increasingly attracted scholarly interest, largely due to its recognized potential to drive innovation and improve organizational outcomes. This analysis reinforces the crucial role of individual entrepreneurial orientation in predicting employee's intrapreneurial behavior, including actions related to strategic renewal behavior and venture-creating behavior. The importance of promoting intrapreneurial activities within organizations, irrespective of their size or age, is widely acknowledged in the academic community [38]. Given the complex organizational dynamics shaped by the current economic environment, scholars argue that the adoption of intrapreneurial initiatives is essential, whether by individuals in top-management positions or those at the operational level

[123, 239].

In the realm of labor economics, there is broad agreement among scholars on the critical role of promoting employee's intrapreneurial behavior within organizations to sustain competitive advantage. However, it is important to recognize that the motivations driving intrapreneurial behavior may vary significantly between senior management and frontline workers, necessitating tailored approaches to encourage such behavior across different organizational levels. This analysis reveals a noteworthy pattern: among high-income employees, who frequently hold positions as department heads or senior executives, the association between an individual entrepreneurial orientation and intrapreneurial behavior is less pronounced compared to that observed in their lower-income counterparts. This disparity can be attributed to several theoretical explanations. Employees with lower incomes may be more driven by the prospect of economic advancement, exhibit a greater willingness to engage in risk-taking behaviors within the organization, and display a stronger motivation to navigate resource limitations. Moreover, their closer engagement with day-to-day challenges may enhance their capacity to recognize and capitalize on opportunities for innovation and progress within the organization.

This analysis identifies that gender acts as a moderating factor in the connection between individual entrepreneurial orientation and intrapreneurial behavior, with this relationship appearing stronger among male employees compared to their female counterparts. The underlying reasons for why individual entrepreneurial orientation might more effectively stimulate intrapreneurial behavior among men within organizational settings may be rooted in various factors, such as socialization processes, cultural norms, disparities in access to resources and networks, a scarcity of female role models, potential higher risk aversion among women, and distinct leadership styles. These explanations are consistent with findings from prior research [15, 90, 163].

In summary, the analysis at stage 1.2 seeks to examine the influence of various demographic groups on the cultivation of employee intrapreneurship—specifically, strategic renewal and venture-creating behaviors—by assessing the extent to which employees align with individual entrepreneurial orientation. Through this analysis, we

aim to contribute to the understanding of how demographic factors shape intrapreneurial initiatives within organizations. The results reveal a significant positive relationship between individual entrepreneurial orientation and employees' involvement in intrapreneurial activities. Additionally, the analysis identifies income level and gender as moderating factors in the relationship between an employee's individual entrepreneurial orientation and their intrapreneurial endeavors. Notably, this relationship is stronger among male employees and those with lower income levels within the organizational context. These findings emphasize the critical role of income level and gender as moderators in shaping the connection between individual entrepreneurial orientation and intrapreneurial behavior among employees.

Analysis at stage 1.3 is to examine the role of socio-psychological factors, namely psychological safety and work engagement, in stimulating individual entrepreneurial orientation in the organizational context[9].

Social-economic group of factors is increasingly becoming important in understanding the growth reserves of labor productivity [13]. Previous studies have extensively investigated the impact of specific personality traits, commonly referred to as the "Big Five," and employee affective states, such as job anxiety and psychological safety, on fostering intrapreneurial behavior [17, 65, 198]. Additionally, the literature has explored the influence of entrepreneurial orientation on the venture creation behavior of entrepreneurs [217, 264]. Nevertheless, despite the breadth of existing knowledge, the relationship between individual entrepreneurial orientation (IEO) and employee intrapreneurship (EI) remains underexplored. To address this research gap, the present analysis seeks to examine the influence of individual entrepreneurial orientation—a well-established entrepreneurial construct—on employee's intrapreneurial behavior. To achieve this objective, this analysis develops a research model (see figure 2.3) incorporating potential situational factors, such as psychological safety (PS), work engagement (WE), and specific dimensions of entrepreneurial

[9] The results of analysis 1.3 are adopted from two author's peer reviewed articles. For details: (1) Wenjun Z. Unleashing Intrapreneurial Behavior: Cultivating an Entrepreneurial Mindset to Meet the Increasing Demand for Intrapreneurship / Wenjun Z., Panikarova S. Zhiyuan L. // Organizatsionnaya Psikhologiya – 2024 – Vol. 14 – № 4 – P.151–170; (2) Wenjun Z. Intrapreneurship as a Growing Demand: Igniting Entrepreneurial Mindset to Fuel Employees' Strategic Renewal Behavior / Wenjun Z. // Human Progress – 2023. – Vol. 9 – № 3 – P.13 (14 pp.).

orientation (e.g., innovativeness, proactiveness, and risk-taking), to assess their roles in facilitating intrapreneurial behavior. The philosophical underpinning of this analysis is also aimed at addressing the growing challenge of balancing work engagement and intrapreneurial behavior in response to the increasing competitive pressures in the business environment.

Especially, the following hypotheses are examined: Hypothesis 1. Psychological safety positively contributes to work engagement; Hypothesis 2. Psychological safety positively contributes to individual entrepreneurial orientation; Hypothesis 3. Work engagement positively contributes to individual entrepreneurial orientation; Hypothesis 4. Individual entrepreneurial orientation positively contributes to employee intrapreneurship; Hypothesis 5. Psychological safety has a positive indirect effect on employee intrapreneurship through individual entrepreneurial orientation; Hypothesis 6. Work engagement has a positive indirect effect on employee intrapreneurship, through individual entrepreneurial orientation; Hypothesis 7. Psychological safety has a positive serial indirect effect on employee intrapreneurship, through employee's work engagement and individual entrepreneurial orientation.

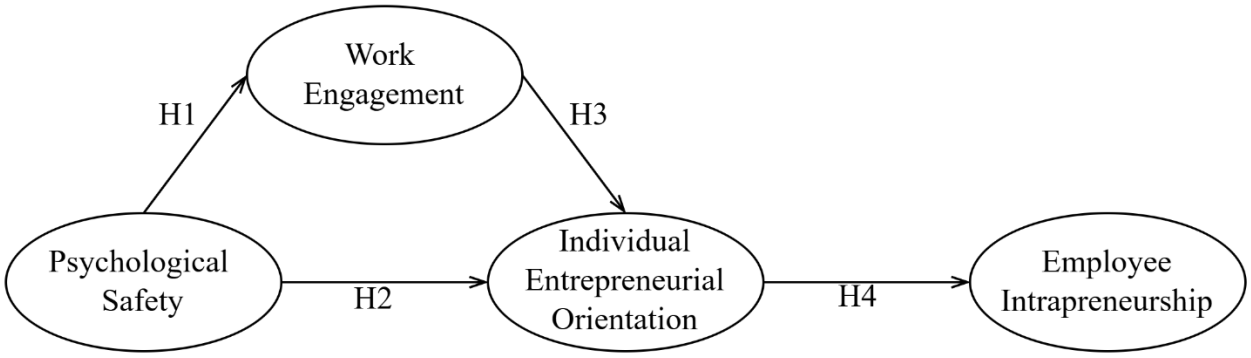


Figure 2.3 – Proposed path analysis model for the formulation mechanism of intrapreneurial behavior

In this analysis, Mplus 8.13 was utilized to conduct an analysis of the research model. The appropriateness of each multi-item scale in accurately representing its respective construct was rigorously evaluated for all constructs within the measurement scale. To ensure the robustness of the measurement model, the study assessed internal consistency, convergent validity, and discriminant validity prior to testing the hypotheses through the conceptual framework [21]. Initially, based on the outcomes of the confirmatory factor analysis, several items were removed, and dimensions were

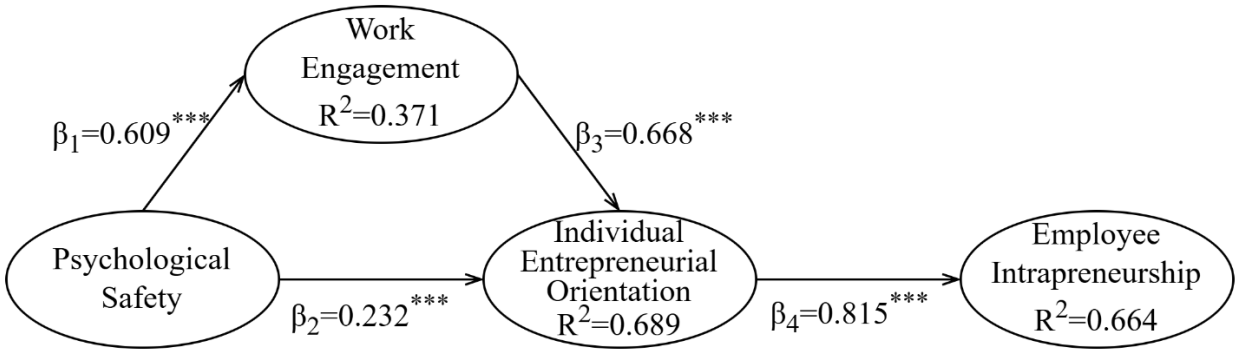
refined. Specifically, items related to autonomy were excluded due to a significantly lower factor loading (0.390) compared to other constructs, such as innovativeness, need for achievement, risk-taking, and proactiveness, which exhibited higher factor loadings (0.900, 0.860, 0.839, and 0.914, respectively). This finding suggests that autonomy may represent a distinct construct in the context of assessing an employee's entrepreneurial orientation, warranting further discussion in the relevant section. Moreover, the confirmatory factor analysis results indicated the need to merge the two dimensions associated with EI into a single construct. In this process, two EI items were discarded due to their insufficient factor loadings.

Table 2.13.a (in Appendix 3) presents the results related to construct reliability within this study, following the deletion of certain items and the compression of dimensions. Construct reliability, which assesses the internal consistency of scale items, is commonly considered acceptable by many scholars when it reaches a threshold of approximately 0.60 [114]. However, Hair et al. [129] recommend a more stringent threshold, suggesting that construct reliability should exceed 0.70. As demonstrated in this table, the construct reliability values for all the constructs in this study range from 0.801 to 0.935, aligning with the acceptable thresholds proposed by Fornell and Larcker [114] and Hair et al. [129]. Therefore, the adjusted scale employed in this research exhibits strong internal consistency.

The validity of this study was rigorously assessed through analyses of both convergent and discriminant validity. Convergent validity refers to the extent to which two measures that are theoretically related are actually correlated. In this study, the most commonly used metric for assessing convergent validity is the average variance extracted (AVE). As shown in Table 2.13.a (in Appendix 3), the AVE values for all constructs range from 0.574 to 0.772, which exceeds the stricter standard of 0.50. These values align with the threshold recommended by Fornell and Larcker [114] as well as Bagozzi and Yi [32]. Discriminant validity, on the other hand, examines whether concepts or measures that are theoretically supposed to be unrelated are, in fact, unrelated. According to the Fornell-Larcker criterion [114], discriminant validity is established if the square root of the AVE for a construct is greater than the correlations

between that construct and any other construct. Table 2.14.a (in Appendix 3), which presents the correlations between all constructs along with the square root of their AVE values, confirms the discriminant validity of the measurement instruments used in this study. Based on the above analyses, it is evident that the measurement tool employed in this research demonstrates both robust reliability and validity.

After conducting the pretest for reliability and validity, the next step involves assessing the structural model's overall fit. In accordance with the recommendations of Bagozzi and Yi [32] and Hair et al. [129], this analysis has compiled key indicators used to evaluate the model's fit in Table 2.15.a (in Appendix 3). The analysis yielded the following results: $\chi^2 = 730.289$, df = 316.000, $\chi^2/df = 2.311$, CFI = 0.917, TLI = 0.908, RMSEA = 0.071, and SRMR = 0.049. As outlined in Table 2.15.a (in Appendix 3), all these indicators satisfy the established thresholds, demonstrating an acceptable fit between the proposed model and the empirical data collected in this study.



Note: Significant at: * — p < 0.05, **— p < 0.01, *** — p < 0.001

Figure 2.4 – The structural model of psychological safety, work engagement, entrepreneurial orientation, and employee intrapreneurship

Table 2.16 – Assessing structural model validity of baseline model

IV	DV	Est.	S.E.	Est./S.E.	P-Value	R Square	Hypo
IEO	PS	0.232	0.068	3.430	0.001	0.689	Support
	WE	0.668	0.058	11.490	0.000		Support
WE	PS	0.609	0.052	11.770	0.000	0.371	Support
EI	IEO	0.815	0.027	30.118	0.000	0.664	Support

Note: IV — Independent Variable; DV — Dependent Variable; Est. — Estimate; S.E — Standard Error; Hypo — Hypothesis; PS — Psychological Safety; WE — Work Engagement; IEO — Individual Entrepreneurial Orientation; EI — Employee Intrapreneurship. * — p < 0.05, ** — p < 0.01, *** — p < 0.001.

The current analysis employed path analysis to investigate the relationships between the independent and dependent variables, as illustrated in Figure 2.4 and detailed in Table 2.16 This analysis specifically addressed four hypotheses. Hypotheses 1 and 2 explored the effects of PS on employees' WE and IEO, respectively, within the

structural model framework presented in Figure 2.4. Hypothesis 1 proposed a positive relationship between PS and WE. The results indicated a significant and positive path coefficient (β =0.609, SE =0.052, $p<0.001$) from PS to WE, thereby supporting Hypothesis 1 (Figure 2.4, Table 2.16). Similarly, Hypothesis 2 posited a positive effect of PS on IEO development. The findings confirmed this hypothesis, with a significant and positive path coefficient from PS to EO (β =0.232, SE =0.068, $p <0.01$), thereby validating Hypothesis 2 (Figure 2.4, Table 2.16).

Hypothesis 3 examined the association between WE and IEO, as delineated in the structural model (Figure 2.4). The hypothesis posited that there would be a positive relationship between these two variables. The empirical findings, as illustrated in Figure 2.3 and detailed in Table 2.16, confirmed a significant and positive impact of WE on IEO (β = 0.668, SE =0.058, $p <0.001$), thereby validating Hypothesis 3. In a similar vein, Hypothesis 4 investigated the connection between employees' IEO and EI, as represented in Figure 2.4. This hypothesis also predicted a positive correlation between these constructs. The empirical results, depicted in Figure 2.4 and outlined in Table 2.16, revealed a significant and positive effect of EO on EI (β = 0.815, SE = 0.027, $p < 0.001$), thus corroborating Hypothesis 4.

Table 2.16 and Figure 2.4 also report the explanatory variances (R^2) associated with each variable in the overall model. The explanatory variance, commonly denoted as R-squared (R^2), serves as a statistical indicator of the proportion of variance in the dependent variable that can be predicted based on the independent variables within a regression model. The specific R^2 values obtained for IEO, WE, and EI were 0.689, 0.371, and 0.664, respectively. These values suggest that PS explains approximately 37.1% of the variance in WE (hypothesis 1), while PS and WE together account for around 68.9% of the variance in IEO (hypotheses 2 and 3). Additionally, approximately 66.4% of the variance in EI can be attributed to IEO (hypothesis 4). These results provide a detailed insight into the relationships among the variables analyzed in the study.

This analysis further explored the validity of three proposed indirect effects: (1) the role of IEO as a mediator in the relationship between PS and EI (hypothesis 5); (2)

the role of IEO as a mediator in the link between WE and EI (hypothesis 6); and (3) the joint mediating effects of WE and IEO on the relationship between PS and EI (hypothesis 7). To test these indirect effects, bias-corrected bootstrapping was employed, utilizing 5,000 bootstrap samples to generate a 95% bias-corrected confidence interval [194]. An indirect effect was deemed significant if the resulting confidence interval did not contain zero [143].

Table 2.17 – The effects from work engagement to employee intrapreneurship

Total effect	β	SE	P-value	Lower confidence interval (at 95%)	Upper confidence interval (at 95%)
Total effect	0.544	0.071	0.000	0.396	0.677
Total indirect effect	0.544	0.071	0.000	0.396	0.677
Specific Indirect effect (WE→IEO→EI)	0.544	0.071	0.000	0.396	0.677

Note: S.E — Standard Error; WE — Work Engagement; IEO — Individual Entrepreneurial Orientation; EI — Employee Intrapreneurship. * — $p < 0.05$, ** — $p < 0.01$, *** — $p < 0.001$.

Table 2.18 – The effects from psychological safety to employee intrapreneurship

Total effect	β	SE	P-Value	Lower confidence interval (at 95%)	Upper confidence interval (at 95%)
Total effect	0.521	0.060	0.000	0.394	0.634
Total indirect effect	0.521	0.060	0.000	0.394	0.634
Specific Indirect effect (PS→IEO→EI)	0.189	0.075	0.012	0.040	0.342
Specific Indirect effect (PS→WE→IEO→EI)	0.331	0.058	0.000	0.234	0.464

Note: SE — Standard Error; PS — Psychological Safety; IEO — Individual Entrepreneurial Orientation; WE — Work Engagement; EI — Employee Intrapreneurship. * — $p < 0.05$, ** — $p < 0.01$, *** — $p < 0.001$.

Hypotheses 5 and 6 anticipated that PS and WE would have mediating effects on employee intrapreneurship (EI), with the mediating role of IEO being central to these relationships. Specifically, Hypothesis 5 proposed that PS would influence EI through EO (PS → IEO → EI), while Hypothesis 6 posited a similar pathway for WE (WE → IEO → EI). The analysis revealed that IEO significantly mediated the relationship between PS and EI (Table 2.18, $\beta = 0.189$, $p<0.05$, 95% CI = [0.040, 0.342]), thereby providing empirical support for Hypothesis 5. Additionally, this analysis found that IEO also significantly mediated the relationship between WE and EI (Table 2.17, $\beta = 0.544$, $p <0.001$, 95% CI = [0.396, 0.677]), supporting Hypothesis 6.

Hypothesis 7 posited that there would be serial indirect effects of PS on employees' EI, specifically through WE and IEO (Hypothesis 7: PS → WE → IEO →

EI). The findings of the present study confirm this hypothesis, demonstrating that the indirect effect of PS on EI via the two mediators, WE and IEO, is statistically significant (Table 2.18, $\beta = 0.331$, $p < 0.001$, 95% CI = [0.234, 0.464]). Consequently, Hypothesis 7 is supported. The detailed presentation of standardized beta coefficients, standard errors, p-values, and standardized 95% confidence intervals related to the indirect effects within the proposed model is provided in Tables 2.17 and 2.18.

In the initial evaluation of employees' individual entrepreneurial orientation, particularly concerning the five dimensions under scrutiny, the confirmatory factor analysis revealed that the factor loadings for the "autonomy" items were significantly below the accepted threshold. Factor loadings quantify the extent to which a specific variable contributes to a particular factor, implying that autonomy—a core element traditionally associated with the individual entrepreneurial orientation—may not adequately reflect the intricacies of employees' individual entrepreneurial orientation or their intrapreneurial orientation. This finding is consistent with the study by Douglas and Fitzsimmons [92], which indicated that although a positive attitude towards autonomy enhances individual entrepreneurial intention, it bears little significance in shaping intrapreneurial intention. This suggests that the established concept of IEO may not be uniformly applicable to intrapreneurs, possibly due to cognitive differences between entrepreneurs and intrapreneurs. Consequently, there is a significant research gap to explore the distinct cognitive attributes that define the "intrapreneurial orientation."

A significant finding from the present analysis is that specific elements of the individual entrepreneurial orientation can be triggered by situational cues. Specifically, this analysis has identified psychological safety and work environment as critical cues that activate employees' IEO, which in turn enhances their innovative and proactive behavior, as well as their inclination towards risk-taking and achievement. This finding aligns with previous studies, which have demonstrated that engaged employees are more likely to exhibit innovative and creative behaviors [16, 85]. This analysis' identification of PS as a key factor in fostering an IEO is consistent with earlier fragmented research. Previous investigations have recognized PS as a vital component

in promoting an IEO by facilitating organizational innovation [214], achievement motivation [50], risk-taking [54, 102, 103], and proactive behavior [31, 124]. However, this analysis extends these fragmented findings by introducing a higher-level construct, the IEO, which offers a more comprehensive understanding. This novel contribution highlights the importance of situational context in shaping employees' intrapreneurial behaviors and emphasizes the potential for cultivating a supportive organizational environment that nurtures and enhances the IEO.

The present analysis underscores that, beyond its established role as a facilitator of WE, PS has emerged as a significant catalytic agent in the activation of individual entrepreneurial orientation, thereby promoting EI at the organizational level. This insight emphasizes the critical importance of PS as a determinant of employees' propensity towards intrapreneurial activities and highlights its potential as a strategic tool for driving organizational transformation and adaptation amidst dynamic market conditions. The findings of this analysis offer a substantive response to previous research, which has identified PS as a predictor of WE in the context of quality improvement initiatives [39, 192, 225]. Additionally, the research conducted by Kark and Carmeli [164] has further substantiated the role of PS as an activator of essential traits, such as vitality and a sense of aliveness, which are instrumental in fostering innovative work behavior.

This analysis introduces an innovative model that serves as a foundation for understanding how corporate goals align with the promotion of work engagement, a longstanding objective within human resource management, and the current emphasis on fostering employees' intrapreneurial behavior. Previous studies have addressed the tension between efforts to promote WE and managerial strategies aimed at cultivating EI, both of which require a workforce that is highly skilled or well-trained. Building on this body of work, this analysis confirms the positive correlation between WE and EI [236], offering a clearer perspective on the interrelationship between these two constructs. Specifically, the relationship between WE and EI is found to be mutually reinforcing, such that an increase in WE can enhance EI, and similarly, an increase in EI can enhance WE. However, it is important to highlight that specific mediators

influence these relationships. In our study, we identified certain characteristics related to individual entrepreneurial orientation that mediate the effect of WE on EI. Regarding the second relationship, existing literature has demonstrated the mediating role of psychological capital in the linkage between IEO and WE [236].

In summary, the primary objective of analysis 1.3 was to clarify the function of individual entrepreneurial orientation, a well-established concept in entrepreneurship research, within the context of an organization. This analysis further explored the effects of psychological safety and work engagement on employee intrapreneurship, emphasizing the intermediary role that individual entrepreneurial orientation plays in the relationship between psychological safety, work engagement, and employee intrapreneurship. Through empirical analysis, including hypothesis testing on collected data, the findings demonstrated that individual entrepreneurial orientation significantly enhances employee intrapreneurship. This is particularly important as employee intrapreneurship is widely recognized as a key determinant of organizational performance and productivity, especially in firms with a strong individual entrepreneurial orientation. Furthermore, this analysis revealed that although autonomy is traditionally viewed as a fundamental aspect of the individual entrepreneurial orientation, it does not seem to exert a significant influence on the intrapreneurial orientation, as indicated by the results of confirmatory factor analysis. Additionally, the mediation analysis identified psychological safety and work engagement as crucial antecedents that activate individual entrepreneurial orientation in employees, thereby driving their intrapreneurial activities. This refined understanding of the complex interactions among these variables contributes to a deeper comprehension of how employee intrapreneurship can be effectively nurtured within organizational settings, offering valuable insights for both theoretical development and practical implementation in the domains of organizational behavior and entrepreneurship.

This study series, while contributing valuable insights, is subject to certain limitations that should be acknowledged and addressed in future research. One potential limitation arises from the regional bias in the sample, as the study did not

rigorously control regional factors. The rationale for this decision is twofold: first, the sample includes employees from diverse backgrounds, with Shenzhen and Shanghai being two economically dynamic cities in Eastern China, where workers predominantly migrated from a range of cities and regions across China. Tracking participants' regional origins and socialization processes in detail would have posed significant logistical challenges and required additional resources, which the researchers deemed impractical within the scope of this study. Second, the socio-economic conditions, policy environments, and cultural contexts of Shenzhen and Shanghai are highly similar, making the potential regional impact on the study's findings less pronounced. Thus, regional factors were not explicitly controlled, as the researchers, at the research design stage, did not anticipate significant variation between the two cities that could affect the outcomes. Although the study's findings have been cross-referenced with existing literature and theoretical frameworks to ensure their objectivity, it is important to recognize that sample characteristics, including country, region, and industry, may influence the results. Therefore, future research should consider strictly controlling these variables or explore the applicability of the study's conclusions across different cultural and economic regions to further validate its robustness and generalizability.

This study series employed non-random sampling for data collection, a method commonly used in the social sciences for its efficiency and cost-effectiveness. However, the inherent limitations of this approach—particularly its susceptibility to bias, including the underrepresentation of certain subgroups—suggest that future research should consider incorporating more diverse sampling techniques, such as purposive and random sampling, to enhance the robustness and generalizability of findings. In addition, while the study's results were compared with other empirical findings and theoretical frameworks to ensure their validity, future investigations would benefit from a broader demographic scope, offering a more comprehensive analysis of entrepreneurial perceptions across different generational cohorts. Data were collected using self-report scales, where employees assessed their own thoughts and behaviors after reviewing the scales. While self-reports provide valuable insight into internal

states, they are inherently subjective. Alternative methods, such as peer-rating scales, could offer a more objective, external perspective on key study variables. Furthermore, future research should focus on exploring the mechanisms underlying the observed patterns, particularly the specific pathways that contribute to the development of individual entrepreneurial orientation and employee intrapreneurship. It is also crucial to examine additional organizational and labor factors that may influence the manifestation of employees' entrepreneurial competencies, specifically in the context of entrepreneurial orientation and intrapreneurial behaviors. Such investigations would enrich our understanding of how these competencies are fostered within organizational settings and contribute to the broader dynamics of labor economics.

2.3 The interaction between individual entrepreneurial orientation and organizational entrepreneurial orientation and its impact on employee intrapreneurship

The purpose of Section 2.3 is to elaborate on the empirical findings—including reliability and validity testing results, hypothesis testing results, and their implications—in relation to the three empirical objectives of the second series of studies. The author's developed methodology makes it also possible to further explore the labor outcomes of the interaction of organizational and individual entrepreneurial orientation. The analyzed data is based 292 valid survey replies gathered from personnel employed by private sector organizations in China. This section is structured as follows: first, the empirical results regarding the influence of the consistency of the entrepreneurial orientation of the organization and employees on the positive attitudes of employees, including affective commitment and organizational identification, was studied; second, the empirical findings on the influence of the fit between Organizational Entrepreneurial Orientation (OEO) and Individual Entrepreneurial Orientation (IEO) on the manifestation of employee intrapreneurial behavior (EI), specifically in the domains of strategic renewal behavior (SRB) and venture-creating behavior (VB); third, the empirical results on the effects of organizational entrepreneurial orientation on employees' intrapreneurial behavior, with organizational identification as a mediating variable within the dynamic between OEO and EI. The

presentation of empirical results follows a systematic approach: first, to provide a clear understanding of the research background, particularly the research gap, and to outline the core research concerns in the form of hypotheses; second, to present the reliability and validity testing results, along with descriptive statistics for the constructs involved in each analysis; and third, to discuss the hypothesis testing results in relation to prior empirical and theoretical work. Before proceeding to the next analysis, a summary of the identified patterns from the preceding analysis is provided. At end of the section, a discussion for the limitations and future research for the second series of study is also provided.

Analysis at stage 2.1 is to analyze the influence of the consistency of the entrepreneurial orientation of the organization and employees on the positive attitudes of employees, including affective commitment and organizational identification[10].

From an organizational science perspective, workers' attitudes towards their work environment are key predictors of their work intentions and behaviors [247]. This underscores our focus to explore the interaction between individual entrepreneurial orientation and organizational entrepreneurial orientation and its impact on workers' positive attitudes such as affective commitment (AC) and organizational identification (OI), which are crucial for work-related outcomes [84, 296]. It is worth to note that an employee's individual entrepreneurial orientation (IEO) often does not match the organization's organizational entrepreneurial orientation (OEO) [14, 81, 308], due to moral hazard issues from information asymmetry in the labor market, fitting into the principal-agent problem framework [195]. According to principal-agent theory, this misalignment can be due to different risk appetites, responsibilities, goals, and monitoring difficulties among employees, managers, and shareholders [312]. Analysis 2.1 aims to explore the impact of alignment between OEO and IEO on positive work attitudes, particularly AC and OI. The objectives of this analysis are to (1) examine the impact of OEO and IEO on positive work attitudes, and (2) investigate how the alignment between OEO and IEO fosters positive work attitudes.

[10] The results of analysis 2.1 are adopted from author's peer-reviewed publication. For details: Wenjun Z. The Effects of Personal-organizational Fit on Employee's Positive Work Attitudes: An Entrepreneurial Orientation Perspective / Wenjun Z., Panikarova S., Zhiyuan L. // The manager – 2024. – Vol. 15 – № 1 – pp. 15–34.

This research employed a two-step approach: reliability and validity analysis were utilized to ensure relevant data is suitable for subsequent major analysis relating to the research objectives; polynomial regression with response analysis to validate the hypotheses. Using Mplus 8.3, this analysis evaluated reliability and validity metrics, including composite reliability, convergent validity, and discriminant validity as recommended by Hair [130].

Table 2.19.a (in Appendix 3) presents composite reliability (CR) and convergent validity statistics. CR values in Table 2.19.a (in Appendix 3), ranging from 0.841 to 0.915, indicate high internal consistency, exceeding the thresholds of 0.6 and 0.7 suggested by Fornell & Larcker [115] and Hair et al. [129]. Convergent validity, assessed by average variance extracted (AVE), shows most values above the 0.5 threshold, except for the IEO construct with an AVE of 0.432, which is still acceptable given its CR of 0.841 [114, 180].

Table 2.20.a (in Appendix 3) shows discriminant validity results. According to Fornell & Larcker, the square root of AVE should be greater than the construct's correlations with other constructs. Most AVE square roots meet this criterion, except for IEO. Further validation using David [82] and Garson [120] criteria, with a maximum correlation of 0.813, confirms discriminant validity. Lastly, the Harman Single-factor test indicated no significant common method bias, with the leading factor accounting for 42.473% of the total variance, below the 50% threshold.

The polynomial regression analysis results are presented in Table 2.21. Models 1 and 2 illustrate the linear and quadratic effects of the fit between individual entrepreneurial orientation (IEO) and organizational entrepreneurial orientation (OEO) on employees' affective commitment (AC). The data show a significant positive relationship between both IEO and OEO with employees' AC. Notably, OEO ($\beta_2 = 0.486$, $p < 0.001$) has a stronger impact than IEO ($\beta_1 = 0.143$, $p < 0.05$), indicating that an entrepreneurially oriented organization is more effective in enhancing employee AC than the entrepreneurial orientation of the employees themselves. Although the linear effect of IEO-OEO fit on AC is not significant, a significant quadratic effect is observed, with the data showing an inverted-U shape pattern for both congruence and

incongruence lines. This suggests an optimal level for IEO and OEO that maximizes AC, as illustrated in Figure 2.5, where the highest AC is reached at moderate levels of both IEO and OEO. Thus, while the fit between IEO and OEO does not significantly impact AC, both IEO and OEO independently influence AC significantly.

Table 2.21 – The impact of the consistency between individual and organizational entrepreneurial orientation on employees' positive work attitudes

Variables	Affective Commitment		Organizational Identification	
	Model 1	Model 2	Model 3	Model 4
Constant	4.634^{***}	5.641^{***}	4.057^{***}	4.698^{***}
Gender	-0.553^{***}	-0.606^{***}	-0.210^{**}	-0.182^{*}
Age	0.508^{***}	0.197^{*}	0.123	-0.052
Education	0.026	-0.222^{*}	0.088	-0.117
Income	0.199^{***}	-0.024	-0.016	-0.100^{*}
IEO, β_1	0.143^{*}	0.079	0.473^{***}	0.454^{***}
OEO, β_2	0.486^{***}	0.092	0.320^{***}	0.089
IEO^2, β_3	-	-0.303^{*}	-	-0.329^{**}
IEO*OEO, β_4	-	-0.082	-	0.327^{***}
OEO^2, β_5	-	-0.419^{***}	-	-0.360^{***}
Response surface analysis				
$Slope_1$: $\beta_1+\beta_2$	-	0.171	-	0.543^{***}
$Curvature_1$: $\beta_3+\beta_4+\beta_5$	-	-0.804^{***}	-	-0.362^{**}
$Slope_2$: $\beta_1+\beta_2$	-	-0.013	-	0.365^{***}
$Curvature_2$: $\beta_3+\beta_4+\beta_5$	-	-0.640^{***}	-	-1.016^{***}
R^2	0.467	0.557	0.508	0.591

Note: *, **, and *** indicate significance at $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively. IEO is individual entrepreneurial orientation, OEO is organizational entrepreneurial orientation, OI is organizational identification, AC is affective commitment. $Slope_1$ and $curvature_1$ represent the characteristics of the congruence line, while $slope_2$ and $curvature_2$ represent the characteristics of the congruence line. Source: calculated by authors using SPSS version 26.0 based on collected data

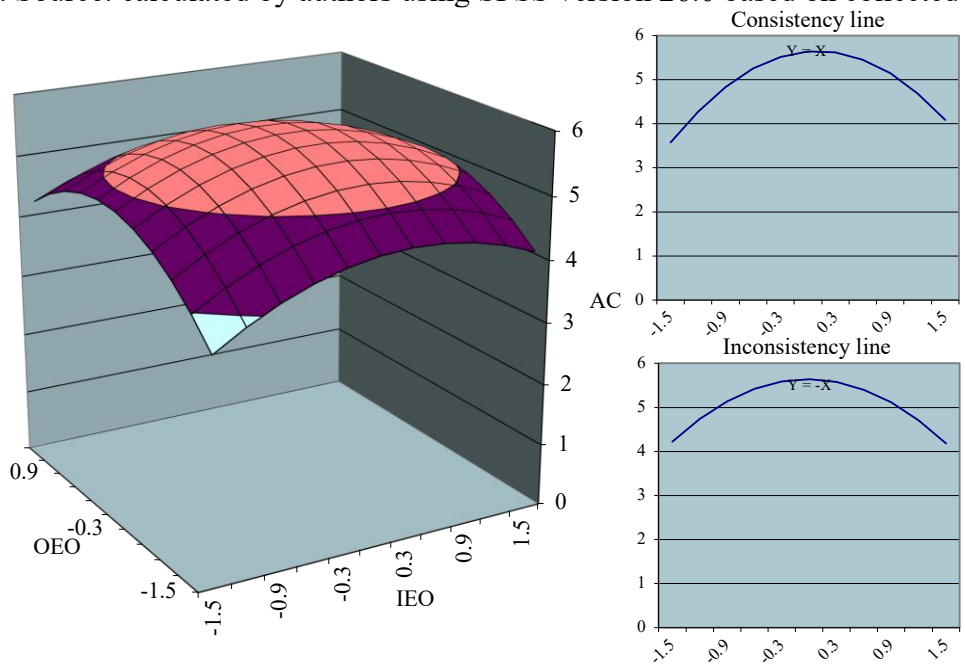


Figure 2.5 – Effects of IEO-OEO fit on AC

Source: calculated by authors using SPSS version 26.0 based on collected data

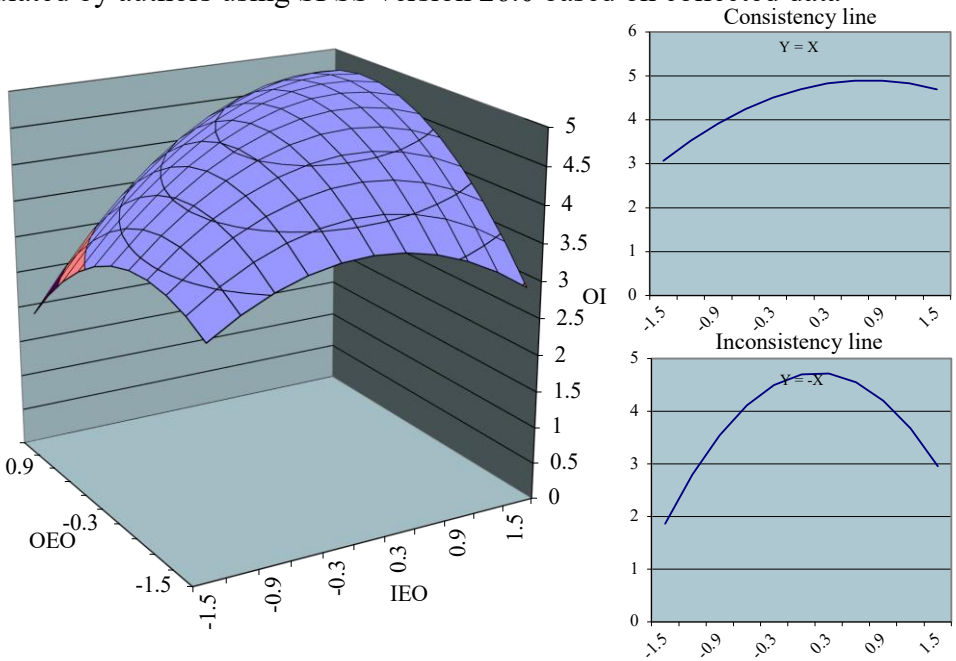


Figure 2.6 – Effects of IEO-OEO fit on OI

Source: calculated by authors using SPSS version 26.0 based on collected data

The results from Model 3 show a significant positive link between both IEO and OEO and an employee's OI. The impact of IEO ($\beta_1 = 0.473$, $P < 0.001$) is stronger than that of OEO ($\beta_2 = 0.320$, $P < 0.001$), indicating IEO has a slightly greater influence on OI. Model 4 illustrates the quadratic effect of IEO-OEO fit on OI, revealing a positive slope and negative curvature, forming an inverted-U shape. This suggests OI increases with IEO-OEO fit up to a point before declining. The inconsistency line in Model 4 also shows an inverted-U shape, indicating maximum OI when both IEO and OEO are high. Specifically, the congruence line's slope ($\beta_1 + \beta_2$) is significantly positive, though the curvature ($\beta_3 + \beta_4 + \beta_5$) indicates a diminishing effect after a peak, as shown by the inverted-U shape in Figure 2.6.

These empirical results provide room for further discussion based on related empirical and theoretical perspectives. Entrepreneurial orientation (EO) is essential for maintaining competitive advantage at both corporate and individual levels. Most existing research has analyzed EO from a single perspective [67, 111, 249, 279]. This analysis aims to provide a fresh perspective by examining the effects of both organizational entrepreneurial orientation (OEO) and individual entrepreneurial orientation (IEO) together, focusing on their impact on workplace attitudes. Using SIPT and P-O fit theory as the theoretical basis and polynomial regression analysis for

data evaluation, the study explores how these EO dimensions influence two key work attitudes: affective commitment (AC) and organizational identification (OI).

This analysis finds that both IEO and OEO positively affect AC and OI, with OEO having a stronger impact on AC. This supports the notion that organizational factors are more influential in predicting AC compared to individual factors. Meyer et al. [207] corroborate this, showing stronger correlations between organizational antecedents and AC compared to individual traits. Matzler & Renzl [202] also support this view, noting that personality influences AC through job satisfaction. For OI, IEO has a slightly greater impact than OEO, aligning with SIPT, which suggests that workplace attitudes are shaped by both social and personal factors [262].

This analysis distinguishes between OI and AC, with Van Knippenberg & Sleebos [295] describing AC as a separate commitment and OI as a cognitive self-reference. Riketta [255] shows that OI has a stronger link to turnover intentions than AC. The research also reveals an inverted-U relationship between IEO-OEO fit and OI: optimal OI occurs when both IEO and OEO are high but not at their maximum levels. Beyond this point, excessive alignment can lead to a decrease in OI, reflecting the "too-much-of-a-good-thing" effect [242, 297]. This effect highlights the complexity of EO fit and its impact on OI, suggesting that very high levels of EO may lead to unrealistic expectations and reduced OI.

In conclusion: entrepreneurial orientation is essential for career growth and corporate entrepreneurship. However, the link between personal-organizational fit in entrepreneurial orientation and employee work attitudes is not well-studied. This analysis examines how aligning organizational entrepreneurial orientation with individual entrepreneurial orientation affects employees' positive work attitudes, specifically affective commitment and organizational identification. This analysis finds a positive correlation between entrepreneurial orientation and favorable work attitudes, but also a "too-much-of-a-good-thing" effect, where excessive alignment can decrease positive attitudes. These results suggest the need for a balanced approach in aligning entrepreneurial values during recruitment and supporting entrepreneurial employees in highly entrepreneurial organizations.

Analysis at stage 2.2 is to explore the influence of the fit between Organizational Entrepreneurial Orientation (OEO) and Individual Entrepreneurial Orientation (IEO) on the manifestation of employee intrapreneurial behavior (EI), specifically in the domains of strategic renewal behavior (SRB) and venture-creating behavior (VB)[11].

Contemporary research focuses on how organizational and employee factors influence employee intrapreneurship (EI) using a contextualized framework [318]. However, there is limited understanding of how alignment between employee and organizational values affects employee intrapreneurship. This gap complicates our grasp of how employee intrapreneurship develops. Value conflicts, which often stem from power imbalances between employers and employees or among labor market groups, are well-documented in labor research [113]. Despite some studies addressing value-related variables, they frequently overlook the impact of value alignment on employee initiatives. Moreover, the outcomes of intrapreneurship can vary significantly, from enhanced productivity to detrimental effects, depending on the surrounding rules [106]. Without value congruence, the productivity of EI for firms is questionable. To address this gap, the present analysis examines how alignment in entrepreneurial orientation (EO) influences employees' engagement in EI.

Table 2.22.a (in Appendix 3) provides composite reliability (CR) and convergent validity statistics from this analysis. The CR values in Table 2.22.a (in Appendix 3) range from 0.841 to 0.895, demonstrating high internal consistency and exceeding the thresholds of 0.6 and 0.7 recommended by Fornell & Larcker [115] and Hair et al. [129]. Convergent validity, measured by average variance extracted (AVE), reveals that most values surpass the 0.5 threshold. However, the IEO construct has an AVE of 0.432, which remains acceptable due to its CR value of 0.841 [114, 180]. Table 2.23.a (in Appendix 3) displays the relevant descriptive statistics and discriminant validity results. As per Fornell & Larcker [115], the square root of the AVE should exceed the correlations between the construct and other constructs. All AVE square roots satisfy this criterion, confirming the presence of discriminant validity. The Harman Single-

[11] The results of analysis 2.2 are adopted from author's peer-reviewed publication. For details: Wenjun Z. The Effects of Entrepreneurial Orientation on Employee's Intrapreneurial Behavior: A Value Congruence Perspective / Wenjun Z., Panikarova S. V. // Kant – 2023. – Vol. 4 – № 49 – pp.174–182.

Factor test assessed common method bias among the variables [246]. The leading factor accounted for 37.67% of the total variance, which is below the 50% threshold, suggesting that common method bias is not a significant issue.

Table 2.24 presents the polynomial regression results. Models 1 and 3 show the linear effects of IEO-OEO fit on two dimensions of EI: SRB and VB, respectively. Model 1 findings reveal that both IEO ($\beta = 0.479$, $p < 0.001$) and OEO ($\beta = 0.649$, $p < 0.001$) have significant positive effects on SRB, with OEO having a greater impact than IEO. In Model 3, IEO ($\beta = 0.490$, $p < 0.001$) and OEO ($\beta = 0.448$, $p < 0.001$) both significantly positively affect VB, but IEO has a stronger influence than OEO.

Model 2 and Model 4 explore the quadratic effects of IEO-OEO fit on SRB and VB, respectively. Model 2 shows a significant positive slope ($\beta = 1.035$, $p < 0.001$) along the congruence line (Y=X, Figure 2.7) and a significant negative curvature ($\beta = -0.367$, $p < 0.05$). On the incongruence line (Y=-X, Figure 2.7), the slope is significantly negative ($\beta = -0.301$, $p < 0.05$) and the curvature is also significantly negative ($\beta = -0.447$, $p < 0.05$). These results indicate an inverted-U shaped relationship between the fit of entrepreneurial orientation and strategic renewal behavior, regardless of congruence or incongruence. Figure 2.7, following Shanock et al. [271], illustrates this inverted-U relationship. In cases of value congruence, "low-low" alignment shows higher strategic renewal behavior compared to "low-low" mismatches. Additionally, the congruence line profile suggests that the positive effect of value congruence is decreasing.

Model 4 yields the following results: The slope is positively significant ($\beta = 1.086$, $p < 0.01$), and the curvature is negatively significant ($\beta = 0.406$, $p < 0.01$) along the congruence line (Y=X, Figure 2.8). Conversely, this relationship is not significant along the incongruence line (Y=-X, Figure 2.8). This indicates that value congruence between the organization and the individual impacts VB in a U-shaped manner. However, there is no significant relationship between value incongruence and VB. A response surface illustrating this U-shaped relationship is shown in Figure 2.8. Within value congruence, a "low-low" match results in better VB compared to a "low-low" mismatch. Additionally, the positive effect of value congruence appears to strengthen.

Although no significant link is found between value incongruence and venture creation performance, Figure 2.8 suggests a general trend: increasing incongruence between individual and organizational values is associated with decreased VB.

Table 2.24 – The impact of the consistency between individual and organizational entrepreneurial orientation on employees' intrapreneurial behaviors

	Strategic renewal behavior		Venture-creating behavior	
	Model 1	Model 2	Model 3	Model 4
Constant	4.289***	4.004***	1.893***	1.254**
Gender	-0.314***	-0.269***	-0.001	0.032
Age	-0.467***	-0.524***	-0.125	0.016
Education	0.233**	0.348***	0.413**	0.579***
Income	-0.090*	-0.048	0.221***	0.142*
IP, b_1	0.479***	0.367***	0.490***	0.408***
OP, b_2	0.649***	0.668***	0.448***	0.678***
IP^2, b_3	-	-0.633***	-	-0.06
IP*OP, b_4	-	0.040	-	0.083
OP^2, b_5	-	0.226**	-	0.383***
Surface response analysis				
$Slope_1$: b_1+b_2	-	1.035***	-	1.086**
$Curvarture_1$: $b_3+b_4+b_5$	-	-0.367*	-	0.406**
$Slope_1$: b_1-b_2	-	-0.301*	-	-0.27
$Curvarture_2$: $b_3-b_4+b_5$	-	-0.447*	-	0.24
ΔR^2	0.624	0.676	0.526	0.551

Note. SE = Standard error; IEO = Individual entrepreneurial orientation; OEO = Organizational entrepreneurial orientation; Significant level: *P<0.05; **P<0.01; ***P<0.001; two tailed tests.

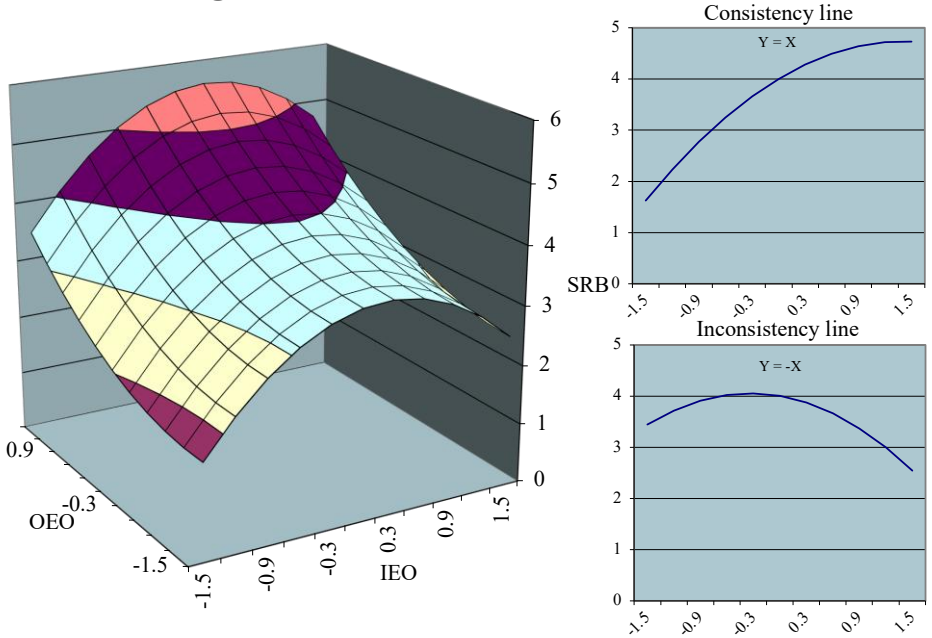


Figure 2.7 – Effect of IEO-OEO fit on SRB

Source: calculated by authors using SPSS version 26.0 based on collected data

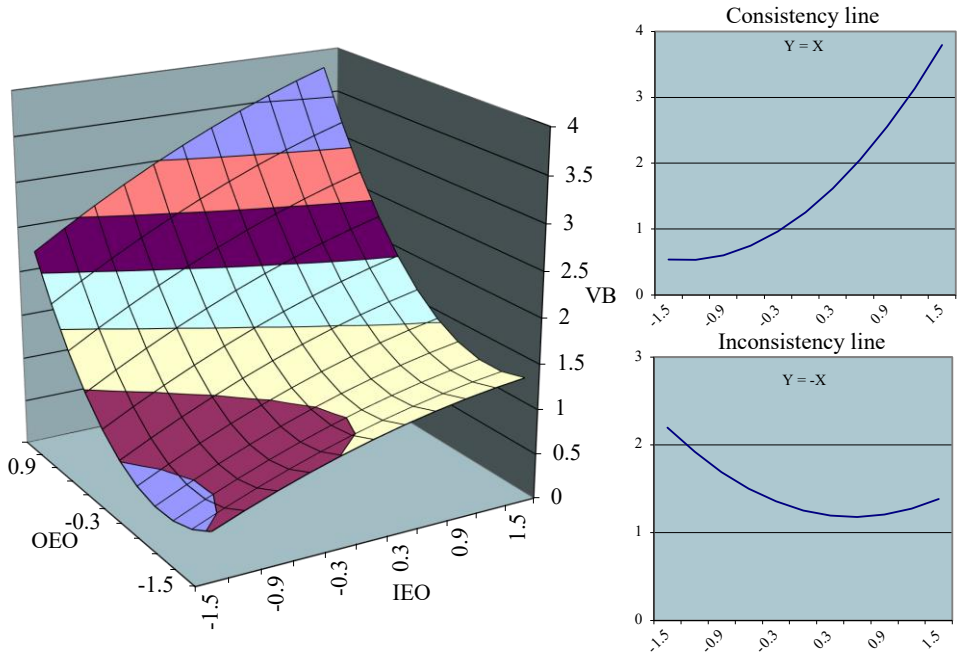


Figure 2.8 – Effect of IEO-OEO fit on VB

Source: calculated by authors using SPSS version 26.0 based on collected data

These empirical results provide room for further discussion based on related empirical and theoretical perspectives. These findings reveal that both OEO and IEO significantly enhance EI since IEO-OEO fit positively affects both SRB and VB. However, the quadratic effects differ: the relationship between IEO-OEO fit and SRB is inverted-U shaped, indicating diminishing returns of fit strength on SRB. In contrast, the relationship between IEO-OEO fit and VB is U-shaped, showing increasing benefits of fit strength for VB. Task context often influences behavioral expressions of personal traits [289]. Stewart and Barrick [282] found that intrateam processes and performance vary with task types. For conceptual tasks, the relationship follows an inverted-U pattern, suggesting a need for innovative thinking without continuous execution. Behavioral tasks show a U-shaped pattern, indicating a focus on cooperative execution rather than ongoing innovation. This distinction highlights that SRB is akin to conceptual tasks, focusing on innovation, while VB resembles behavioral tasks, emphasizing cooperative methods. These findings clarify the complex interactions between task context, IEO-OEO fit, and EI dimensions in organizational settings.

In conclusion: entrepreneurial Orientation is a crucial driver of organizational innovation and entrepreneurship. This study, grounded in Personal-Environment (P-E) Fit theory, examines how the alignment between Organizational Entrepreneurial

Orientation (OEO) and Individual Entrepreneurial Orientation (IEO) affects employee intrapreneurship (EI), focusing on strategic renewal behavior (SRB) and venture-creating behavior (VB). It provides a fresh perspective on the interaction between IEO and OEO within the EO framework. While the significance of EO in boosting organizational competitiveness is well-established, this research highlights the need to consider both individual and organizational dimensions in shaping EO's effects. Key findings include: (1) Both IEO and OEO positively influence EI, though the impact varies across its subdimensions; (2) The alignment between IEO and OEO enhances EI; (3) SRB and VB, as distinct aspects of EI, are driven by different mechanisms within the P-E Fit theory framework.

Analysis at stage 2.3 delves into the effects of OEO on EI, which encompasses SRB and VB. Furthermore, this analysis examines the role of OI as a mediating variable within the dynamic between OEO and EI [12].

Firms with an entrepreneurial culture are likely to cultivate an entrepreneurial orientation among employees [79, 303]. Such an approach strengthens competitive advantage by aligning strategic goals with employee behavior, a notion consistent with social identity theory as described by Tajfel and Turner [287]. According to this theory, an organization’s entrepreneurial orientation (OEO) forms part of its workplace identity, which influences employee intrapreneurship (EI) [131]. Social identity theory asserts that organizational identification (OI) is crucial for understanding employees' pro-organizational behavior [137]. However, the literature lacks a detailed exploration of how OEO influences EI through OI [52], which is a crucial component of positive work attitudes in the organizational context. This gap presents an opportunity to investigate how OI mediates the OEO-IB relationship, thereby extending social identity theory to organizational entrepreneurship and illustrating how OEO affects organizational identity and employee behavior.

Furthermore, there is a dearth of research at the intersection of entrepreneurship theories, human resource development, and leadership [170]. While OEO's overall

[12] The results of analysis 2.3 are derived from the author's peer-reviewed publication. For details: Wenjun Z. Organizational entrepreneurial orientation: Influence on intrapreneurial behavior / Wenjun Z., Panikarova S., Fang S. // Russian Management Journal – 2025. – Vol. 23 – № 1 – pp. 76–94.

impact is well-documented, the specific mechanisms linking organizational OEO to employee EI remain underexplored. Existing studies focus broadly on OEO's effects on firm growth [215] and performance [249], but offer limited insight into human resource development strategies that support entrepreneurial goals. Building on Miller's [209] foundational work on entrepreneurial strategic orientation, which has significantly influenced management studies [300], recent literature has increasingly focused on OEO at the individual and employee level [67, 273, 304]. This analysis adds to this body of knowledge by developing a theoretical framework to explore the OEO-EI relationship in depth.

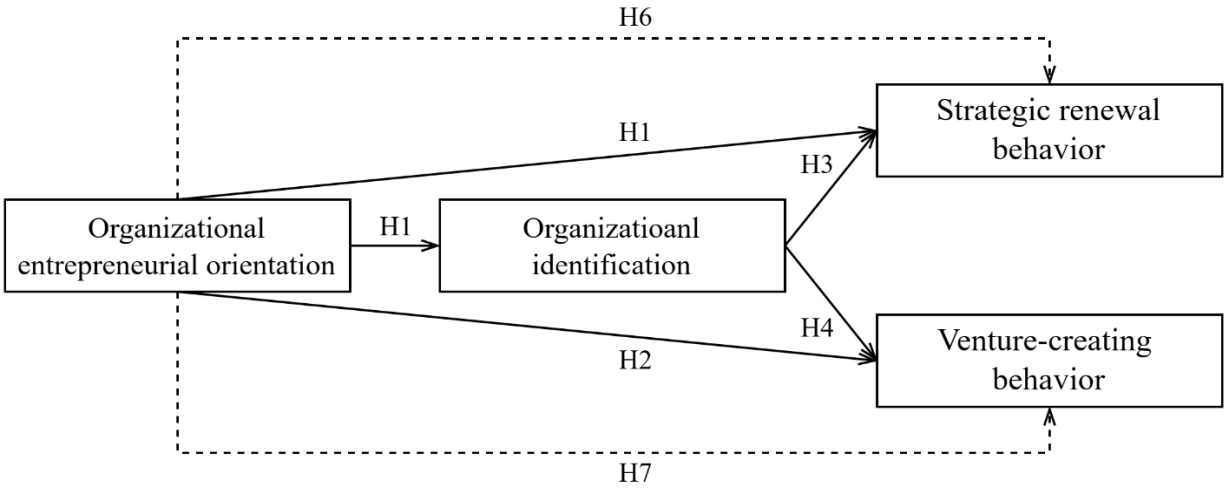


Figure 2.9 – Theoretical framework on the mediating role of organizational identification in the relationship between entrepreneurial orientation and employee intrapreneurship
Note: H1, H2 (the solid lines) represent direct hypotheses; H6, H7 (the dashed lines) represent mediating hypotheses. Source: made by authors based on conceptual work.

The analysis aims to address gaps by examining the effect of organizational OEO on employee EI, focusing on two main aspects: the direct influence of OEO on enhancing EI and the mediating role of OI in this dynamic, particularly regarding strategic renewal and venture-creating behaviors [128, 216]. This analysis uniquely emphasizes OI as a mediator and contributes by detailing how EO fosters or impedes employee EI, offering both theoretical insights and practical strategies for cultivating an entrepreneurial culture within organizations. Specifically, a theoretical model (figure 2.9) with seven hypotheses is examined: H1**.** OEO positively contributes to employees' strategic renewal behavior. H2. OEO positively contributes to employees' venture-creating behavior. H3. OI positively contributes to employees' strategic renewal behavior. H4. OI positively contributes to employee's venture-creating

behavior. H5. OEO positively contributes to OI. H6. OI mediates the relationship between OEO and employee's strategic renewal behavior. H7. OI mediates the relationship between OEO and employee's venture-creating behavior.

To validate the data for hypothesis testing, indicators for goodness of fit, including composite reliability, convergent validity, and discriminant validity, were assessed following Hair [130]. Table 2.25.a (in Appendix 3) presents the statistical details on composite reliability and convergent validity. Composite reliability, shown by CR values in Table 3.8, ranges from 0.853 to 0.915, indicating high reliability and meeting Hair et al.'s [129] recommended threshold. Additionally, Cronbach's alpha was used to measure reliability, with scores of 0.70 considered acceptable, 0.80 or higher as strong, and 0.90 and above as excellent. The study's Cronbach's alpha values are 0.867 for OEO, 0.908 for OI, 0.815 for strategic renewal behavior, and 0.823 for venture-creating behavior, demonstrating high reliability of the research instruments. A threshold Average Variance Extracted (AVE) value greater than 0.5 indicates established convergent validity [114]. As shown in Table 2.25.a (in Appendix 3), all AVE values in this study surpass the 0.5 threshold, confirming the convergent validity of the research instrument. Discriminant validity ensures constructs that should not correlate are indeed unrelated. According to the Fornell-Larcker criterion, the square root of AVE for each construct must exceed its correlations with other constructs. Table 2.27.a (in Appendix 3) shows that all AVE square roots (diagonal values) are greater than the correlations beneath them, confirming discriminant validity.

Common method variance (CMV), which arises from the data collection method rather than structural significance, may be present due to the use of a single questionnaire in this study. CMV was assessed using Harman's Single Factor Test. An exploratory factor analysis with varimax rotation revealed that a one-factor solution accounted for only 46.49% of the variance and no factor loadings exceeded 50%, indicating minimal common method bias [118]. Multicollinearity, which obscures the effects of independent variables on response variables, was evaluated using the Variance Inflation Factor (VIF) test [205]. The criteria are no multicollinearity if tolerance >0.1 and VIF <10; multicollinearity present if tolerance <0.1 and VIF >10.

For our major mediation models—strategic renewal behavior and venture-creating behavior—Table 2.26.a (in Appendix 3) shows VIF values of 1.628 and 1.983, respectively, for the independent variables OI and OEO, both below 10. Tolerance values for OI and OEO are 0.614 and 0.504, respectively, both greater than 0.1. These results indicate that multicollinearity is not a significant issue in this study.

To begin testing the hypotheses, this analysis presents descriptive statistics, including mean, standard deviation, and correlations for organizational OEO, OI, strategic renewal behavior, and venture-creating behavior (Table 2.27.a, in appendix 3). The analysis shows a significant positive correlation between organizational OEO and OI ($r = 0.556$, $p < 0.01$), suggesting a strong link. Additionally, organizational EO is strongly correlated with strategic renewal behavior ($r = 0.693$, $p < 0.01$) and venture-creating behavior ($r = 0.501$, $p < 0.01$). OI also significantly correlates with both strategic renewal behavior ($r = 0.617$, $p < 0.01$) and venture-creating behavior ($r = 0.631$, $p < 0.01$). These findings support the hypothesized relationships and provide initial evidence that OI may mediate the relationship between OEO and employee intrapreneurial behavior.

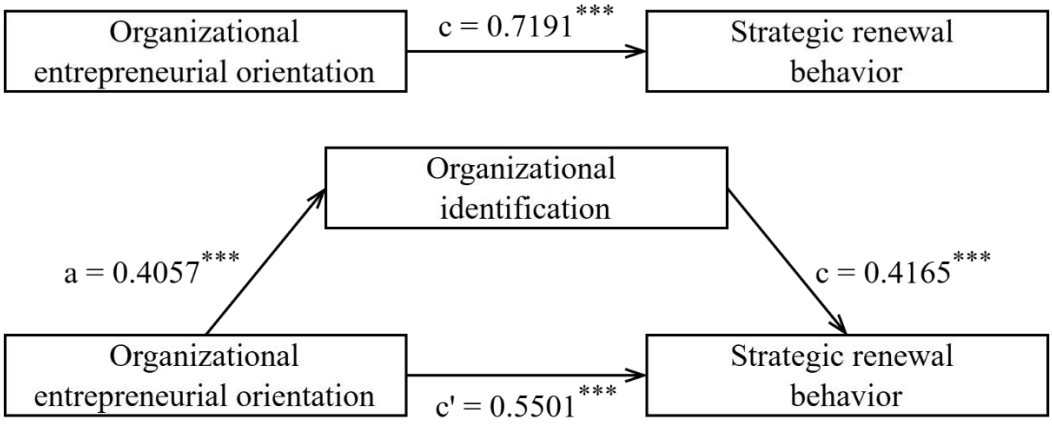


Figure 2.10 – Mediation model—strategical renewal behavior

Note: N = 292; Significant level: *P < 0.05, **P < 0.01, ***P < 0.001.

This analysis examined how organizational entrepreneurial orientation (OEO) impacts strategic renewal behavior, emphasizing the mediating role of organizational identification (OI). The results revealed that OEO significantly affects strategic renewal behavior ($\beta = 0.719$, $p < 0.001$), confirming Hypothesis 1 (Table 2.28, Figure 2.10). Additionally, OEO is positively and significantly correlated with OI ($\beta = 0.406$, $p < 0.001$), supporting Hypothesis 5. OI also shows a significant positive link to

strategic renewal behavior (β = 0.417, p < 0.001), validating Hypothesis 3. When considering OI as a mediator, OEO's impact on strategic renewal behavior is still significant (β = 0.550, p < 0.001), which supports Hypothesis 1 (path c', Figure 2.10).

Table 2.28 – Results of simple mediation model for strategical renewal behavior

Direct effect model							
Predictor		Outcome = M (Organizational identification)					
		β	SE	t	p	LLCI	ULCI
X = OEO	a	0.4057	0.0598	6.7812	0.0000	0.2880	0.5235
Constant	i_1	2.8123	0.4135	6.8013	0.0000	1.9984	3.6262
Gender		-0.3955	0.0797	-4.9644	0.0000	-0.5523	-0.2387
Age		0.1263	0.0819	1.5425	0.1241	-0.0349	0.2874
Education		0.0474	0.0893	0.5303	0.5963	-0.1285	0.2232
Income		0.0196	0.0368	0.5314	0.5955	-0.0529	0.0921
Direct effect model							
Predictor		Outcome = Y (Strategical renewal behavior)					
		β	SE	t	P	LLCI	ULCI
X = OEO	c'	0.5501	0.0630	8.7284	0.0000	0.4261	0.6742
M = OI	b	0.4165	0.0578	7.2049	0.0000	0.3027	0.5303
Constant	i_2	0.2850	0.4358	0.6540	0.5137	-0.5728	1.1427
Gender		-0.2128	0.0812	-2.6215	0.0092	-0.3726	-0.0530
Age		-0.4048	0.0804	-5.0363	0.0000	-0.5631	-0.2466
Education		0.2472	0.0874	2.8290	0.0050	0.0752	0.4192
Income		-0.0697	0.0360	-1.9356	0.0539	-0.1406	0.0012
Total effect model							
Predictor		Outcome = Y (Strategical renewal behavior)					
		β	SE	t	p	LLCI	ULCI
X = OEO	c	0.7191	0.0635	11.3261	0.0000	0.5942	0.8441
Constant	i_3	1.4564	0.4388	3.3191	0.0010	0.5927	2.3201
Gender		-0.3776	0.0845	-4.4659	0.0000	-0.5440	-0.2112
Age		-0.3522	0.0869	-4.0540	0.0001	-0.5232	-0.1812
Education		0.2670	0.0948	2.8159	0.0052	0.0804	0.4536
Income		-0.0616	0.0391	-1.5757	0.1162	-0.1385	0.0153

Note: N = 292; SE = standard error; LLCI = lower-level confidence interval; ULCI = Upper-level confidence level; Confidence level for all confidence intervals= 95%; bootstrap sample size = 5000; Demographic variables (gender, age, educational level, and income) are controlled in each model.
Source: calculated by authors using SPSS version 26.0 based on collected data.

The mediation analysis, including both direct and indirect effects (Tables 2.28 and 2.30), shows that the bootstrap confidence interval for the indirect effect (0.082 to 0.258) does not include zero, indicating a significant mediation effect and thus supporting Hypothesis 6. Although the direct effect of OEO on strategic renewal behavior remains significant (b = 0.550, p < 0.001) with OI as a mediator, it suggests partial mediation. This implies that while OI significantly facilitates the OEO-strategic renewal relationship, other factors might also contribute.

Table 2.29 – Results of simple mediation model for venture-creating behavior

Direct effect model							
Predictor		Outcome = M (Organizational identification)					
		β	SE	t	p	LLCI	ULCI
X - OEO	a	0.4057	0.0598	6.7812	0.0000	0.2880	0.5235
Constant	i_1	2.8123	0.4135	6.8013	0.0000	1.9984	3.6262
Gender		-0.3955	0.0797	-4.9644	0.0000	-0.5523	-0.2387
Age		0.1263	0.0819	1.5425	0.1241	-0.0349	0.2874
Education		0.0474	0.0893	0.5303	0.5963	-0.1285	0.2232
Income		0.0196	0.0368	0.5314	0.5955	-0.0529	0.0921
Direct effect model							
Predictor		Outcome = Y (Venture-creating behavior)					
		β	SE	t	P	LLCI	ULCI
X - OEO	c'	0.2304	0.0821	2.8055	0.0054	0.0687	0.3920
M - OI	b	0.6827	0.0753	9.0640	0.0000	0.5344	0.8309
Constant	i_2	-1.9287	0.5677	-3.3974	0.0008	-3.0461	-0.8113
Gender		0.1739	0.1058	1.6444	0.1012	-0.0343	0.3821
Age		-0.1205	0.1047	-1.1506	0.2508	-0.3266	0.0856
Education		0.3821	0.1138	3.3562	0.0009	0.1580	0.6062
Income		0.2457	0.0469	5.2363	0.0000	0.1534	0.3381
Total effect model							
Predictor		Outcome = Y (Venture-creating behavior)					
		β	SE	t	P	LLCI	ULCI
X - OEO	c	0.5074	0.0864	5.8755	0.0000	0.3374	0.6773
Constant	i_3	-0.0088	0.5968	-0.0147	0.9883	-1.1834	1.1659
Gender		-0.0961	0.1150	-0.8358	0.4040	-0.3224	0.1302
Age		-0.0343	0.1182	-0.2901	0.7719	-0.2669	0.1983
Education		0.4144	0.1289	3.2144	0.0015	0.1607	0.6682
Income		0.2591	0.0531	4.8751	0.0000	0.1545	0.3637

Note: N = 292; SE = standard error; LLCI = lower-level confidence interval; ULCI = Upper-level confidence level; OEO = Organizational entrepreneurial orientation; OI = Organizational identification; Confidence level for all confidence intervals= 95%; bootstrap sample size = 5000; Demographic variables (gender, age, educational level and income) are controlled in each model. Source: calculated by authors using SPSS version 26.0 based on collected data.

This analysis investigates how OEO promotes venture-creating behavior, emphasizing the mediating role of organizational identification (OI). The results show a strong overall effect of OEO on venture-creating behavior ($\beta = 0.507$, $p < 0.001$), supporting Hypothesis 2 (Table 2.29, Figure 2.11). OI also positively influences venture-creating behavior with a beta coefficient of 0.683 ($p < 0.001$), validating Hypothesis 4 (Table 2.29, Figure 2.11). When accounting for OI as a mediator, OEO's impact on venture-creating behavior remains significant ($\beta = 0.230$, $p < 0.01$), further supporting Hypothesis 2 (Table 2.29, Figure 2.11).

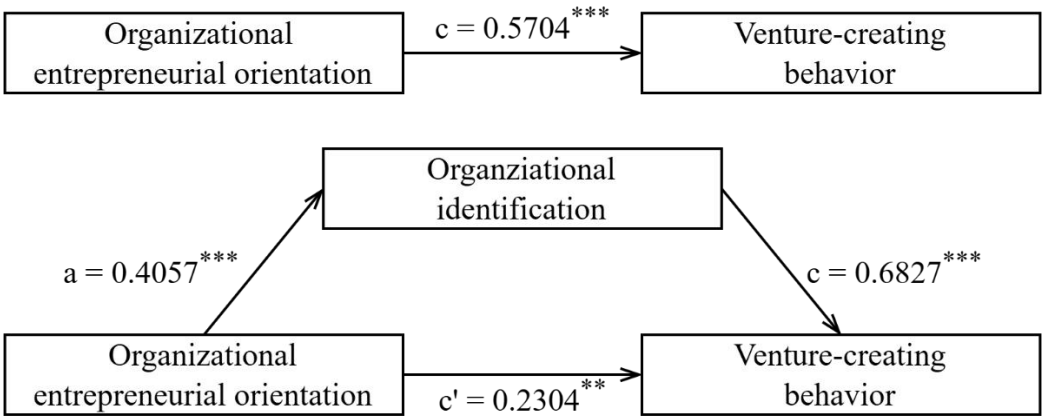


Figure 2.11 – Mediation model—venture-creating behavior

Note: N = 292; Significant level: *P < 0.05, **P < 0.01, ***P < 0.001.

Mediation analysis indicates a significant indirect effect of OEO on venture-creating behavior through OI, with a bootstrap confidence interval for the indirect effect ranging from 0.139 to 0.413 (excluding zero), confirming Hypothesis 7 (Tables 2.29 and 2.30). The direct effect of EO on venture-creating behavior, even with OI as a mediator, is substantial (b = 0.230, p < 0.01), suggesting partial mediation by OI. These findings underscore the important intermediary role of OI in the relationship between OEO and venture-creating behavior.

Figure 2.30 – Mediation analysis summary

Relationship	Total effect	Direct effect	Indirect effect	Confidence Interval		Conclusion
				Lower Bound	Upper bound	
OEO -> OI -> SRB	0.7191	0.5501	0.1690	0.0818	0.2581	Partial mediation
OEO -> OI -> VB	0.5074	0.2304	0.2711	0.1391	0.4128	Partial mediation

Note: OEO is organizational entrepreneurial orientation, OI is organizational identification, SRB is strategic renewal behavior, VB is venture-creating behavior. Source: calculated by authors using SPSS version 26.0 based on collected data.

Detailed hypothesis testing results are summarized in Table 2.31.a (in Appendix 3). These empirical results provide room for further discussion based on related empirical and theoretical perspectives. The study reveals a strong positive link between an organization's organizational entrepreneurial orientation (OEO) and employees' intrapreneurial behaviors, such as strategic renewal and venture creation. Organizations with a robust entrepreneurial culture are more likely to demonstrate individual-level strategic innovation and adaptability. This suggests that such organizations are better at adapting strategies to stay competitive and seize new

opportunities. Additionally, the link between OEO and venture-creating behavior indicates that entrepreneurial-minded organizations support employee-led entrepreneurial initiatives, including new projects and innovations. These findings underscore the importance of fostering an entrepreneurial culture within organizations. Leaders can promote such a culture by encouraging entrepreneurial thinking among employees, thus enhancing strategic renewal and new venture creation. Recognizing the connection between OEO and EI is crucial for improving talent management, employee development, and overall performance.

Organizational identification (OI) mediates the relationship between OEO and employee intrapreneurial behavior. According to social identity theory [99], employee identification is a key motivational factor, especially in modern workplaces where work and leisure boundaries are increasingly blurred. The shift towards dynamic workplace models [23] highlights the need for effective OI to enhance employee motivation and competitiveness. Social Exchange Theory [80] and Social Information Processing Theory [262] also provide insights into this dynamic. Social Exchange Theory suggests that positive workplace interactions enhance OI, while Social Information Processing Theory links work characteristics to attitudes and behaviors, positioning OI as a crucial mediator between OEO and intrapreneurial behavior. OI emerges from organizational characteristics and personal judgment, highlighting its role in mediating OEO's effects on intrapreneurial behavior.

The partial mediation effect observed indicates that while OI significantly channels the influence of OEO on intrapreneurial behavior, it does not fully account for this effect [259]. Other factors, such as individual values [276], experiences [26], and motivations [61], may directly impact intrapreneurial behavior. External factors like market dynamics [285] and technological advancements [43] can also spur intrapreneurial actions independently of OI.

In summary: this analysis explored how organizational entrepreneurial orientation influences employee intrapreneurial behavior, focusing on the mediating role of organizational identity. Results reveal a positive relationship between organizational entrepreneurial orientation and various facets of employee

intrapreneurship, as well as between organizational entrepreneurial orientation and employee organizational identification. Employees who identify with an entrepreneurially oriented organization are more inclined to engage in intrapreneurial activities that benefit the organization. Notably, organizational identification partially mediates the effect of organizational entrepreneurial orientation on intrapreneurial behavior, suggesting that organizations with strong entrepreneurial orientation foster employee intrapreneurial behavior by enhancing organizational identification. This process boosts employee engagement and drives proactive and innovative intrapreneurial behavior, even without explicit organizational directives.

This study series contributes valuable insights to the field; however, it also presents certain limitations that suggest important avenues for future research. While socio-demographic variables, including age and gender, were controlled in the polynomial regression analysis to mitigate their potential influence on the hypothesis, this does not substitute for the need for a more representative sample should the goal be to generalize findings to a broader population. Moreover, the use of non-random sampling, though a common and practical approach in social science research due to its cost-effectiveness, is inherently susceptible to bias, particularly in underrepresented subgroups. To enhance the robustness of future studies, it is advisable to adopt a more diverse sampling strategy that combines multiple techniques. In addition, the antecedent conditions such as the historical context of the organization and the sector in which it operates—particularly the technological maturity of the industry (e.g., high-tech versus low-tech)—are likely to influence intrapreneurial behaviors, organizational identification, and perceptions of entrepreneurial orientation. Future research should, therefore, systematically consider these factors, applying appropriate controls to minimize their impact on the emergence of intrapreneurship. By doing so, researchers can more precisely delineate the relationships at play, advancing a deeper and more nuanced understanding of the determinants of intrapreneurial behavior within organizational settings. Lastly, although this study has drawn on established theoretical frameworks and similar research to evaluate and discuss mechanisms such as the non-linear relationship between organizational entrepreneurial orientation and employee

intrapreneurship, as well as the partial mediating role of organizational identification, these discussions should be empirically tested in future studies to validate the proposed mechanisms. Empirical validation remains a critical step in ensuring the robustness and generalizability of the theoretical claims presented.

CONCLUSIONS OF CHAPTER 2

This chapter presents the methodological and empirical results of the development of employees' entrepreneurial competencies as growth reserves for labor productivity and efficiency in the context of demographic and socio-psychological factors. It includes two series of study: the formation of individual entrepreneurial orientation and its impact on employee intrapreneurship; the alignment of individual entrepreneurial orientation and organizational entrepreneurial orientation and its impact on employee intrapreneurship. Key Conclusions:

1. A methodology for analyzing the parameters of employee intrapreneurship and entrepreneurial orientation has been developed. For the individual level, the T-test, ANOVA, group regression, and structural equation model were applied. To study the entrepreneurial orientation of employees and organizations, as well as their relationship with employee intrapreneurship, a polynomial regression with surface response analysis and a mediator model have been developed.

2. The patterns of the formation of individual entrepreneurial orientation are revealed, deepening the understanding of its manifestations in connection with certain demographic and socio-psychological characteristics of employees and complementing knowledge about the mechanisms for stimulating the development of intrapreneurship in the organization. These patterns are entrepreneurial orientation varies across different demographic traits; specific demographic traits moderate the relationship between entrepreneurial orientation and intrapreneurial behavior; a work environment fostering psychological safety and work engagement enhances entrepreneurial orientation, promoting intrapreneurial behavior.

3. The patterns of interaction between organizational entrepreneurial

orientation and individual entrepreneurial orientation are revealed. These patterns are when organizational and individual entrepreneurial orientations align, employees are more likely to adopt a positive work attitude, though excessive alignment may reduce it; alignment between organizational and individual entrepreneurial orientations encourages intrapreneurial behavior, though this effect varies across different dimensions of intrapreneurship; organizational entrepreneurial orientation promotes intrapreneurial behavior when employees identify with it.

CHAPTER 3. THE HUMAN RESOURCE DEVELOPMENT SYSTEM TO INCREASE LABOR PRODUCTIVITY THROUGH EMPLOYEES' ENTREPRENEURIAL COMPETENCIES[13]

3.1 Main directions of increasing labor productivity through entrepreneurial orientation and intrapreneurship of employees

The purpose of section 3.1 is to suggest areas of human resource development to improve productivity through entrepreneurial orientation and employee intrapreneurship. This section structures in the following way: First, the author explores the barriers to increasing labor productivity through intrapreneurship and entrepreneurship orientation and their causes. The authors then point out the rationale for establishing an effective human resource development system to incentivize intrapreneurship and entrepreneurial orientation and the shortcomings of existing research in this direction. Finally, the author proposes that a human resource development system should be established that considers both the general laws of human resource development practice and the specific characteristics of entrepreneurial competencies development in terms of entrepreneurial orientation and employee intrapreneurship.

Developing employees' entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship can be a crucial reserve of labor productivity and competitiveness in the modern economy [3]. Employee intrapreneurship is closely linked to labor productivity within organizations [302]. Specifically, our research shows that employee intrapreneurship is strongly associated with individual work performance and the overall performance of the organization. Employee intrapreneurship acts as a mediator in the relationship between entrepreneurial orientation and labor productivity, as shown by employee and organizational performance. In other words, entrepreneurial orientation influences

[13] The results of Chapter 3 are adopted from the implications parts of author's peer reviewed publications under this PhD project. The results of Chapter 3 were also presented and approbated at the XIX International Conference "Russian Regions in the Focus of Change" (session: "New Challenges for Management in Times of Uncertainty"), Yekaterinburg, Russia, 2024.

organizational productivity by fostering employee intrapreneurship. This orientation encompasses both organizational-level and individual-level, highlighting the importance of fostering entrepreneurial orientation at all levels as a crucial strategy to enhance productivity within organizations. However, for human resource development practices, verifying the role of entrepreneurial orientation and intrapreneurship in increasing labor productivity primarily provides broad directional guidance rather than specific applications. Therefore, a more refined human resource development system is essential for effective human resource practice to increase labor productivity through employees' entrepreneurial competencies such as intrapreneurship and entrepreneurial orientation [60, 108].

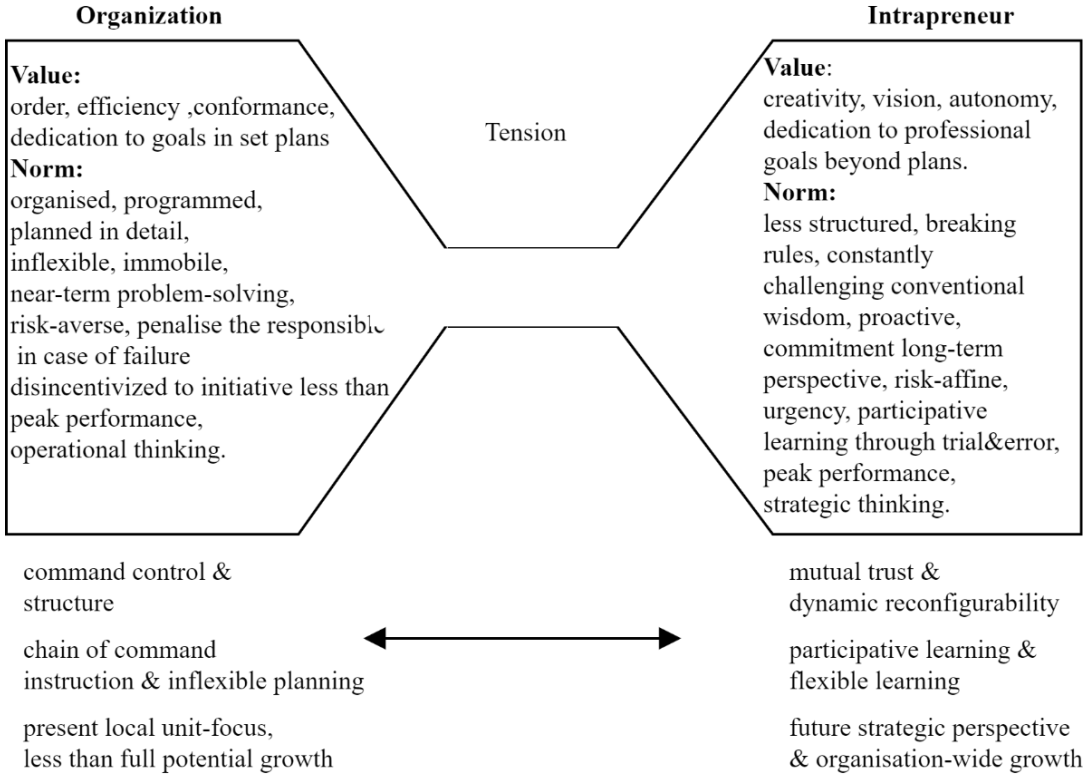


Figure 3.1 – Contrast in values and norms between intrapreneur and the status-quo groups and resulting tension

The existing barriers to the development of employees' entrepreneurial competencies to improve labor productivity can be considered both from the values and normative identity tension between intrapreneur and the enterprise, and the principal-agent theory. In terms of values and normative identity, this study is based on the research of Meng and Roberts [206]. In order to provide a convincing explanation from the theoretical perspective, this research defines the essence of the incentive problem of intrapreneurship as the principal-agent problem [98, 136], and explains the

causes of the obstacle from the economic perspective of the principal-agent problem.

In the field of intrapreneurship research, some scholars attribute the barriers to conflicts arising from differences in organizational values and those held by intrapreneurs. Meng and Roberts [206], among others, identified potential value conflicts in this area (Figure 3.1). In terms of values, intrapreneurs prioritize vision (future), creativity (beyond the established plan), autonomy (willingness to take risks), and flexibility (beyond organizational structure). Conversely, the organization emphasizes efficiency (present) and problem-solving (convergent thinking) and requires order and control. Normatively, intrapreneurs are less structured, rule-breaking, and constantly challenging conventional wisdom, while the organization operates with a highly organized, programmed, and meticulously planned structure. These differences result in mismatched needs: for instance, intrapreneurs seek mutual trust and dynamic re-configurability, whereas the organization prefers command, control, and structure. Based on survey studies, they dynamically summarized the causes of these barriers (Figure 3.2). First, market competition drives companies to adopt an entrepreneurial orientation that encourages employee intrapreneurship. Second, in intrapreneurial process, a series of conflicts between organizational and individual elements emerge creative thinking and creative tension, contrasting values and norms, and tension factors between intrapreneurs and status quo groups. Finally, this conflict cycle further intensifies the organization's fear of change, creating innovation barriers. The same perspective on the value conflicts in intrapreneurship can also be identified in recent research [63, 66].

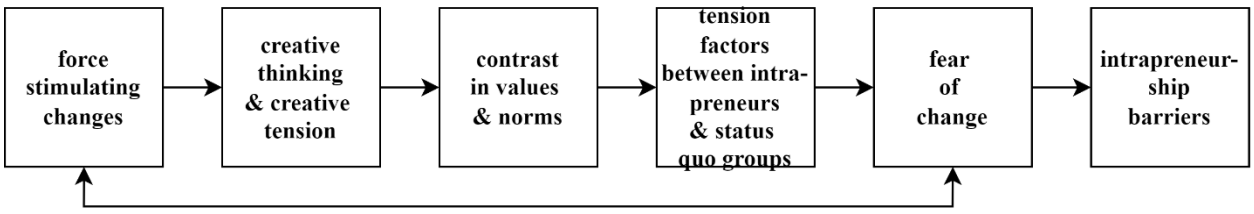


Figure 3.2 – Simplified schematic of origins of intrapreneurship barriers

From a theoretical perspective, the relationship between intrapreneurs and the firm within an organization often exhibits characteristics of a typical principal-agent relationship [98, 136]. As the principal, the firm aims to enhance productivity by incentivizing employees' entrepreneurial orientation and intrapreneurial behaviors.

However, as agents, employees may pursue personal interests or make decisions that do not fully align with the firm's objectives. This relationship necessitates that firms design appropriate incentive and control mechanisms to guide employees' behaviors in ways that align with the organization's overall interests [310]. Therefore, the issue of motivating entrepreneurial orientation and intrapreneurial behavior among employees to improve labor productivity can be analyzed through the lens of principal-agent theory [265]. According to Zhang Weiying [312], the principal-agent problem arises due to four factors:

-Hidden Action: Under conditions that incentivize intrapreneurship and entrepreneurial orientation among employees, it is challenging for firms to effectively monitor employees' actual entrepreneurial activities and level of effort [93]. Due to the complexity of entrepreneurial activities, companies can only observe final outcomes but struggle to directly assess employees' daily contributions. Employees may choose lower-risk, less demanding tasks to ensure project success or to yield short-term results, aiming to secure favorable performance evaluations or compensation. This issue of "hidden action" makes it difficult for companies to effectively motivate employees to maintain sustained effort and innovation, thus diminishing the effectiveness of intrapreneurship.

- Goal Misalignment: There may be a misalignment between employees' personal goals and the company's overarching objectives [117]. While organizations aim to enhance innovation capabilities and labor productivity by promoting entrepreneurial orientation, employees may prioritize personal growth, immediate rewards, or short-term interests. Such discrepancies can lead employees to favor projects that align with their own interests over those that advance the company's long-term development. For instance, employees may prefer entrepreneurial projects that offer short-term gains, overlooking more innovative, high-risk projects that the company might prioritize for future growth. Goal misalignment may result in suboptimal returns on the resources and time the organization dedicates to incentivization.

- Risk Aversion: Employees often exhibit a degree of risk aversion in

intrapreneurial activities [261]. Despite company encouragement, they may fear that failure in entrepreneurial ventures could impact their career progression or compensation. Consequently, risk-averse employees may avoid high-risk innovation projects, favoring safer, more predictable tasks instead, which can compromise the quality and outcomes of intrapreneurship. Employees' risk avoidance may prevent the organization from fully achieving its goals of increased innovation and productivity, especially when the company's incentive system is insufficient to fully offset the risks assumed by employees.

- Uneven Responsibility Allocation: In incentivizing intrapreneurship and entrepreneurial orientation, the issue of responsibility allocation is particularly critical. Companies typically bear the majority of resource investment and the risk of entrepreneurial failure, while employees' responsibilities are relatively limited [119]. This can result in a lack of ownership among employees, leading to "moral hazard" behaviors, or even attempts to shift blame in case of failure, thus impacting overall corporate performance [317]. For example, employees may not exercise caution in resource usage, causing wastage or resource misallocation, with the organization bearing the loss while employees face minimal accountability. Ensuring a fair distribution of risk and rewards, so that employees assume appropriate responsibility along with the benefits of entrepreneurial success, is an essential challenge for companies to address.

It is worth noting that examining barriers to intrapreneurial motivation from both individual and organizational perspectives has a basis in the research community's categorization of practical obstacles. In the intrapreneurship model developed by Kuroto et al. [176], organizational characteristics, personal attributes, and combined "precipitating events" are identified as key preconditions for employees choosing intrapreneurship within an organization. Building on Kuroto's work, Alireza Feyzbakhsh et al. [19] further classified intrapreneurial barriers from individual and organizational angles. On the individual level, barriers to developing intrapreneurship include employees' propensity for risk-taking, desire for autonomy, need for achievement, goal orientation, and internal locus of control. Organizationally, barriers

arise from management policies on support, work discretion, reward and reinforcement, time availability, and organizational boundaries. Similarly, Salarzehi and Forouharfar [263], through case study analysis, divided intrapreneurial barriers into Intra-Organizational Innovation Barriers and Organizational Barriers. The former, resulting from interactions between individuals and organizations, includes issues such as lack of opportunity perception, insufficient intrapreneurs, organizational obstacles, resistance to change, and value tensions between intrapreneurs and the organization. The latter, organizational barriers, are more focused on the organization itself, including bureaucratic structure, organizational policies, characteristics of large organizations, inappropriate compensation methods, and organizational culture. These insights confirm that the motivation for intrapreneurship lies in resolving issues arising from the need for alignment between organizational actions and intrapreneurs.

From a theoretical perspective, the establishment of an organizational human resource (HR) development system serves as an initial solution to the barriers hindering internal entrepreneurship [108]. An effective organizational HR development system can facilitate the resolution of such issues by supporting intrapreneurial behavior within the organization. In other words, a well-structured HR development system can potentially address these challenges, providing both individual and organizational support for fostering employee intrapreneurship. Broadly defined, an organizational HRM system is a structured set of management processes and policies that organizations build to achieve strategic goals, promote employee development, and enhance organizational effectiveness [157]. Therefore, the effectiveness of an organizational HRM system is closely linked to motivating employee intrapreneurship.

Empirical research demonstrates that effective HR practices significantly increase a firm's innovation output. For example, optimizing training, performance assessment, and reward mechanisms for key roles such as R&D and marketing staff substantially enhances the internal atmosphere of innovation and entrepreneurship within the organization [86]. Additionally, the HR development system plays a role in promoting knowledge sharing, cross-departmental collaboration, and teamwork, indirectly supporting the effective advancement of internal entrepreneurship [108].

According to resource dependence theory, employees' innovative behaviors and intrapreneurial efforts are supported by organizational resources [293]. In a well-designed HR development system, organizations provide the skills, knowledge, and resources employees need to undertake innovative tasks and engage in employee intrapreneurship, through measures such as training, career development paths, and resource support. Practical research shows that organizations with higher levels of resource support are more likely to motivate employees toward innovative work [87]. Furthermore, both intrinsic and extrinsic incentives have a significant impact on employees' intrapreneurial behavior. A robust HR development system, through salary benefits, promotion opportunities, and performance-based incentives, can fulfill employees' fundamental needs, thus motivating them for intrapreneurship [34]. Studies indicate that intrapreneurial behavior often requires a high level of individual engagement [232], and an effective incentive system can enhance employees' sense of responsibility and accomplishment, thereby fostering their willingness to innovate and undertake entrepreneurial activities.

Thus, the three core elements in human resource development system—namely, the Knowledge, Skills, and Abilities (KSAs) domain (or competency-based domain), the Motivation and Effort domain, and the Contribution Opportunity domain [157]—can potentially alleviate incentive obstacles in intrapreneurship. According to the Jiang et al. [157], these three domains of human resource system capture three primary methods functioned by the human resource system to relate human resource development to employee performance. Furthermore, theses three domains capture the major human resource policies: the KSAs domain comprises a set of policies and practices focused on enhancing employee capabilities, including three general HR policies such as recruitment, selection, and training policies; the Motivation and Effort domain consists of policies that influence employee motivation and effort during their performance rather than their abilities, including three general HR policies such as performance management, compensation, and incentive and reward policies; the contribution opportunities domain strives to design work in a way that enables employees to leverage their KSAs and efforts by providing opportunities to contribute,

including two general HR policies such as job design and participation policies.

These domains with its corresponding human resource development policies potentially help overcome value conflicts between the organization and intrapreneur, principal-agent issues, and specific barriers arising from organization and individual, thereby promoting the development of intrapreneurial productivity. The positive impact of each policy area as a solution to the intrapreneurial barriers is justified as follows:

- Knowledge, Skills, and Abilities (KSAs) or Competency-based Domain: First, by providing training and development opportunities, the KSAs domain strengthens employees' understanding of organizational goals and values, aligning their skills and knowledge with organizational strategy [135]. Additionally, improvements in knowledge and skills enable the organization to better assess and understand employee abilities and potential, reducing uncertainty related to "hidden actions." [315]. Finally, the KSAs domain enhances employees' innovation skills and entrepreneurial capacity, equipping them to address entrepreneurial challenges more effectively [291].

- Motivation and Effort Domain: First, the Motivation and Effort domain can strengthen employees' identification with organizational values through fair, transparent reward mechanisms (e.g., performance bonuses, profit sharing, equity incentives) [165], aligning entrepreneurial activities with organizational strategic goals. Additionally, by allowing employees to gain direct benefits from intrapreneurial achievements, incentive mechanisms more closely align personal and organizational interests, reducing goal conflicts [193]. Lastly, incentive measures maintain employees' motivation to overcome intrapreneurial challenges [222].

- Contribution Opportunity Domain: First, the Contribution Opportunity domain provides employees with more opportunities to participate in organizational strategic decisions and project selection, empowering them with a sense of responsibility in intrapreneurship [211]. Furthermore, granting employees opportunities to contribute in employee intrapreneurship can reduce the "hidden actions" issue in agency problems [275]. Finally, the Contribution Opportunity domain allows employees to participate in and assume key responsibilities within entrepreneurial projects, enabling them to

leverage their expertise and innovation potential, thus lowering barriers in entrepreneurship arising from organizational resource constraints or management restrictions [91].

However, current research on the relationship between organizational human resource development systems and intrapreneurship is overly broad, and merely explaining solutions from the perspective of human resource system theories does not substitute for recommendations based on empirically observed patterns due to following reasons:

-Firstly, addressing the motivational challenges of intrapreneurship through human resource development systems has indeed been proposed by some scholars, yet most studies only broadly confirm a positive relationship between organizational HR development system and intrapreneurship without offering actionable insights on how to design an effective system. For example, the study by Escribá-Carda et al. [108] confirmed that employees' exposure to a "High-Performance Work System" encourages knowledge-sharing behaviors and, simultaneously, supports intrapreneurial activities. From this paper's perspective, the contribution of Escribá-Carda et al.'s research lies more in affirming the need for a robust human resource management system rather than addressing how to tailor this system to the dynamics of intrapreneurship. Furthermore, this system's development was based on Jensen et al. [156], who synthesized general management system insights from prior studies rather than basing it on the specific developmental patterns of intrapreneurship. Related studies include the work of Wan and Liu [301], who advocate for a human resource management approach centered around empowerment.

-Secondly, while this research asserts that human resource systems should play a role in addressing the challenges of intrapreneurial motivation and discusses their role across three domains of the human resource system, these discussions remain too abstract to capture the unique dynamics of intrapreneurship. For example, human resource systems function fundamentally through the domains of knowledge, skills, and abilities (KSAs), motivation and effort, and opportunities to contribute to organizational performance and goal achievement [157]. However, it can be argued that

any specific goal requiring the involvement of human resource systems will rely on these three methods, indicating a general approach to human resources without consideration for the distinct developmental trajectory of organizational context and subject has its limitations [70, 155].

Therefore, the facilitation of human resource development systems should account for both the unique characteristics of human resource development specific to intrapreneurship and the general principles and methods of human resource system, integrating the fundamental features of human resource systems with the empirically observed patterns supporting intrapreneurial growth.

3.2 The identified patterns and HR practices of developing entrepreneurial competencies at the organizational level

The purpose of section 3.2 is to synthesize the six patterns obtained from the empirical study and considers the specific barriers and causes of intrapreneurship and the basic components of the human resource development system in Section 3.1 to establish a human resource development system based on the patterns on the development of intrapreneurship and entrepreneurial orientation. Based on the reasons for intrapreneurship barriers and its causes discussed in section 3.1 (value conflicts between organizations and intrapreneurs and principal-agent problems) and the dual nature of entrepreneurial orientation, this study conducts two rounds of empirical study on entrepreneurial orientation at both the employee and organizational levels. Each round investigates three distinct traits associated with these orientations, leading to the identification and discussion of six various patterns or models.

Formulating human resources development policies based on the special characteristics of empirical research and the general characteristics of human resources systems is justified for three reasons. First of all, entrepreneurial orientation within organizations is not a singular dimension; it can be categorized into at least two distinct types: organizational entrepreneurial orientation and individual employee entrepreneurial orientation [67, 72]. This categorization stems both from practical management insights and theoretical conclusions drawn by researchers in management studies. Secondly, these two directions are also in line with the explanation of the

reasons for the obstacles to the development of intrapreneurship and entrepreneurial orientation. As mentioned earlier, scholars believe that the conflict of values between the two parties (including intrapreneurs and organizations) is the key to hindering the development of intrapreneurship, which is further confirmed by the principal-agent theory [98, 136, 302]. The conclusions obtained through the research on the two directions of entrepreneurship can well reflect the specific pattern of value conflict between intrapreneurs and organizations. Thirdly, the combination of the empirical analysis results and the three general practices of the human resource system results in the human resource development system, which not only has the comprehensiveness of the general human resource development system, but also can take into account the actual characteristics of intrapreneurship and entrepreneurial orientation development, reflecting the increasing demand to integrate human resource development system with the managerial context [70, 155].

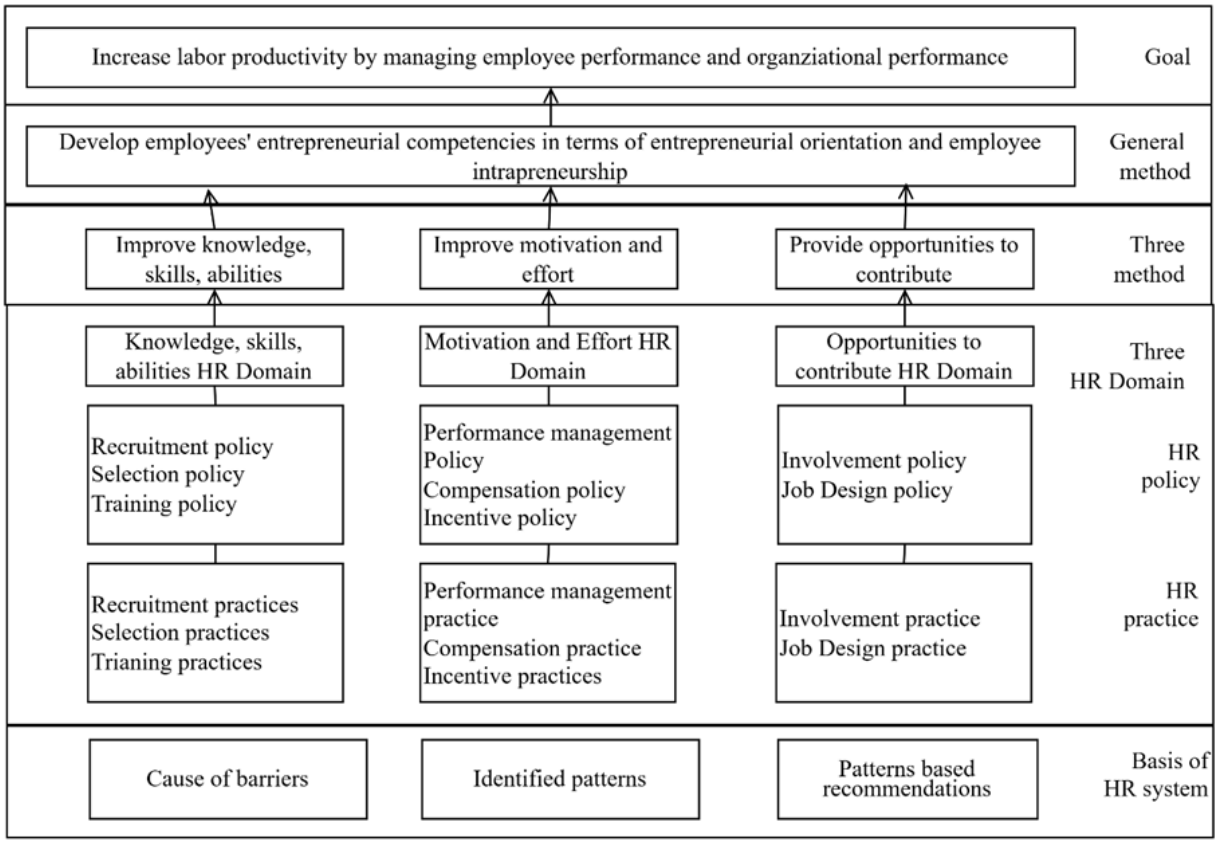


Figure 3.3 – The human resource development system through the development of employees' entrepreneurial competencies

Based on two series of studies, six patterns of the development of employees' entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship are summarized. Based on these six patterns and the general

characteristics of the human resource system described in the previous section, a human resource development system with recommendations that provides organizational labor productivity from the perspective of intrapreneurship and entrepreneurship orientation is formed (see Figure 3.3).

Based on results from analysis 1.1 and 1.2, demographic characteristics not only influence the formation of individual entrepreneurial orientation but also modify the relationship between entrepreneurial orientation and entrepreneurial activity within an organization. Results from analysis 1.1 reveal that entrepreneurial orientation varies across different demographic traits (pattern 1) [14]. This research indicates that individuals with higher income levels tend to exhibit a stronger propensity for adopting an entrepreneurial orientation. It is also observed that male employees are more likely to exhibit entrepreneurial orientation within the workplace, particularly in areas such as risk-taking, autonomy, and innovativeness. This suggests that when formulating human resource development policies, it is necessary to be flexible to consider the special performance patterns of individual entrepreneurial orientation in demographic variables.

These results produce the HR principle to recognize, and leverage varied demographic traits to cultivate a balanced entrepreneurial orientation within teams (principle 1). Potential specific applications include: In terms of KSA-related HR policies, given that high-income groups and male employees demonstrate a stronger entrepreneurial orientation, recruitment and training policies aimed at getting a more entrepreneurially oriented human resources should prioritize the selection and development of individuals with high entrepreneurial orientation traits to enhance organizational innovation based on the individual differences. In the motivation and effort HR domain, including performance management and incentive policies, differentiated incentive mechanisms should be established based on the distinct entrepreneurial orientation characteristics across different demographic groups. For instance, male employees' incentive schemes could emphasize innovation and risk-

[14] Based on the results of author's publication: Wenjun Z. Working in the "Neo-Liberal Hegemony": An Investigation on Entrepreneurial Mindset of Internal Labor Market Based on Individual Differences / Wenjun Z., Panikarova S.V., Zhiyuan L., Qi Z. // Changing Societies & Personalities – 2023. – Vol. 7 – № 4 – pp. 47-70.

taking, while employees in different salary range could be offered more diverse and individualized incentives to stimulate their intrapreneurial behavior. To support entrepreneurial orientation across diverse demographic groups, opportunities to contribute HR domain policies, such as involvement and job design, can provide employees with high entrepreneurial orientation more opportunities for innovation practice, such as project leadership roles or cross-department collaboration. It is also important to note that while there is a general trend of demographic variation in the manifestation of employees' entrepreneurial orientation, rigid HR policies may overlook individual differences and perpetuate stereotypes. Therefore, the key finding regarding the individual variation in employee entrepreneurial orientation underscores the need for more flexible and personalized HR policies.

Results based on analysis 1.2 show that specific demographic traits moderate the relationship between entrepreneurial orientation and intrapreneurial behavior (pattern 2)[15]. A noteworthy pattern has been revealed: among high-income employees, who frequently hold positions as department heads or senior executives, the association between an entrepreneurial orientation and intrapreneurial behavior is less pronounced compared to that observed in their lower-income counterparts. Secondly, this analysis identifies that gender acts as a moderating factor in the connection between an entrepreneurial orientation and intrapreneurial behavior, with this relationship appearing stronger among male employees compared to their female counterparts.

These results produce the HR principle to design programs that adjust entrepreneurial orientation to suit individual traits, enhancing its influence on intrapreneurial behavior (principle 2). Potential specific applications include: First, research shows that high-income employees have a significant but weaker association between entrepreneurial orientation and intrapreneurship behavior comparing the low-income group in this analysis. This might be caused by the underlying motivation and need under different employed positions. Based on this, recruitment and training policies should focus on the different motivation and requirements of employees under

[15] Based on the results of author's publication: Wenjun Z. Intrapreneutial Behavior in Employees: Influence of Entrepreneurial Mindset and Demographics / Wenjun Z., Panikarova S.V. // Beneficium – 2023. – № 4 – P.100–108.

different demographic groups. At the same time, employee can receive more specific and personalized training to encourage them to create a supportive culture of intrapreneurship within the organization. Secondly, gender as a moderating variable makes entrepreneurial orientation more significant for male employees' motivation for entrepreneurial behavior. Therefore, performance management and incentive policies can strengthen the incentive mechanism of intrapreneurship behavior for male employees, while introduce not only a broader innovation incentive dimension but also the personalized training programs for female employees in the case of attempting to utilizing effective use of labor regardless gender role. In addition, low-income employees can be motivated by performance rewards based on intrapreneurship behavior, while high-income management can set up long-term incentives to support the promotion of intrapreneurship culture. Finally, given that the intrapreneurship behavior of high-income employees is less affected by entrepreneurial orientation, participation and work design policies can give them greater decision-making power to support others to engage in intrapreneurial tasks, while low-income employees can gain the opportunity to contribute through entrepreneurially oriented task design.

Results from Analysis 1.3 show a work environment fostering psychological safety and engagement enhances entrepreneurial orientation, promoting intrapreneurial behavior (pattern 3)[16]. A work environment that provides psychological safety and job engagement stimulates entrepreneurial orientation in employees, which in turn motivates intrapreneurial behavior.

These results produce the HR principle to establish a supportive environment that fosters psychological safety and work engagement, promoting employees' entrepreneurial orientation (principle 3). Employees' psychological safety is influenced by a series of social, economic and managerial factors [11]. Especially, Plouffee et al. [245] delineate five fundamental criteria that constitute employees' psychological safety within organizational settings: (1) interpersonal risk-taking, which reflects

[16] Based on the results of author's publication: (1) Wenjun Z. Intrapreneurship as a Growing Demand: Igniting Entrepreneurial Mindset to Fuel Employees' Strategic Renewal Behavior / Wenjun Z. // Human Progress – 2023. – Vol. 9 – № 3 – P.13 (14 pp.). (2) Wenjun Z. Unleashing Intrapreneurial Behavior: Cultivating an Entrepreneurial Mindset to Meet the Increasing Demand for Intrapreneurship / Wenjun Z., Panikarova S. Zhiyuan L. // Organizatsionnaya Psikhologiya – 2024 – Vol. 14 – № 4 – P.151–170.

employees' willingness to express ideas and concerns without fear of negative consequences; (2) mutual trust and respect, fostering a culture of reciprocity and collegiality; (3) organizational and structural support, ensuring that formal mechanisms reinforce psychological security; (4) identity and clarity within the team context, where clearly defined roles and expectations enhance a sense of belonging; and (5) supportive leadership, which actively cultivates an inclusive and trust-based environment. Expanding on this foundation, Edmondson [104] posits that psychological safety should not be misconstrued as mere comfort or an absence of accountability; rather, it signifies the creation of an environment in which employees feel empowered to take risks without the fear of humiliation or punitive repercussions. Her framework for fostering a fearless organization is structured around three core practices: (1) setting the stage by reframing work as a learning process, thereby normalizing uncertainty and growth-oriented risk-taking; (2) inviting engagement through proactive solicitation of employee input, active listening, and the normalization of speaking up as a constructive organizational norm; and (3) responding productively by expressing appreciation, destigmatizing failure, maintaining a non-defensive stance toward criticism, and facilitating difficult yet necessary conversations to reinforce an open and adaptive work culture.

These criteria can be reflected in the human resources practices of the organization. First, creating a psychologically safe environment makes employees more willing to explore and learn new skills and knowledge, which can help improve entrepreneurial orientation. To this end, training policies can encourage employees to actively participate in entrepreneurship-oriented learning activities through the design of psychological safety and open culture, and provide employees with intrapreneurship skills development programs. The selection policy can also favor the selection of employees who are comfortable with a high psychological safety environment and are willing to innovate to strengthen the overall entrepreneurial atmosphere**.** Second, the work environment has a significant impact on employees' psychological safety and job engagement, which can be reinforced through incentive policies and performance management. Performance management policies can include indicators that promote

psychological safety, encourage management to create a supportive environment for employees, and reduce concerns about the risk of intrapreneurship failure, thereby motivating more intrapreneurial behavior. At the same time, incentive policies should include incentives for work commitment, such as special project bonuses, to motivate employees to invest deeply in intrapreneurship activities**.** Finally, in an environment of high psychological safety and engagement, employees are more likely to participate in innovative projects with an entrepreneurial orientation. Therefore, the participation policy can provide employees with more opportunities to participate in intrapreneurship, such as regularly opening internal project competitions or innovation proposal solicitations, to enhance employees' sense of responsibility and willingness to engage in intrapreneurship. The job design policy should add intrapreneurship-related tasks to give employees the opportunity to take on innovative roles in their daily work, to enhance their entrepreneurial orientation and motivation to contribute**.**

Results from Analysis 2.1 show that when organizational and individual entrepreneurial orientations align, employees are more likely to adopt a positive work attitude, though excessive alignment may reduce it[17]. The study finds that both individual and organizational entrepreneurial orientation positively affect two important positive work attitudes: affective commitment and organizational identification. The research also reveals an inverted-U relationship between IEO-OEO fit and OI, AC: optimal organizational identification and affective commitment occurs when both individual and organizational entrepreneurial orientation are high but not at their maximum levels. Beyond this point, excessive alignment can lead to a decrease in OI, reflecting the "too-much-of-a-good-thing" effect.

These results produce the HR principle to ensure a balanced match between organizational and individual entrepreneurial orientations to encourage positive work attitudes without overemphasis. Potential specific applications include: First, in recruitment and selection, candidates with an adoptive and flexible skill should be identified and attracted to achieve the best individual-organizational entrepreneurial

[17] This pattern is based on the results of author's publication. Wenjun Z. The Effects of Personal-organizational Fit on Employee's Positive Work Attitudes: An Entrepreneurial Orientation Perspective / **Wenjun Z.,** Panikarova S., Zhiyuan L. // The manager – 2024. – Vol. 15 – № 1 – pp. 15–34.

orientation match (IEO-OEO fit). Training policies can focus on regulating employees' entrepreneurial orientation to avoid overmatching. For example, employees with a high entrepreneurial orientation are encouraged to focus on teamwork and resource integration and avoid leaning towards a completely independent entrepreneurial orientation. Secondly, based on the "moderate matching" effect of the research, performance management and incentive policies should pay attention to the appropriate incentives for employees with high entrepreneurial orientation. Rewarding entrepreneurial behavior excessively but lacking intime support can lead to overmatching, which in turn weakens employees' organizational identity and emotional commitment. A phased incentive strategy can be adopted to provide encouragement when employees reach the best matching state and avoid continuous high-intensity incentives. Finally, in the contribution opportunity policy, based on the principle of "moderate matching", work design shall offer controlled intrapreneurship — allowing intime support and feedback in entrepreneurial tasks while ensuring alignment with organizational objectives. This prevents emotional exhaustion, maintaining employees' sense of belonging and commitment. For example, give employees some room for independent innovation in project design, but at the same time ensure that it is aligned with organizational goals and avoid excessive autonomy and weakening organizational identity.

Results from Analysis 2.2 show alignment between organizational and individual entrepreneurial orientations encourages intrapreneurial behavior, though this effect varies across different dimensions of intrapreneurship [18]. Our findings reveal that both OEO and IEO significantly enhance EI, though their effects vary across its subdimensions. However, the quadratic effects differ: the relationship between IEO-OEO fit and SRB is inverted-U shaped, indicating diminishing returns of fit strength on SRB. In contrast, the relationship between IEO-OEO fit and VB is U-shaped, showing increasing benefits of fit strength for VB. According to Stewart

[18] Based on the results of author's publication: Wenjun Z. The Effects of Entrepreneurial Orientation on Employee's Intrapreneurial Behavior: A Value Congruence Perspective / Wenjun Z., Panikarova S. V. // Kant – 2023. – Vol. 4 – № 49 – pp.174–182.

and Barrick [282], this distinction possiblely highlights that SRB is akin to conceptual tasks, focusing on innovation, while VB resembles behavioral tasks, emphasizing cooperative methods. For conceptual tasks, the relationship follows an inverted-U pattern, suggesting a need for innovative thinking without continuous execution. Behavioral tasks show a U-shaped pattern, indicating a focus on cooperative execution rather than ongoing innovation.

These results produce the managerial HR principle to tailor HR policies to support different intrapreneurial dimensions, as alignment impacts each dimension uniquely. Potential specific applications include: First of all, in this field, the influence model of OEO and IEO matching on different intrapreneurship behaviors provides a precise basis for talent development. In the design of the training policy, the focus on conceptual tasks (SRB) can be focused on innovation-oriented employees and their innovative thinking can be cultivated to stimulate the best innovation results without over-execution. For employees who focus on behavioral tasks (VB), training can focus more on collaboration skills to help them execute and collaborate effectively in a team. In the design of the selection policy, priority can be given to candidates who are in line with the entrepreneurial orientation of the organization to ensure the compatibility between IEO and OEO. For positions with high demand for conceptual innovation, attention should be paid to innovative thinking ability; For more collaborative positions, the focus can be on selecting candidates with cooperation and execution skills. Secondly, the different effects of OEO-IEO matching have implications for the design of incentive policies. For example, in terms of performance management policies, hierarchical performance indicators are set up to reward innovation-oriented employees for staged conceptual innovation, and for collaborative employees to motivate their continuous team contributions; In terms of incentive policy, it is necessary to design innovation rewards within the limit for SRB tasks, and implement a long-term incentive mechanism for VB tasks to gradually increase and enhance collaborative investment. Finally, the matching of different task requirements optimizes the design of contribution opportunities. In terms of participation policy design, short-term innovation projects can be provided to motivate innovation-

oriented employees (SRB), and stable teamwork opportunities can be allocated for collaborative task (VB) employees. In terms of work design policies, conceptual tasks can provide intermittent innovation space, while behavioral tasks reinforce a framework for continuous collaboration.

Results from Analysis 2.3 show organizational entrepreneurial orientation promotes intrapreneurial behavior once employees identify with it [19]. The study reveals a strong positive link between an organization's entrepreneurial orientation (EO) and employees' intrapreneurial behaviors, such as strategic renewal and venture creation. Besides, organizational identification (OI) mediates the relationship between EO and employee intrapreneurial behavior. According to social identity theory [99], employee identification is a key motivational factor, especially in modern workplaces where work and leisure boundaries are increasingly blurred.

These results produce the HR principle to cultivate a strong organizational entrepreneurial orientation that employees can identify with, as this enhances their intrapreneurial behavior. Potential specific applications include: First, the mediating role of employee identity suggests that in terms of knowledge, skills, and ability development, organizations should emphasize entrepreneurship-oriented cultural transfer to enhance employee's organizational identification. In terms of training policy, training courses based on organizational entrepreneurship orientation can be designed to convey the entrepreneurial culture and strategic goals of the enterprise to employees and enhance their sense of organizational identification. Skills training around intrapreneurship behaviors (e.g., strategy renewal behavior, venture-creating behavior) internalizes the concept of OEO in employees and stimulates their willingness as an organizational member to contribute to its strategic renewal and venture-creating. In terms of recruitment policy, the candidate's organizational cultural adaptability can be considered when recruiting, and people who are more likely to agree with the entrepreneurial orientation of the enterprise can be selected to ensure that new employees are more likely to develop intrapreneurship behaviors in the organization.

[19] Based on the results of author's accepted manuscript: Wenjun Z. Organizational entrepreneurial orientation: Influence on intrapreneurial behavior / Wenjun Z., Panikarova S., Fang S. // Russian Management Journal – 2025. – Vol. 23 – № 1 – pp. 76–94.

Secondly, the relationship between OEO and employees' intrapreneurship behavior is enhanced under the effect of OI, and it is pointed out that organizations can strengthen employees' sense of identity with the organization through incentive policies, to promote intrapreneurial behavior. A performance management policy can include employees' identification with the organization's entrepreneurial orientation as part of the performance appraisal. Employees with high levels of buy-in are more likely to engage in strategy updates and new business creation, reinforcing such behaviors through performance feedback and rewards. In terms of incentive policies, it is encouraged to support the development of employees' intrapreneurial behaviors through differentiated incentives, such as providing special bonuses or equity incentives, to improve employees' sense of identity with OEO and strengthen their motivation for intrapreneurship. The role of OI in the relationship between OEO and intrapreneurial behavior suggests that organizations should promote employee internalization of entrepreneurial orientation by designing appropriate job engagement opportunities. In terms of participation policy, more opportunities can be provided to participate in the entrepreneurial orientation of the organization, such as the right to participate in decision-making in innovative projects or strategic updates, to strengthen employees' sense of identity and belonging, and further promote intrapreneurial behavior. In terms of work design policy, it implies integrating more autonomy and innovation space into work design, creating conditions for employees to develop intrapreneurship behavior, and motivating them to apply OEO concepts to real work.

3.3 State policy in the field of development of employees' entrepreneurial competencies

The purpose of Section 3.3 is to propose, at the level of government and higher education institutions, directions for increasing productivity through the formation of entrepreneurial competencies. A comprehensive system for developing entrepreneurial competencies of employees requires the inclusion of additional stakeholders in the process, in addition to business organizations. This section begins by examining the fundamental role of entrepreneurial education in a general sense in shaping entrepreneurial competencies as a key qualitative attribute of labor resources,

reinforcing its relevance in the evolving labor market. It then synthesizes the incentives, motivations, and primary initiatives undertaken by key stakeholders—employees, organizations, governments, and higher education institutions—thereby providing a holistic perspective on the mechanisms fostering entrepreneurial capability development. Finally, while the previous sections examined HR policies at the organizational level in detail, this section focuses on policies at the level of government and the higher education system, emphasizing their role in creating an enabling macro-ecosystem for building entrepreneurial skills and adapting the workforce to modern labor market conditions.

Entrepreneurship education was formally introduced at UNESCO's 1989 International Symposium on Education for the 21st Century in Beijing, emphasizing the development of pioneering and adventurous spirit, entrepreneurial and independent work abilities, interpersonal skills, professional expertise, and organizational management competencies. This initiative integrated entrepreneurship education into the global education system, recognizing its role in enhancing labor force competitiveness. The 1998 World Declaration on Higher Education further reinforced this by positioning entrepreneurship education as a key objective in preparing students for dynamic labor markets. UNESCO broadly defines entrepreneurship education as fostering an innovative and proactive mindset, essential not only for entrepreneurs but also for salaried employees. Employers increasingly prioritize initiative, risk-taking, entrepreneurial thinking, autonomy, and social and managerial competencies alongside professional expertise. This aligns with CELCEE's definition, which frames entrepreneurship education as developing cognitive and practical skills for opportunity recognition, risk management, strategic decision-making, and resource mobilization in uncertain environments. Collectively, these perspectives underscore the necessity of entrepreneurial competencies as fundamental qualities of labor resources in the modern economy.

Accordingly, entrepreneurship education serves as both a form of competency-based learning to form the professional competency and orientation of labor resources and a framework for understanding business creation and management. These

conceptualizations directly inform the objectives and scope of this dissertation work, which aims to provide understanding on the increase of labor productivity by developing employees' entrepreneurial competencies. In this context, such competencies are defined as the ability to adopt an entrepreneurial orientation and engage in intrapreneurial behavior within organizational settings. From a broader perspective, entrepreneurial orientation and behavior in business environments constitute fundamental professional competencies that shape employees' capacity to innovate and adapt within dynamic labor markets.

Table 3.1— The main motives, incentives, main activities and its policies examples of developing entrepreneurial competencies among employees, organizations, government, and higher education

Stakeholders	Main Motives & Incentives	Mian activities	Policies Example
Employees	Career advancement, personal development, financial incentives, job security	Participate in training, seek mentorship, engage in side projects, networking	Google's 20% Rule, where employees develop independent projects
Organizations	Drive innovation, employee retention, intrapreneurship, attract top talent	Offer training, create intrapreneurial programs, provide resources, incorporate skills into evaluations	Google's "20% Time Project", Intel's "Intel Intrapreneur/Ignite Program"
Government	Economic growth, job creation, global competitiveness, social development	Fund education programs, provide grants/tax incentives, establish policies, support public-private partnerships	Finland's "Skills for Work" program; European Union's Horizon 2020 program; 2024, China's bankruptcy law, 2024
Higher education	Relevance/reputation, graduate employability, research commercialization, community engagement	Integrate entrepreneurship into curricula, offer degrees/workshops, establish incubators, collaborate with industry	the Global Entrepreneurship Lab (G-Lab) at MIT, Stanford University's Startup Garage

Thus, the primary objective of entrepreneurship education for employees should be to cultivate an entrepreneurial approach to professional competencies and orientation within the employed labor force, thereby enhancing their labor productivity and overall competitiveness in the labor market. These entrepreneurial competencies are reflected not only in employees' ability to develop an entrepreneurial orientation but also in their capacity to engage in entrepreneurial behaviors within their

professional roles, fostering innovation, adaptability, and value creation within organizational structures. The necessity of implementing policies aimed at developing employees' entrepreneurial competencies stems from their pivotal role in driving organizational innovation, sustaining competitive advantage, and enhancing workforce resilience in an evolving economic landscape characterized by rapid technological advancements and shifting labor market demands.

To present a relatively comprehensive analysis on the economic policy on the development of employees' entrepreneurial competencies, firstly it is necessary to evaluate the main motives and incentives and the activities of relevant stakeholders: employees, organizations, government, and higher education (Table 3.1).

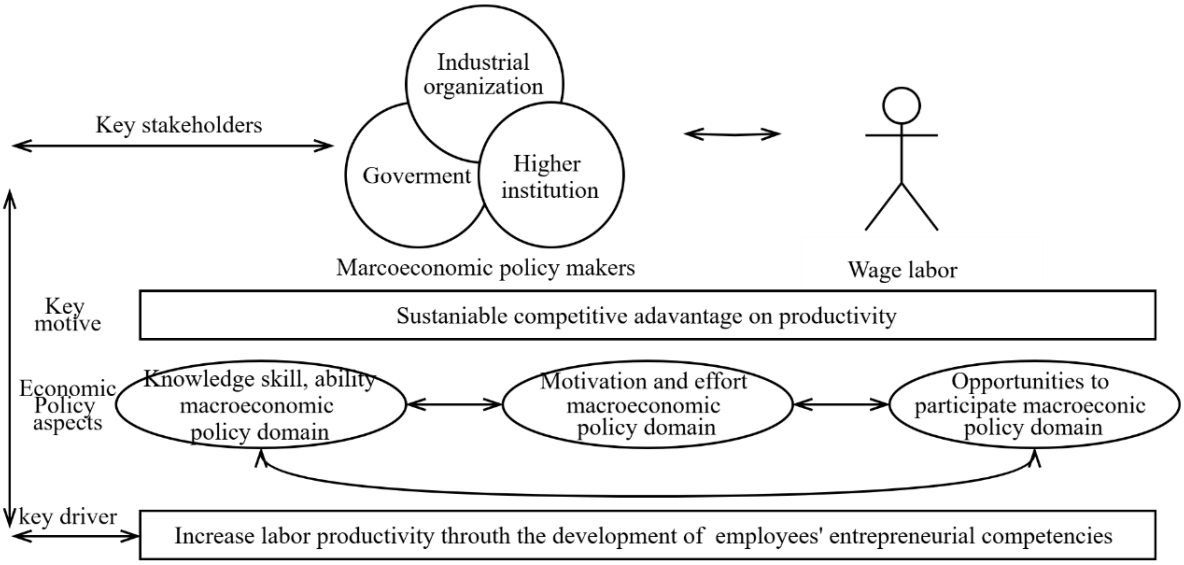


Figure 3.4 – The goal, key motives, and policy aspects of key policy stakeholders on the development of employees' entrepreneurial competencies

Developing employees' entrepreneurial competencies is a multifaceted endeavor that involves various stakeholders, each with distinct motives, incentives, and activities （Figure 3.4）. From an individual labor market perspective, employees seek to enhance their entrepreneurial competencies to improve their employability, income potential, and career growth prospects. Organizations invest in employees' entrepreneurial competencies to sustain long-term growth, competitiveness, and market adaptability. Governments have macro-economic and labor market incentives to strengthen employees' entrepreneurial competencies, as these skills contribute to national economic growth, employment stability, and global competitiveness. Higher education institutions potentially seek to equip their students with entrepreneurial competencies out of the purpose to stay relevance

and reputation, improve the employability of graduates, drive research commercialization and innovation within academic institutions, and contribute to local and regional economic development through entrepreneurial initiatives.

It is also worthwhile noting that the development of entrepreneurial competencies is most effective when stakeholders collaborate. Employees benefit from organizational support, while organizations gain from employees' innovative contributions. The academic consensus suggests a tripartite collaboration among the government, higher education institutions, and enterprises to cultivate highly skilled and entrepreneurial talent. The government's primary role within this system is to provide policy support and institutional guarantees, ensuring that the education system adapts to the evolving demands of the labor market while fostering a favorable macro environment for innovation and entrepreneurship. Higher education institutions, as the main implementers of innovation and entrepreneurship education, are responsible for systematically developing the innovative thinking and entrepreneurial capabilities of the future workforce. Enterprises, in turn, offer practical opportunities, resource support, and market feedback mechanisms that enable individuals to translate theoretical knowledge into actionable entrepreneurial practices.

The key motive of this collaborative mechanism is to enhance sustainable competitiveness at fourth levels: individuals, enterprises, higher institutions and the nation. These competitive advantages are interdependent and collectively form the foundation of national economic strength. Specifically, individual competitiveness serves as the bedrock for both organizational and national competitiveness. Drawing on the theoretical framework of human resource development systems, the formation of such competitiveness can be understood from three dimensions of three macroeconomic policy makers, namely government, higher institution and industrial organization. First, systematic education and training must enhance individuals' knowledge, skills, and competencies related to intrapreneurship. Second, effective incentive mechanisms should be established to encourage individuals to translate their acquired knowledge and skills into concrete entrepreneurial actions. Third, an optimized opportunity provision system should be developed to expand individuals'

access to entrepreneurial opportunities within enterprises and broader socio-economic environments. As the core implementers of entrepreneurship education policies, governments, higher education institutions, and industrial organization should integrate institutional design, resource allocation, and practical support to comprehensively enhance entrepreneurial capabilities, thereby driving national economic innovation and industrial upgrading.

The government should formulate systematic innovation and entrepreneurship education policies to enhance the entrepreneurial capabilities of enterprise workers through a multi-tiered and multidimensional approach, particularly in terms of knowledge, skills, and competencies. To achieve this, a national entrepreneurship skills enhancement program can be established, offering free or low-cost training courses covering core competencies such as business model development, market analysis, and financial management. Additionally, fiscal subsidies can be used to encourage collaboration between enterprises and universities in developing entrepreneurship training programs tailored for employees. For instance, China's State Council introduced the Vocational Skills Enhancement Action Plan (2019–2021), which aimed to provide large-scale vocational training for key groups such as employees and disadvantaged workers, with participation incentivized through training subsidies and living allowances. Moreover, the plan allocated 100 billion yuan from the unemployment insurance fund to establish a special account dedicated to supporting employee skills training, effectively mitigating structural employment mismatches caused by shifting labor market demands. Internationally, Germany's EXIST program, Singapore's SkillsFuture initiative, and Finland's Skills for Work program serve as examples of government-funded entrepreneurship capacity-building schemes. These initiatives not only enhance workers' entrepreneurial skills but also align policy support with market demand, improving labor market efficiency and fostering endogenous economic growth.

However, based on our results these policies on entrepreneurial training programs need to be care about the demographic difference when providing these entrepreneurial competencies training. In this study, we found that entrepreneurial

orientation is influenced by demographic characteristics, providing important insights for the formulation of government policies on entrepreneurial capacity training. Given the variations in entrepreneurial orientation across different groups (such as males, high-income, and low-income individuals), the government can collaborate with enterprises and universities to develop targeted entrepreneurial training programs. For instance, low-income groups should receive practical entrepreneurial skills training, such as digital skills, marketing, and financial management, to enhance their market adaptability, whereas high-income groups could benefit from more advanced courses focusing on entrepreneurial management, technological innovation, and capital operations to foster high-level innovation and entrepreneurship.

Furthermore, from a macroeconomic perspective, entrepreneurial behavior among employees is not only a means for enterprises to maintain competitiveness but also an essential component of sustainable economic development. As such, corporate intrapreneurship training provides workers with opportunities to cultivate entrepreneurial thinking while being highly practice-oriented, thereby offering substantial real-world applicability. In corporate intrapreneurship training practices, initiatives such as Google’s "20% Time Project" and Intel’s "Intel Intrapreneur/Ignite Program" empower employees with a degree of creative autonomy to stimulate intrapreneurial spirit and drive continuous innovation within enterprises. Such training programs, closely aligned with business practices, should receive policy support, particularly in startups and small-to-medium enterprises (SMEs), where financial constraints and a lack of expert mentorship often hinder effective intrapreneurship training. In terms of existing policy practices, Finland’s "Skills for Work" program provides a valuable reference, as it fosters collaboration between the government and businesses to offer tailored skills training for low-income and technical workers, enhancing their entrepreneurial and innovation capacities while strengthening labor market competitiveness and promoting economic growth.

In the realm of motivational incentives, government intervention typically operates through tax policies, labor protection systems, and various incentive mechanisms to influence corporate behavior and employees' entrepreneurial

motivation. Although corporate intrapreneurship enhances competitiveness, its inherent failure risks often lead enterprises to adopt more conservative, traditional production methods, thereby suppressing intrapreneurial activities. Against this backdrop, the government can implement economic incentives, such as tax reductions, to encourage companies to offer entrepreneurial bonuses and equity incentives, thereby lowering the costs associated with entrepreneurial risk for both enterprises and employees while stimulating employees' willingness to engage in intrapreneurship. Furthermore, our research indicates that employees' psychological safety and work engagement significantly influence their intrapreneurial behavior. Thus, governments can introduce labor protection policies to foster a "failure-friendly culture" within enterprises, alleviating employees' concerns about punitive consequences following entrepreneurial failure. For instance, the establishment of a "failure tolerance mechanism" could ensure that employees retain their positions or receive social security benefits even after an internal entrepreneurial project fails, thereby reducing the cost of failure and enhancing employees' entrepreneurial enthusiasm.

Although corporate human resource development policies fall within internal organizational governance, the extent to which society and national policies accommodate entrepreneurial failure directly affects how enterprises manage employees who experience setbacks. For example, in 2024, China issued relevant policies, which called for "improving the corporate bankruptcy mechanism, exploring the establishment of a personal bankruptcy system, promoting reforms to streamline enterprise deregistration, and enhancing the corporate exit system." Traditionally, bankruptcy laws are designed to regulate the orderly exit of businesses from the market and serve as a key indicator in the World Bank's Ease of Doing Business Index. Their refinement and implementation reflect a society's tolerance for entrepreneurial failure, thereby fostering an environment that provides greater psychological safety for innovation. Similarly, the European Union's Horizon 2020 program, while providing funding support for innovation projects, explicitly acknowledges the possibility of failure in the innovation process. Such policies not only mitigate psychological barriers to corporate intrapreneurship but also contribute to shaping a corporate culture that

embraces failure, thereby further promoting the vigorous development of intrapreneurial activities.

In providing entrepreneurial opportunities for corporate employees, the government can collaborate with enterprises to establish "Corporate Intrapreneurship Labs," allowing employees to incubate entrepreneurial ideas within their companies while receiving government funding. For example, the government can offer entrepreneurial funds, enterprises can provide resources and market access, and employees can apply to join incubation programs to drive corporate internal innovation. Additionally, the government can create open innovation platforms where corporate employees can apply to participate in "Government-Enterprise Joint Entrepreneurship Projects" outside of their regular work hours, fostering collaborative innovation between corporate employees and social entrepreneurs.

Furthermore, higher education institutions should play a crucial role in enhancing the skills, motivation, and opportunities of the potential workforce. We have observed several initiatives led by educational institutions aimed at improving students' entrepreneurial skills. For instance, the Global Entrepreneurship Lab (G-Lab) at MIT and Stanford University's Startup Garage provide comprehensive experiential learning, guiding students through the entire entrepreneurial process—from ideation to product prototyping and market testing—while simulating real-world entrepreneurial challenges. A key aspect of such entrepreneurship education is to replicate the real-life issues that students may encounter in their future careers. For example, these programs help students understand how to apply their entrepreneurial skills within corporate environments, enabling them to navigate and contribute to intrapreneurial initiatives after entering the workforce.

Entrepreneurship and innovation education in higher education institutions should incorporate intrapreneurship education [2]**.** Traditionally, entrepreneurship education in universities has primarily focused on external entrepreneurship, emphasizing the creation of independent startups by students. However, with changes in corporate organizational structures and the growing global demand for innovation, intrapreneurship has increasingly become a key driver of sustainable corporate growth

and a crucial factor in enhancing labor market competitiveness. Therefore, integrating intrapreneurship into higher education entrepreneurship programs holds significant economic and educational value.

While university entrepreneurship education has traditionally prioritized external entrepreneurship, the reality is that most graduates enter the workforce rather than start their own businesses. Given that the success rate of startups remains low, with new businesses failing remails high globally, directly pursuing independent entrepreneurship may not be the optimal career choice for most students shortly after graduation. In contrast, intrapreneurship provides relatively safer experimental ground, mitigating the financial and social risks associated with entrepreneurial failure. By cultivating intrapreneurial capabilities, students can contribute to innovation within existing companies rather than being confined to external entrepreneurial ventures.

Modern enterprises seek employees who not only have a stable career trajectory but also demonstrate proactive innovation skills. This evolving labor market demand necessitates a shift in university entrepreneurship education from exclusively teaching independent entrepreneurship toward a broader curriculum that includes intrapreneurial skill development. If universities continue to emphasize only external entrepreneurship, many graduates may struggle with entrepreneurial failures and fail to effectively leverage their skills in corporate settings. Additionally, many students aspire to work in innovation-driven roles after graduation but are reluctant to bear the high risks associated with independent entrepreneurship. By incorporating intrapreneurship into entrepreneurship education, universities can enable students to exercise their entrepreneurial mindset within existing organizations, offering them more diverse career pathways beyond the binary choice of either traditional employment or independent entrepreneurship.

In entrepreneurship education at universities, merely teaching theoretical knowledge or simulating independent entrepreneurship scenarios is no longer sufficient to meet modern enterprises' demand for intrapreneurial talent. Universities should design entrepreneurship education systems that closely align with actual corporate operations, simulating real intrapreneurship environments to enable students

to develop the skills necessary to adapt to corporate innovation needs within a controlled setting. Especially, our research findings reveal the relationship between entrepreneurial orientation and intrapreneurial behavior, as well as the influence of demographic characteristics, psychological safety, and organizational alignment on intrapreneurial activities. These patterns provide a strong foundation for universities to construct intrapreneurship simulation environments.

Entrepreneurship education in higher education institutions should establish a high-fidelity corporate intrapreneurship simulation environment to enhance students' ability to innovate within organizations and improve their adaptability to corporate innovation ecosystems. Specifically, universities should establish Corporate Innovation Labs, simulating corporate operations to allow students to explore entrepreneurial practices in realistic settings. Additionally, a team-driven model should be adopted, encouraging students to collaborate within diverse teams, assume different functional roles, and replicate the dynamic complexities of corporate intrapreneurship while strengthening cross-functional cooperation skills. Furthermore, universities should deepen industry-academia collaboration, integrating real corporate innovation projects so that students can work under the guidance of corporate mentors to solve practical problems, thereby bridging the gap between theory and practice and enhancing the feasibility of intrapreneurial projects.

Based on our research findings, universities can further refine the simulation environment by implementing differentiated role assignments based on demographic characteristics, enabling students of different genders and income levels to take on varied roles to examine their entrepreneurial behaviors and provide targeted guidance. In designing team-based tasks, demographic background variables should be incorporated to assess how individuals adapt and develop entrepreneurial capabilities within different organizational settings. The creation of psychological safety mechanisms, including mentorship programs and team support systems, should be considered to explore how psychological security influences individual innovation willingness. Lastly, through task design, students should be placed in organizational culture alignment scenarios to experience the impact of entrepreneurial orientation on

intrapreneurial behavior, thereby enhancing their entrepreneurial identity and action capacity within corporate environments. This systematic pedagogical approach not only addresses the limitations of traditional university entrepreneurship education but also contributes to cultivating future labor force participants equipped with corporate adaptability and innovation potential.

CONCLUSIONS OF CHAPTER 3

Directions for increasing labor productivity have been developed through the development of entrepreneurial competency characteristics within the workforce. A human resource development system for increasing labor productivity through employees' entrepreneurial competencies has been discussed. Key conclusions:

1. The cause of barriers of employee intrapreneurship can be explained from the perspective of value and norm tension and principal-agent theory. Existing research mainly examines the barrier in two categories: individual and organizational. The HR development system consists of three elements (improving knowledge, skills, and abilities; improving motivation and effort; and providing opportunities to contribute) with it corresponding human resource policies and practices. However, it needs consider the patterns of the development of employee intrapreneurship and entrepreneurial orientation to manage labor productivity.

2. The identified patterns produce HR principles with their specific recommendations at the organizational level. These principles integrated with the specific HR development system generate the applications of the results of the empirical parts of the dissertation work to increase labor productivity through the development of employees' entrepreneurial competencies.

3. The economic stakeholders of developing employees' entrepreneurial competencies can be expanded to include the policy aspects at government and higher institution levels. What's more, the motives and incentives, activities and policy aspects from the employee, organization, government, and higher education are summarized. The government policy on developing employee's entrepreneurial competencies from

the aspects of improving the entrepreneurial knowledge, skill, and abilities, enhance the intrapreneurial motivations and effort, provide with intrapreneurial opportunities. The higher education institution should also enhance its graduates with general knowledge and practical training on intrapreneurial competencies.

CONCLUSION

In today’s economic landscape, entrepreneurial orientation acts both as a competitive competency for employees and as a strategic factor enabling firms to sustain market position. Individual entrepreneurial orientation reflects employees' predisposition toward innovation, while organizational orientation drives intrapreneurial activities that leverage this mindset for corporate advantage. As production shifts from mass scale to continuous innovation, fueled by technological advancements and the Austrian principle of "consumer sovereignty," firms face pressure to align internal processes with volatile consumer demands, heightening competition. This shift signals a "post-employment" era, marked by job instability, continuous professional demands, and rising wage disparities, underscoring the need for the "entrepreneurial self"—a proactive, adaptable approach that aligns personal and organizational goals.

This dissertation investigates the development of employees’ entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship as growth reserves to labor productivity and efficiency. The purpose of the dissertation research is to develop theoretical and methodological approaches to the increase of labor productivity in organizations through the development of employees’ entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship. This study examines the complex interaction of environmental, psychological, individual, and organizational factors that foster employees’ entrepreneurial competencies and labor productivity.

This dissertation’s empirical part spanned three phases. Initially, preliminary phrase research confirms the role of entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship in improving labor productivity indicators such as employee performance and organizational performance, concluding the necessity to increase labor productivity through the development of entrepreneurial orientation and employee intrapreneurship. The first stage explores entrepreneurial orientation as a professional orientation of personnel and its role in the

development of employee intrapreneurship, concluding that demographic variables (such as gender, income), organizational environments facilitating psychological safety and work engagement benefit the manifestation of individual entrepreneurial orientation and subsequently employee intrapreneurship. The second stage explores the interaction between organizational entrepreneurial orientation and individual entrepreneurial orientation and its impact on the development of intrapreneurial productivity, concluding that the alignment of entrepreneurial orientation at both individual and organizational level is beneficial for the manifestation of employee positive work attitudes, and intrapreneurship, emphasizing the need to create a shared entrepreneurial identity to enhance labor productivity in the organizational context.

Based on the research findings, a human resource development system has been suggested, and the following recommendations are proposed:

1. For the HR practices at the organizational level: Recognize and leverage varied demographic traits to cultivate a balanced entrepreneurial orientation within teams. Design programs that adjust entrepreneurial orientation to suit individual traits, enhancing its influence on entrepreneurial behavior. Establish a supportive environment that fosters psychological safety and work engagement, promoting employees' entrepreneurial orientation. Ensure a balanced match between organizational and individual entrepreneurial orientations to encourage positive work attitudes without overemphasis. Dimension-Specific Intrapreneurship Support: Tailor HR policies to support different intrapreneurial dimensions, as alignment impacts each dimension uniquely. Cultivate a strong organizational entrepreneurial orientation that employees can identify with, as this enhances their intrapreneurial behavior.

2. The importance of government policies in shaping labor market dynamics and organizational should be acknowledged. Key policy tools include workforce reskilling programs, entrepreneurship education, public-private partnerships (PPPs), startup grants, incubators, and corporate R&D support. These aim to drive economic growth, job creation, and workforce competitiveness while addressing structural unemployment. Policymakers should tailor interventions to account for demographic differences in entrepreneurial skills and leverage tax incentives, labor regulations, and

targeted incentives to influence corporate behavior and employee motivation. Additionally, the societal and policy approach to entrepreneurial failure, as seen in initiatives like China's 2024 bankruptcy regulation and the EU's Horizon 2020 program, is crucial in fostering a balanced environment for risk-taking and innovation.

3. Higher education institutions should expand entrepreneurship education to include intrapreneurship training, aligning with industry needs and employment realities. Initiatives like MIT's G-Lab and Stanford's Startup Garage demonstrate the value of bridging academia and industry through practical learning. Universities should create corporate intrapreneurship simulation environments to enhance students' innovation skills and adaptability within organizational ecosystems, preparing them for both startup and corporate innovation roles.

Despite significant strides in understanding the knowledge on the increase labor productivity through the development of employees' entrepreneurial competencies in terms of entrepreneurial orientation and employee intrapreneurship in the field of labor economics, further development prospects of this research topic are recommended: investigating the economic and socio-demographic factors influencing the formation of employees' professional competencies; advancing the theoretical and methodological foundations of intrapreneurship within public sector organizations to enhance their productivity; and further expanding the scope of research on the qualitative characteristics of labor resources to deepen the understanding of workforce competencies, competitiveness, and characteristics of human capital in contemporary economic and labor realities.

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APPENDIX 1. Questionnaire, and its sources

For study 1:

Questionnaire on the Relationships between Entrepreneurial Orientation, Employee Intrapreneurship, and Labor Productivity

Dear participants,

We invite you to participate in a study on the relationship between entrepreneurial orientation, employee intrapreneurship, and labor productivity by answering the questionnaire below. This questionnaire will take about 5 minutes to complete. Thank you in advance for taking time out of your busy schedule to complete this questionnaire. You are not obligated to answer these questions, but answering them will greatly help us in completing this research and give us a new understanding of the field. The data collected will be anonymous and used for academic purposes only.

1. Individual entrepreneurial orientation (Covin et al., 2020). Evaluate and judge the following descriptions about you and select the value that best matches. The rating scale is as follows: 1 to 5, from "Strongly Disagree" to "Strongly Agree."

	Questions	**1**	**2**	**3**	**4**	**5**
1	I have very little problems with renewal and change.	1	2	3	4	5
2	I quickly master new routines, procedures and new ways of working.	1	2	3	4	5
3	When it comes to problem solving, I always search for creative solutions instead of familiar ones.	1	2	3	4	5
4	I always try to find if (internal) clients have wishes or desires that they are not consciously aware of.	1	2	3	4	5
5	I always actively help internal clients, and not only when I am asked or approached to do so.	1	2	3	4	5
6	I am constantly looking for new ways to improve my performance at the job.	1	2	3	4	5
7	I value new plans and ideas, even if I feel that they could fail in practice.	1	2	3	4	5
8	I sometimes provide assistance to internal clients without first discussing this with my supervisor.	1	2	3	4	5
9	In order to be more productive, I sometimes act without the permission of my supervisor.	1	2	3	4	5

2. Organizational entrepreneurial orientation (Covin & Slevin, 1989, Hu&Zhang, 2012). Evaluate and judge the following descriptions about your organization and select the value that best matches. The rating scale is as follows: 1 to 5, from "Strongly Disagree" to "Strongly Agree."

	Questions					
1	Very many new lines of products/services marketed in the past 5 years	1	2	3	4	5
2	Changes in product or service line have usually been quite dramatic	1	2	3	4	5
3	In general, the top managers of my firm favor a strong emphasis on R&D, technological leadership, and innovations	1	2	3	4	5
4	A strong proclivity for high-risk projects (with chances of very high returns)	1	2	3	4	5
5	When confronted with decisions involving uncertainty, my firm typically adopts a bold posture in order to maximize the probability of exploiting opportunities	1	2	3	4	5
6	Owning to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives	1	2	3	4	5
7	In dealing with competitors, my firm is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc	1	2	3	4	5
8	In general, the top managers of my firm have a strong tendency to be ahead of others in introducing novel ideas or products	1	2	3	4	5

3. Employee intrapreneurship (Gawke et al., 2019) Evaluate and judge the following descriptions about you and select the value that best matches. The criteria for evaluation and judgment are as follows: 1 = strongly disagree, 2 = disagree, 3 = fair, 4 = agree, 5 = strongly agree.

	Questions	1	2	3	4	5
1	I undertake activities to realize change in my organization	1	2	3	4	5

2	I undertake activities to change the current products/services of my organization	1	2	3	4	5
3	I contribute ideas for strategic renewal for my organization	1	2	3	4	5
4	I conceptualize new ways of working for my organization	1	2	3	4	5
5	I undertake activities to set up new business units	1	2	3	4	5
6	I undertake activities to reach new market or communities for my organization	1	2	3	4	5
7	I undertake activities that result in new departments outside of my organization	1	2	3	4	5
8	I actively establish new collaborations with experts outside of my own profession	1	2	3	4	5

Note. Items 1-4 are on strategic renewal behavior; items 5-8 are on venture-creating behavior.

4. Micro-level labor productivity in organization: employee performance (Griff M. A., Neal A. & Parker S. K., 2007). Please rate the frequency of engaging in the following behaviors in the past month. 5-point scale, 1~5, from "little" to "much".

	Questions	**1**	**2**	**3**	**4**	**5**
1	Carried out the core parts of your job well	1	2	3	4	5
2	Completed your core tasks well using the standard procedures	1	2	3	4	5
3	Ensured your tasks were completed properly	1	2	3	4	5
4	Adapted well to changes in core tasks	1	2	3	4	5
5	Coped with changes to the way you have to do your core tasks	1	2	3	4	5
6	Learned new skills to help you adapt to changes in your core tasks	1	2	3	4	5
7	Initiated better ways of doing your core tasks	1	2	3	4	5
8	Come up with ideas to improve the way in which your core tasks are done	1	2	3	4	5
9	Made changes to the way your core tasks are done	1	2	3	4	5
10	Coordinated your work with coworkers	1	2	3	4	5
11	Communicated effectively with your coworkers	1	2	3	4	5
12	Provided help to coworkers when asked, or needed	1	2	3	4	5
13	Dealt effectively with changes affecting your work unit (e.g., new member)	1	2	3	4	5
14	Learnt new skills or taken on new roles to cope with changes in the way your unit works.	1	2	3	4	5
15	Responded constructively to changes in the way your team works	1	2	3	4	5
16	Suggested ways to make your work unit more effective	1	2	3	4	5
17	Developed new and improved methods to help your work unit perform better	1	2	3	4	5
18	Improved the way your work unit does things	1	2	3	4	5
19	Presented a positive image of the organisation to other people (e.g., clients)	1	2	3	4	5
20	Defended the organisation if others criticized it	1	2	3	4	5
21	Talked about the organisation in positive ways	1	2	3	4	5
22	Responded flexibly to overall changes in the organisation (e.g., changes in management).	1	2	3	4	5
23	Coped with changes in the way the organisation operates	1	2	3	4	5
24	Learnt skills or acquired information that helped you adjust to overall changes in the organization.	1	2	3	4	5
25	Made suggestions to improve the overall effectiveness of the organisation (e.g., by suggesting changes to administrative procedures).	1	2	3	4	5
26	Involved yourself in changes that are helping to improve the overall effectiveness of the organization.	1	2	3	4	5
27	Come up with ways of increasing efficiency within the organization	1	2	3	4	5

Note. Items 1-3 are on individual task proficiency; items 4-6 are on individual task adaptivity; items 7-9 are on individual task proactivity; items 10-12 are on team member task proficiency; items 13-15 are on team member task adaptivity; items 16-18 are on team member task proactivity; items 29-21 are on organizational member task proficiency; items 22-25 are on organizational member task adaptivity; items 25-27 are on organizational member task proactivity.

5. Organizational performance (Delaney J. T. & Huselid M. A.1996). Over the past year, how has your organization's performance compared to other organizations in your industry in terms of the following item descriptions? 4-point scale, 1~4, from "much worse" to "much better".

	Questions	1	2	3	4
1	Quality of products, services, or programs.	1	2	3	4
2	Development of new products, services, or programs.	1	2	3	4
3	Ability to attract essential employees.	1	2	3	4
4	Ability to retain essential employees.	1	2	3	4
5	Satisfaction of customers or clients.	1	2	3	4
6	Relations between management and other employees.	1	2	3	4
7	Relations among employees in general.	1	2	3	4
8	Marketing.	1	2	3	4
9	Growth in sales.	1	2	3	4
10	Profitability.	1	2	3	4
11	Market share.	1	2	3	4

Note. Items 1-7 are on internal organizational performance; items 8-11 are external organizational performance.

Your personal information.

Your gender	☐ Male ☐Female
Your age	☐ 18-30 ☐31-40 ☐ 41-50 ☐51 and above
Your education	☐ High or vocational school ☐University or junior college ☐Postgraduate (master or doctor)
Your income	☐ Below 6000 RMB ☐6000-9000 RMB ☐9000-12000 RMB ☐above 12000 RMB

For study 2:

Questionnaire on the Formation of Individual Entrepreneurial Orientation and Employee Intrapreneurship

Dear participants,

We invite you to participate in a study on the formation of individual entrepreneurial orientation and employee intrapreneurship by answering the questionnaire below. This questionnaire will take about 5 minutes to complete. Thank you in advance for taking time out of your busy schedule to complete this questionnaire. You are not obligated to answer these questions, but answering them will greatly help us in completing this research and give us a new understanding of the field. The data collected will be anonymous and used for academic purposes only.

1. Employee intrapreneurship (Gawke et al. 2019). Evaluate and judge the frequency of following descriptions about you and select the value that best matches. The criteria for evaluation and judgment are as follows: 1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Sometimes, 5 = Often, 6 = Frequently, 7 = Aways.

	Questions	1	2	3	4	5	6	7
1	I undertake activities to realize change in my organization	1	2	3	4	5	6	7
2	I undertake activities to change the current products/services of my organization	1	2	3	4	5	6	7
3	I contribute ideas for strategic renewal for my organization	1	2	3	4	5	6	7
4	I conceptualize new ways of working for my organization	1	2	3	4	5	6	7
5	I undertake activities to set up new business units	1	2	3	4	5	6	7
6	I undertake activities to reach new market or communities for my organization	1	2	3	4	5	6	7
7	I undertake activities that result in new departments outside of my organization	1	2	3	4	5	6	7
8	I actively establish new collaborations with experts outside of my own profession	1	2	3	4	5	6	7

Note. Items 1-4 are on strategic renewal behavior; items 5-8 are on venture-creating behavior.

2. Individual entrepreneurial orientation (Jung and Lee, 2020). Evaluate and judge the frequency of following descriptions about you and select the value that best matches. The criteria for evaluation and

judgment are as follows: The criteria for evaluation and judgment are as follows: 1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Sometimes, 5 = Often, 6 = Frequently, 7 = Aways.

	Questions	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	I like to take on a new challenge.	1	2	3	4	5	6	7
2	I try to work in a novel way.	1	2	3	4	5	6	7
3	I am likely to accept new ideas.	1	2	3	4	5	6	7
4	I like imaginative ideas.							
5	I try to look for new opportunities earlier than others.							
6	I persistently try to come up with outstanding ideas.	1	2	3	4	5	6	7
7	I act aggressively to achieve a goal.	1	2	3	4	5	6	7
8	I am more passionate than others.	1	2	3	4	5	6	7
9	I have a strong will to achieve something.	1	2	3	4	5	6	7
10	I persist in pushing forward necessary things against all odds.	1	2	3	4	5	6	7
11	I tend to push forward something with high expected value even with high risk.	1	2	3	4	5	6	7
12	I tend to take risks for new opportunities.	1	2	3	4	5	6	7
13	I tend to take challenges even when there is a risk of failure.	1	2	3	4	5	6	7
14	I am reluctant to receive outside aid.	1	2	3	4	5	6	7
15	I prefer solving problems independently.	1	2	3	4	5	6	7
16	I prefer acting based on my own decision.	1	2	3	4	5	6	7
17	I proactively plan new things.	1	2	3	4	5	6	7
18	I plan and act in advance rather than waiting for something to be given.	1	2	3	4	5	6	7
19	I tend to actively overcome hardships rather than attributing to the environment.	1	2	3	4	5	6	7

Note. Items 1-6 are on innovativeness; Items 7-10 are on need for achievement; Items 11-13 are on risk-taking; Items 14-16 are on autonomy; Items 17-19 are on proactiveness.

3. Psychological Safety (A. Edmondson, 1999). Evaluate and judge the following descriptions on your organization and select the value that best matches. The criteria for evaluation and judgment are as follows.: 1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Sometimes, 5 = Often, 6 = Frequently, 7 = Aways.

	Questions	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	Members of this organization are able to bring up problems and tough issues.	1	2	3	4	5	6	7
2	It is safe to take a risk on this team	1	2	3	4	5	6	7
3	Working with members of this organization, my unique skills and talents are valued and utilized	1	2	3	4	5	6	7

4. Work Engagement (Schaufeli et al,2019). Evaluate and judge the following descriptions on you and select the value that best matches. The criteria for evaluation and judgment are as follows: 1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Sometimes, 5 = Often, 6 = Frequently, 7 = Aways.

	Questions	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	At my work, I feel bursting with energy.	1	2	3	4	5	6	7
2	I am enthusiastic about my job.	1	2	3	4	5	6	7
3	I am immersed in my work.	1	2	3	4	5	6	7

5. Your personal information.

Your gender	☐ Male ☐Female
Your age	☐ 18-30 ☐31-40 ☐ 41-50 ☐51 and above
Your education	☐ High or vocational school ☐University or Junior college ☐Postgraduate (master's or doctor's degree)
Your income	☐ Below 4000 RMB ☐4000-8000 RMB ☐8000-12000 RMB ☐above 12000 RMB

For study 3:

Questionnaire on the Interaction between Individual and Organizational

Entrepreneurial Orientation and its Impact on Employee Intrapreneurship

Dear participants,

We invite you to participate in a study on the interaction between individual and organizational entrepreneurial orientation and its impact on employee intrapreneurship by answering the questionnaire below. This questionnaire will take about 5 minutes to complete. Thank you in advance for taking time out of your busy schedule to complete this questionnaire. You are not obligated to answer these questions, but answering them will greatly help us in completing this research and give us a new understanding of the field. The data collected will be anonymous and used for academic purposes only.

Initial screening question[20]

	Questions	
1	Is your employment status an employee of a private company?	☐ Yes ☐No

1. Organizational entrepreneurial orientation (Lumpkin and Dess, 2001; Covin and Slevin, 1986). Evaluate and judge the following descriptions and select the value that best matches. The criteria for evaluation and judgment are as follows: 1 = strongly disagree, 2 = disagree, 3 = fair, 4 = agree, 5 = strongly agree.

	Questions	**1**	**2**	**3**	**4**	**5**
1	In general, top managers of my company favor a strong emphasis on R&D, technological leadership and innovations.	1	2	3	4	5
2	In the last five years, my company has marketed many new product lines or services.	1	2	3	4	5
3	In the last years, my company has typically initiated actions which the competition then responds to.	1	2	3	4	5
4	In the last years, my company was very often the first business to introduce new products/services, administrative techniques, and operating technologies.	1	2	3	4	5
5	In the last years, my company had a strong proclivity for high-risk projects (with chances of very high return).	1	2	3	4	5
6	In the last years, my company believed that owing to the nature of the environment, wide-ranging acts are necessary to achieve the company's objectives.	1	2	3	4	5
7	When confronted with decision-making situations involving uncertainty, my company has typically adopted a bold, aggressive posture to maximize the probability of exploiting potential opportunities.	1	2	3	4	5

1. Individual entrepreneurial orientation (Langkamp Bolton and Lane, 2012). Evaluate and judge the following descriptions and select the value that best matches. The criteria for evaluation and judgment are as follows: 1 = strongly disagree, 2 = disagree, 3 = fair, 4 = agree, 5 = strongly agree.

	Questions	**1**	**2**	**3**	**4**	**5**
1	In general, I prefer a strong emphasis in projects on unique, one-of-a-kind approaches rather than revisiting tried and true approaches used before.	1	2	3	4	5
2	I prefer to try my own unique way when learning new things rather than doing it like everyone else does.	1	2	3	4	5
3	I favour experimentation and original approaches to problem solving rather than using methods others generally use for solving their problems.	1	2	3	4	5
4	I usually act in anticipation of future problems, needs or changes.	1	2	3	4	5
5	I tend to plan ahead on projects.	1	2	3	4	5
6	I like to take bold action by venturing into the unknown.	1	2	3	4	5
7	I am willing to invest a lot of time and/or money on something that might yield a high return.	1	2	3	4	5

2. Organizational identification[21] **(Smidts et al. 2001, Zhonghua and Chen, 2014).** Evaluate and judge the following descriptions and select the value that best matches. The criteria for evaluation and judgment are as follows: 1 = strongly disagree, 2 = disagree, 3 = fair, 4 = agree, 5 = strongly agree.

	Questions	**1**	**2**	**3**	**4**	**5**

[20] In the case of the employment status is confirmed, the respondent is invited to the next stage formal question answer; in the case of not confirmed, the possibility to further answer the question is terminated.

[21] The Chinese version of Organizational Identification scale is developed by Zhonghua and Chen (2014) based on the work of Smidts et al. (2001). This dissertation research employs the Chinese version scale.

1	I feel strong ties with my organization.	1	2	3	4	5
2	I experience a strong sense of belonging to my company.	1	2	3	4	5
3	I feel proud to work for my company.	1	2	3	4	5
4	I am sufficiently acknowledged in my organization.	1	2	3	4	5
5	I am glad to be a member of my organization.	1	2	3	4	5

3. Affective commitment[22] **(Tang et al. 2008, Meyer et al. 1993, and Ko et al. 1997).** Evaluate and judge the following descriptions and select the value that best matches. The criteria for evaluation and judgment are as follows: 1 = strongly disagree, 2 = disagree, 3 = fair, 4 = agree, 5 = strongly agree.

	Questions	**1**	**2**	**3**	**4**	**5**
1	I would be very happy to spend the rest of my career with this organization.	1	2	3	4	5
2	I really feel as if this organization's problems are my own.	1	2	3	4	5
3	I feel a strong sense of belonging to my organization.	1	2	3	4	5
4	I do not feel emotionally attached to this organization.	1	2	3	4	5

4. Employee intrapreneurship (Gawke et al. 2019). Evaluate and judge the following descriptions and select the value that best matches. The criteria for evaluation and judgment are as follows: 1 = strongly disagree, 2 = disagree, 3 = fair, 4 = agree, 5 = strongly agree.

	Questions	**1**	**2**	**3**	**4**	**5**
1	I undertake activities to realize change in my organization	1	2	3	4	5
2	I undertake activities to change the current products/services of my organization	1	2	3	4	5
3	I contribute ideas for strategic renewal for my organization	1	2	3	4	5
4	I conceptualize new ways of working for my organization	1	2	3	4	5
5	I undertake activities to set up new business units	1	2	3	4	5
6	I undertake activities to reach new market or communities for my organization	1	2	3	4	5
7	I undertake activities that result in new departments outside of my organization	1	2	3	4	5
8	I actively establish new collaborations with experts outside of my own profession	1	2	3	4	5

Note. Items 1-4 are on strategic renewal behavior; items 5-8 are on venture-creating behavior.

5. Your personal information.

Your gender	☐ Male ☐Female
Your age	☐ 18-30 ☐31-40 ☐ 41-50 ☐51 and above
Your education	☐ High or vocational school ☐Undergraduate ☐Postgraduate (master or doctor)
Your income	☐ Below 6000 RMB ☐6000-8000 RMB ☐8000-10000 RMB ☐above 10000 RMB

[22] The Chinese version of Affective Commitment scale is developed by Tang et al. (2008) based on the work of Meyer et al. (1993) and Ko et al. (1997).

APPENDIX 2. List of tables and figures

Figures

Tables

APPENDIX 3. Other tables

Table 1.4.a –Reliability analysis in terms of Cronbach Alpha

Constructs	Number of variables	Cronbach's α
IEO	9	0.621
OEO	8	0.777
EI	8	0.842
EP	27	0.919
OP	11	0.842

Note: IEO — Individual Entrepreneurial Orientation; OEO — Organizational Entrepreneurial Orientation; EI — Employee Intrapreneurship; EP — Employee Performance; OP — Organizational Performance. Source: authoring based on the data analysis results.

Table 1.5.a – KMO and Bartlett's Test Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.846
Bartlett's Test of Sphericity	Approx. Chi-Square	5197.219
	df	1953
	Sig.	0.000

Note: df — degree of freedom; sig — significance level. Source: authoring based on the data analysis results

Table 1.6.a – The reliability and validity analysis of each measurable variable

Constructs	Items	Estimate	S.E.	Est./S.E.	P-Value	SMC	CR	AVE
IEO	IEO1	0.233	0.092	2.528	0.011	0.054	0.594	0.167
	IEO2	0.287	0.093	3.100	0.002	0.082		
	IEO3	0.150	0.099	1.512	0.131	0.023		
	IEO4	0.324	0.099	3.291	0.001	0.105		
	IEO5	0.153	0.100	1.538	0.124	0.023		
	IEO6	0.371	0.084	4.403	0.000	0.138		
	IEO7	0.581	0.077	7.506	0.000	0.338		
	IEO8	0.658	0.076	8.707	0.000	0.433		
	IEO9	0.554	0.075	7.390	0.000	0.307		
OEO	OEO1	0.646	0.057	11.434	0.000	0.417	0.788	0.322
	OEO2	0.528	0.066	8.031	0.000	0.279		
	OEO3	0.508	0.067	7.575	0.000	0.258		
	OEO4	0.399	0.074	5.363	0.000	0.159		
	OEO5	0.703	0.052	13.559	0.000	0.494		
	OEO6	0.602	0.060	10.050	0.000	0.362		
	OEO7	0.559	0.063	8.810	0.000	0.312		
	OEO8	0.541	0.065	8.313	0.000	0.293		
EI	EI1	0.474	0.067	7.130	0.000	0.225	0.842	0.403
	EI2	0.581	0.058	9.965	0.000	0.338		
	EI3	0.603	0.057	10.662	0.000	0.364		
	EI4	0.618	0.055	11.265	0.000	0.382		
	EI5	0.727	0.045	16.210	0.000	0.529		
	EI6	0.729	0.045	16.252	0.000	0.531		
	EI7	0.713	0.047	15.335	0.000	0.508		
	EI8	0.593	0.057	10.378	0.000	0.352		
EP	ITPF1	0.717	0.041	17.380	0.000	0.514	0.911	0.535
	ITAD2	0.794	0.033	24.187	0.000	0.630		
	ITPA3	0.625	0.051	12.331	0.000	0.391		

	TTPF4	0.653	0.048	13.606	0.000	0.426		
	TTAD5	0.803	0.032	25.478	0.000	0.645		
	TTPA6	0.740	0.039	18.921	0.000	0.548		
	OTPF7	0.699	0.043	16.182	0.000	0.489		
	OTAD8	0.717	0.041	17.339	0.000	0.514		
	OTPA9	0.809	0.031	25.913	0.000	0.654		
OP	IOP1	0.986	12.253	0.080	0.936	0.972	0.857	0.753
	EOP2	0.731	9.082	0.080	0.936	0.534		

Note: IEO — Individual Entrepreneurial Orientation; OEO — Organizational Entrepreneurial Orientation; EI — Employee Intrapreneurship; EP — Employee Performance; ITPF — Individual task proficiency; ITAD — individual task adaptivity; ITPA — Individual task proactivity; TTPF — Team member task proficiency; TTAD — Team member task adaptivity; TTPA — Team member task proactivity; OTPF — Organizational member task proficiency; OTAD — Organizational member task adaptivity; OTPA — Organizational member task proactivity; OP — Organizational Performance; IOP — Internal organizational performance; EOP — External organizational performance. Source: authoring based on the data analysis results.

Table 1.7.a – Descriptive Statistics and Correlations

	Mean	S.d.	1	2	3	4	5	6	7	8	9
1.Gender	1.72	0.45	1								
2. Age	1.89	0.80	-0.25**	1							
3. Edu	2.33	0.50	0.13	0.12	1						
4.Income	2.54	0.88	-0.14	0.48**	0.49**	1					
5. IEO	3.74	0.47	-0.21**	0.12	-0.07	0.16*	*(0.41)*				
6. OEO	3.86	0.54	-0.22**	0.13	-0.06	0.13	0.45**	(0.57)			
7. IB	3.86	0.64	-0.20**	0.06	-0.04	0.23**	0.62**	0.53**	(0.63)		
8. OP	3.16	0.44	-0.16*	0.08	-0.03	0.17*	0.37**	0.52**	0.56**	(0.73)	
9. EP	4.07	0.45	-0.09	0.16*	0.02	0.15*	0.45**	0.50**	0.67**	0.74**	(0.87)

Note: IEO — Individual Entrepreneurial Orientation; OEO — Organizational Entrepreneurial Orientation; EI — Employee Intrapreneurship; EP — Employee Performance; OP — Organizational Performance. The values in parentheses in the diagonal line is the square root of AVE. Source: authoring based on the data analysis results.

Table 1.8.a – Model fit indicators

Index	Criteria	Research Model
CH-SQR	SMALLER IS BETTER	197.096
DF	LARGER IS BETTER	86
CHI-SQR/DF	3>NORM CHI-SQR>1	2.292
CFI	>0.90	0.925
TLI	>0.90	0.909
RMSEA	<0.08	0.087
SRMR	<0.08	0.061

Note: CH-SQR — Chi-square; DF — Degrees of Freedom; CFI — Comparative Fit Index; TLI — Tucker-Lewis Index; RMSEA — Root Mean Square Error of Approximation; SRMR — Standardized Root Mean Square Residual.

Table 2.2.a – Descriptive statistics for demographic variables in the first series of study

Variables	Frequency	Percent
Gender		
Male	46	17.6
Female	215	82.4
Age		

18-30	235	90
31-40	25	9.6
41-50	1	0.4
Education		
Junior college or university	193	73.9
Master's or doctor's degree	68	26.1
Income		
Below 4000 CNY (below 564.58 USD)	102	39.1
4000-8000 CNY (564.58-1129.16 USD)	109	41.8
8000-12000 CNY (1129.16-1693.74 USD)	32	12.3
12000 RMB and above (1693.74 USD and above)	18	6.9

Source: calculated by authors using SPSS version 26.0 based on collected data

Table 2.3.a – Descriptive statistics for demographic variables in second series of study

Variables	Items	Number	Proportion (%)
Gender	Male	96	32.9
	Female	196	67.1
Age	18-30	219	75
	31-40	73	25
Education	Undergraduate	166	56.8
	Master's or doctoral degree	126	43.2
Income	Below 6000 CNY	145	49.7
	6000-8000 CNY	35	12
	8000-10000 CNY	22	7.5
	Above 10000 CNY	90	30.8

Source: calculated by authors using SPSS version 26.0 based on collected data

Table 2.4.a – Overview of measurement model

Constructs	Items	CR	AVE	Cronbach's α
Innovativeness	4	0.831	0.556	0.824
Need of achievement	4	0.883	0.653	0.881
Risk taking	3	0.874	0.698	0.873
Autonomy	2	0.670	0.504	0.688
Proactiveness	3	0.800	0.573	0.795

Note. Some items are deleted to enhance research reliability Source: Developed by Authors.

Table 2.5.a – Loadings and Cross-loadings

Items	Component				
	1	2	3	4	5
I1	0.525	0.688	***0.842***	0.518	0.195
I2	0.497	0.575	***0.867***	0.403	0.170
I3	0.427	0.309	***0.812***	0.434	0.069
I6	0.687	0.691	***0.655***	0.479	0.175
NA1	***0.866***	0.432	0.503	0.572	0.184
NA2	***0.838***	0.580	0.600	0.583	0.137
NA3	***0.846***	0.547	0.491	0.533	0.200
NA4	***0.869***	0.502	0.414	0.526	0.177
RT1	0.574	***0.881***	0.543	0.482	0.268

RT2	0.537	***0.891***	0.517	0.503	0.244
RT3	0.465	***0.868***	0.436	0.508	0.266
A1	0.094	0.281	0.106	0.108	***0.870***
A2	0.282	0.233	0.193	0.302	***0.862***
P1	0.583	0.596	0.575	***0.815***	0.258
P2	0.556	0.458	0.456	***0.896***	0.188
P3	0.603	0.564	0.461	***0.782***	0.172

Note. Extraction method: principal component analysis; Rotation method: varimax with Kaiser normalization; some items are deleted to enhance the research reliability. Source: Developed by Authors.

Table 2.13.a – The reliability and validity analysis of each measurable variable

Constructs	Items	Est.	S.E.	Est./S.E.	P-Value	SMC	CR	AVE
EI	EI1	0.832	0.022	37.767	0.000	0.692	0.935	0.707
	EI2	0.835	0.022	38.124	0.000	0.697		
	EI3	0.820	0.023	35.675	0.000	0.672		
	EI4	0.863	0.019	45.332	0.000	0.745		
	EI5	0.864	0.019	46.199	0.000	0.746		
	EI6	0.829	0.022	37.565	0.000	0.687		
WE	WE1	0.863	0.026	33.509	0.000	0.745	0.872	0.694
	WE2	0.821	0.028	29.384	0.000	0.674		
	WE3	0.815	0.028	28.737	0.000	0.664		
PS	PS1	0.700	0.043	16.441	0.000	0.490	0.801	0.574
	PS2	0.726	0.042	17.424	0.000	0.527		
	PS3	0.840	0.039	21.604	0.000	0.706		
IEO	I	0.906	0.025	36.611	0.000	0.821	0.931	0.772
	NA	0.861	0.028	31.294	0.000	0.741		
	RT	0.836	0.030	28.172	0.000	0.699		
	P	0.909	0.029	31.602	0.000	0.826		

Note: Est. — Estimate; S.E — Standard Error; SMC — Squared Multiple Correlation; CR — Construct Reliability; AVE — Average Variance Extracted; EI — Employee Intrapreneurship; PS — Psychological Safety; WE — Work Engagement; IEO — Individual Entrepreneurial Orientation; I — Innovativeness; NA — Need of Achievement; RT — Risk Taking; P — Proactiveness. Some items are deleted to ensure the research reliability. * — $p < 0.05$, ** — $p < 0.01$, *** — $p < 0.001$.

Table 2.14.a – Descriptive statistics and results of discriminatory validity analysis

Constructs	Mean	Std. deviation	EI	PS	WE	IEO
EI	4.417	1.263	*0.841*			
PS	4.791	1.085	0.576	*0.758*		
WE	4.788	1.123	0.658	0.610	*0.833*	
IEO	4.910	0.941	0.809	0.626	0.809	*0.879*

Note: CR — Construct Reliability; AVE — Average Variance Extracted; EI — Employee Intrapreneurship; PS — Psychological Safety; WE — Work Engagement; IEO — Individual Entrepreneurial Orientation. Square root of AVE in Italic.

Table 2.15.a – Model fit indicators

Index	Criteria	Research Model
CH-SQR	SMALLER IS BETTER	730.289
DF	LARGER IS BETTER	316.000
CHI-SQR/DF	3>NORM CHI-SQR>1	2.311
CFI	>0.90	0.917
TLI	>0.90	0.908
RMSEA	<0.08	0.071
SRMR	<0.08	0.049

Note: CH-SQR — Chi-square; DF — Degrees of Freedom; CFI — Comparative Fit Index; TLI — Tucker-Lewis Index; RMSEA — Root Mean Square Error of Approximation; SRMR — Standardized Root Mean Square Residual.

Table 2.19.a – The results of composite reliability and convergent validity

Constructs	Items	Std. Factor Loading	Square Multiple Correlations	CR	AVE
IEO	IEO1	0.616	0.379	0.841	0.432
	IEO2	0.613	0.376		
	IEO3	0.690	0.476		
	IEO4	0.612	0.375		
	IEO5	0.597	0.356		
	IEO6	0.679	0.461		
	IEO7	0.776	0.602		
OEO	OEO1	0.659	0.434	0.895	0.551
	OEO2	0.700	0.490		
	OEO3	0.760	0.578		
	OEO4	0.720	0.518		
	OEO5	0.776	0.602		
	OEO6	0.787	0.619		
	OEO7	0.783	0.613		
AC	AC1	0.829	0.687	0.915	0.730
	AC2	0.814	0.663		
	AC3	0.795	0.632		
	AC4	0.968	0.937		
OI	OI1	0.708	0.501	0.915	0.685
	OI2	0.793	0.629		
	OI3	0.820	0.672		
	OI4	0.863	0.745		
	OI5	0.938	0.880		

Note: CR is composite reliability, AVE is average variance extracted, IEO is individual entrepreneurial orientation, OEO is organizational entrepreneurial orientation, OI is organizational identification, AC is affective commitment. Source: calculated by authors using Mplus version 8.3 based on collected data

Table 2.20.a – The results of discriminant validity test and descriptive statistics of the research variables

Constructs	Mean	Std. deviation	IEO	OEO	AC	OI

IEO	3.843	0.587	*0.657*			
OEO	3.870	0.682	0.501	*0.742*		
AC	3.970	0.706	0.691	0.615	*0.854*	
OI	4.038	0.673	0.435	0.556	0.813	*0.827*

Note: IEO is individual entrepreneurial orientation, OEO is organizational entrepreneurial orientation, OI is organizational identification, AC is affective commitment. Source: calculated by authors using Mplus version 8.3 based on collected data

Table 2.22.a – The results of composite reliability and convergent validity in analysis 2.2

Constructs	Items	Std. Factor Loading	Square Multiple Correlations	CR	AVE
IEO	IEO1	0.616	0.379	0.841	0.432
	IEO2	0.613	0.376		
	IEO3	0.690	0.476		
	IEO4	0.612	0.375		
	IEO5	0.597	0.356		
	IEO6	0.679	0.461		
	IEO7	0.776	0.602		
OEO	OEO1	0.659	0.434	0.895	0.551
	OEO2	0.700	0.490		
	OEO3	0.760	0.578		
	OEO4	0.720	0.518		
	OEO5	0.776	0.602		
	OEO6	0.787	0.619		
	OEO7	0.783	0.613		
SRB	SRB1	0.854	0.729	0.853	0.601
	SRB2	0.915	0.837		
	SRB3	0.755	0.570		
	SRB4	0.518	0.268		
VB	VB1	0.793	0.629	0.897	0.688
	VB2	0.801	0.642		
	VB3	0.765	0.585		
	VB4	0.946	0.895		

Note: CR is composite reliability, AVE is average variance extracted, IEO is individual entrepreneurial orientation, OEO is organizational entrepreneurial orientation, SRB is strategic renewal behavior, VB is venture-creating behavior. Source: calculated by authors using Mplus version 8.3 based on collected data

Table 2.23.a – The results of descriptive statistics and discriminant validity test in analysis 2.2

Constructs	Mean	Std. deviation	IEO	OEO	SRB	VB
IEO	3.843	0.587	*0.657*			
OEO	3.870	0.682	0.501	*0.742*		
SRB	3.682	0.706	0.561	0.693	*0.775*	
VB	3.328	0.673	0.518	0.501	0.696	*0.829*

Note: CR is composite reliability, AVE is average variance extracted, IEO is individual entrepreneurial orientation, OEO is organizational entrepreneurial orientation, SRB is strategic renewal behavior, VB is venture-creating behavior. Source: calculated by authors using Mplus version

8.3 based on collected data

Table 2.25.a – Reliability statistics

Constructs	Items	Std. Factor Loading	Square Multiple Correlations	CR	AVE	Cronbach's α
OEO	OEO1	0.659	0.434	0.895	0.551	0.867
	OEO2	0.700	0.490			
	OEO3	0.760	0.578			
	OEO4	0.720	0.518			
	OEO5	0.776	0.602			
	OEO6	0.787	0.619			
	OEO7	0.783	0.613			
OI	OI1	0.708	0.501	0.915	0.685	0.908
	OI2	0.793	0.629			
	OI3	0.820	0.672			
	OI4	0.863	0.745			
	OI5	0.938	0.88			
SRB	SRB1	0.854	0.729	0.853	0.601	0.815
	SRB2	0.915	0.837			
	SRB3	0.755	0.570			
	SRB4	0.518	0.268			
VB	VB1	0.793	0.629	0.897	0.688	0.823
	VB2	0.801	0.642			
	VB3	0.765	0.585			
	VB4	0.946	0.895			

Note: CR is composite reliability, AVE is average variance extracted, OEO is organizational entrepreneurial orientation, OI is organizational identification, SRB is strategic renewal behavior, VB is venture-creating behavior. Source: calculated by authors using Mplus version 8.3 based on collected data.

Table 2.26.a – Results of Multicollinearity Test

Model	Variables	Coefficients statistics		Collinearity Statistics	
			Std. Error	Tolerance	VIF
1	(constant)	0.285	0.436	-	-
	OI	0.417	0.058	0.614	1.628
	OEO	0.550	0.063	0.504	1.983
2	(constant)	-0.929	0.568	-	-
	OI	0.683	0.075	0.614	1.628
	OEO	0.230	0.082	0.504	1.983

Note: N = 292; for model 1, strategic renewal behavior is the dependent variable, while for model 2, venture-creating behavior is the dependent variable; Demographic variables are controlled in each model; VIF is the variance inflation factor. Source: calculated by authors using SPSS version 26.0 based on collected data.

Table 2.27.a – Descriptive statistics and correlations

Variables	Mean	SD	1	2	3	4
1. Organizational entrepreneurial	3.8704	0.68212	*0.742*			

orientation						
2. Organizational identification	4.0377	0.67377	0.556**	*0.827*		
3. Strategical renewal behavior	3.6824	0.83363	0.693**	0.617**	*0.775*	
4. Venture-creating behavior	3.3279	1.04646	0.501**	0.631**	0.696**	*0.829*

Note: N = 292; SD is standard deviation; the AVE square root of each construct is on the diagonal in parentheses; Significant level: *P < 0.05, **P < 0.01, ***P < 0.001. Source: calculated by authors using SPSS version 26.0 based on collected data.

Figure 2.31.a – Summarization for the hypothesis testing results

Number	Description	Results
Hypothesis 1	OEO positively contributes to employee's strategic renewal behavior.	Support
Hypothesis 2	OEO positively contributes to employee's venture creating behavior.	Support
Hypothesis 3	OI positively contributes to employee's strategic renewal behavior.	Support
Hypothesis 4	OI positively contributes to employee's venture-creating behavior.	Support
Hypothesis 5	OEO positively contributes to OI.	Support
Hypothesis 6	OI mediates the relationship between OEO and employee's strategic renewal behavior.	Support
Hypothesis 7	OI mediates the relationship between OEO and employee's venture-creating behavior.	Support

Note: OEO is organizational entrepreneurial orientation, OI is organizational identification. Source: made by authors based on hypothesis testing results.

APPENDIX 4. Glossary, abbreviations, and basic explanation[23]

1. **Labor Productivity (LP).** One way to measure the effectiveness of human resource development in terms of organizational success. This dissertation includes indicators such as employee performance and organizational performance to indicate labor productivity.
2. **Entrepreneurial Competencies (EC).** In this dissertation, entrepreneurial competencies are defined using the characteristics-based approach (individual entrepreneurial orientation with certain general entrepreneurial traits) and behavior-based approach (employee intrapreneurship). Entrepreneurial orientation is investigated at both employee and organizational level.
3. **Human Resource Development (HRD).** It refers to a structured and continuous process within an organization aimed at enhancing the knowledge, skills, abilities, and behaviors of employees to improve individual and organizational performance. This dissertation explores the concept of human resource development by investigating the relationship between entrepreneurial orientation, employee intrapreneurship, and labor productivity in terms of employee performance and organizational performance.
4. **Entrepreneurial Orientation (EO)[24].** A critical characteristic aspect of entrepreneurial competencies represented by traits such as innovativeness, proactivity, and risk-taking, for both existing organization and its labor resources in the economy of neo-liberalism, the society post-industry. Therefore, this dissertation work distinguishes this concept by individual entrepreneurial orientation and organizational entrepreneurial orientation.
5. **Organizational Entrepreneurial Orientation (OEO).** One level of the entrepreneurial orientation explored in current dissertation work. It represents entrepreneurial characteristics and competencies such as innovativeness, proactivity, and risk-taking at the organizational level.
6. **Individual Entrepreneurial Orientation (OEO).** Another aspect of the entrepreneurial orientation explored in current dissertation work. It represents entrepreneurial characteristics and competencies such as innovativeness, proactivity, and risk-taking at employee level.
7. **Employee Performance (EP).** One indicator of labor productivity measures the effectiveness of human resource development. It explained by the proficiency, adaptivity and proactivity in the employee task as an individual, team member, and organizational member.
8. **Organizational Performance (OP).** Another indicator of labor productivity to measure the effectiveness of human resource development. It explained by the internal performance and external or market performance. The former focuses on product quality, customer satisfaction,

[23] These abbreviations are used throughout the dissertation, with the full version provided in each section the first time it appears, for the convenience of the reader.

[24] In section 2.2, EO primarily refers to individual entrepreneurial orientation. However, due to the dual nature of EO, it may also denote organizational entrepreneurial orientation depending on the context.

and new product development; The latter focuses more on economic outcomes such as profitability and market share.

9. **Positive Work Attitudes.** Positive work attitude refers to an employee's optimistic, constructive, and proactive approach to their job, characterized by enthusiasm, dedication, and a willingness to contribute to organizational goals. This dissertation explores positive work attitudes such as affective commitment and organizational identification.
10. **Affective Commitment (AC).** One positive work attitude explored in this dissertation work. It refers to an employee's emotional attachment to, identification with, and involvement in the organization.
11. **Organizational Identification (OI).** Another positive work attitude explored in this dissertation work. It describes the extent to which an employee aligns their self-concept with the identity of the organization, feeling a sense of belonging and shared purpose.
12. **Employee Intrapreneurship (EI).** Employee intrapreneurship involves proactive, innovative behaviors within the organization, where employees act as entrepreneurs by identifying opportunities, driving change, and creating new ventures or initiatives that benefit the organization. It is customarily explained by employees' strategic renewal behavior and venture-creating behavior.
13. **Strategic Renewal Behavior (SRB).** One component of employee intrapreneurship. It includes opportunity-seeking and advantage-seeking activities aimed at fundamentally or incrementally updating current products, services, working methods, and organizational strategies. This type of renewal involves the refreshment or replacement of resources and capabilities, which can be both intangible and human.
14. **Venture-creating Behavior (VB).** Another component of employee intrapreneurship. It involves activities where employees create, contribute to, or invest resources in new business opportunities.
15. **Psychological Safety (PS).** It is understood as the collective perception among employees regarding the degree of safety and comfort they feel in taking interpersonal risks within the workplace environment.
16. **Work Engagement (WE).** Work engagement refers to a positive, fulfilling work-related state of mind characterized by vigor, dedication, and absorption. Engaged employees show high levels of energy, enthusiasm, and immersion in their tasks.

APPENDIX 5. Author's acknowledgement

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To the best of my knowledge, this dissertation does not contain any material previously published by another individual, except where proper acknowledgment has been provided. Additionally, this dissertation does not include any material that has been submitted for the award of any other degree or diploma at any university. The work presented here does not infringe upon any copyright, trademark, patent, or other rights of any person.

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