# Analyzing the Impact of Dual Learning on the Performance and Sustainable Innovation Practices of Start-ups in the Sports Sector

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**Abstract**

This paper discusses the relationship between dual learning (research learning and applied learning) and sustainable development performance evaluation in the sports sector. According to the basic theory of learning, the basic theory of continuous innovation ability, the basic theory of sustainable development performance evaluation, the cooperation theory and contingency theory, this paper discusses the harm of dual learning and complementation to the sports enterprise sustainable development performance evaluation under the dynamic environment. According to the empirical research on the questionnaire survey of 179 units in Jiangsu and Henan, dual learning and complementarity have a positive impact on innovation ability, and continuous innovation ability has a positive impact on sustainable development performance evaluation. Continuous innovation ability plays a part of the intermediary role in the impact of dual learning and complementation on the performance evaluation of sustainable development. The management plan obtained from scientific research reminds us that sports enterprises must "go forward" with dual learning to obtain excellent continuous innovation ability and sustainable development performance evaluation. Startups attach great importance to sustainable innovation capability, and pay more attention to the complementary effect of dual learning on sustainable innovation capability under the dynamic environment.

**Key words:** Dual learning; Performance of start-ups; Continuous innovation capability

## 1. Introduction

The strategic management of institutional learning and innovation believes that institutional learning is one of the important ways for sports enterprises to effectively carry out business processes and carry out independent innovation in order to achieve the overall goal of sustainable development, and the continuous innovation ability is the main pre-independent variable of sports enterprises' sustainable development (Sollander & Engström, 2022). Dual learning is one of the research focuses and key points in the field of institutional learning in recent years. So far, experts and professors around the world have done a lot of research on dual learning and the whole process, and have obtained some scientific research results. The experts and professors have also achieved some results in the sustainable development of sports enterprises, especially in performance appraisal and scientific research on elements. They found that the IT level of sports enterprises is beneficial to the performance appraisal of sustainable development of sports enterprises. However, there are few research achievements in machine science research on the harm of dual learning and complementarity to the sustainable development (performance evaluation) of sports enterprises (Han Chen, 2022). To put it simply, this scientific research applied causal analysis and empirical research to reveal the interrelationship between dual learning and complementation (independent variable), continuous innovation ability (intermediary effect), sports enterprise sustainable development performance evaluation (variable), and natural environment dynamics model (natural environment dynamics model) regulatory independent variables, as shown in Figure 1:

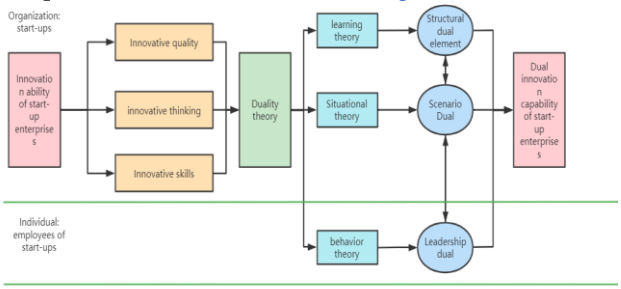


***Figure 1.*** Innovation ability of sports start-up enterprises

## 2. Dual learning

### 2.1 Concept of dual learning

Duality comes from the word "ambidexter", which translates into "people who can handle two different things at the same time". Through the identification of different types of external environmental knowledge,

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sports enterprises transfer the knowledge different from their own knowledge reserves to the internal structure to carry out the whole learning process. Applied learning refers to a process of discovering and utilizing the existing old knowledge of sports enterprises (Valenzuela-córdova, 2021). The key of using learning is influenced by the ability of knowledge digestion. The learning effect of sports enterprises depends on whether the current knowledge of sports enterprises can be fully digested and absorbed.

The relationship between dual learning and enterprise capability is closely related. The shaping of enterprise capability is inseparable from institutional learning, which also follows the whole growth stage of the enterprise. The formation of ability is a complicated whole process of knowledge accumulation, and dual learning provides efficient knowledge for ability building. Research has shown that dual learning can improve the digestion and absorption capacity of sports enterprises, which is achieved by the exploration of external knowledge and the use of internal structural knowledge (Emad, 2018). Although some experts and scholars have found that the dual learning in institutions can harm the promotion innovation and incremental independent innovation and thus affect the breakthrough ability of institutions, in sports enterprises, whether sports enterprises can build continuous independent innovation ability based on dual learning has not been recognized. In order to solve this problem, this scientific research explores the relationship between dual learning and continuous innovation capability of sports enterprises on this basis. As shown in Figure 2 below:

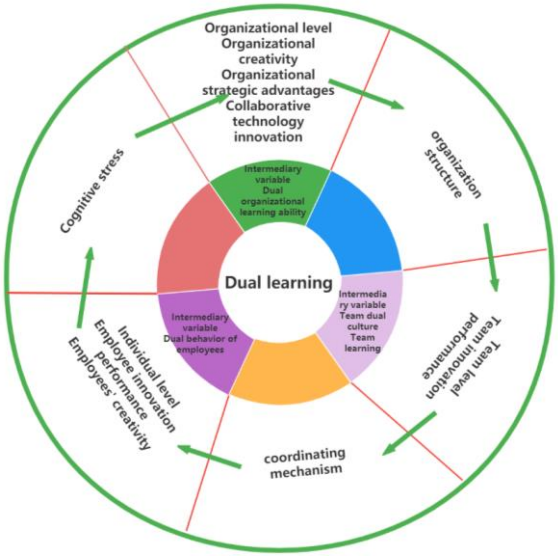


***Figure 2.*** Dual learning and sustainable development ability of sports start-up enterprises

## 2.2 Research status of dual learning

### 2.2.1 Precedent variables of dual learning

First of all, from a personal perspective, scientific research on the antecedents of dual learning, first of all, from the perspective of dual concepts and the effects of selectivity on dual learning. In the process of establishing a dual organizational scenario, senior managers play an indispensable role (Karifala., 2022). Some scholars believe that leadership is harmful to organizational dual learning. According to the interpretation of the relationship between enterprise dual learning and HRM, I found that my dual willingness and dual learning (exploration and application) have a certain impact on enterprise dual learning, and the latter is based on this. On the enterprise side, sports enterprises can achieve and maintain the stability and stability of the organization by optimizing the current professional knowledge. But we can't just rely on our own knowledge and ability. The industry with great changes and increasingly fierce competition have higher requirements on the ability of sports enterprises, so it is urgent to develop new opportunities and new operations. The external uncertain natural environment promotes the sports start-up enterprises to build dynamic capabilities based on learning, and complete the enterprise development trend. The dynamic nature of the environment requires sports enterprises to choose two different learning methods to face various tests at the same time.

### 2.2.2 Result variables of dual learning

At the individual level, there is very little research on the impact of dual learning correctness. Some scholars believe that self-creative activities have a great impact on students' dual learning. There will be more scientific research on the results of dual learning in sports enterprises. The key is to verify that dual learning can significantly improve entrepreneurial performance assessment at the level of enterprise performance assessment. It also verifies that dual learning plays a very important role in performance appraisal. Taking Chinese sports enterprises as examples, this paper studies the effect of dual learning on performance appraisal, and gives the view of integrating exploration and using learning (Escandon-Barbosa, Salas-Paramo, & Rialp-Criado, 2021). Some scholars have also found that under the premise of exploratory learning, sports enterprises can continuously improve their integration ability, keep pace with the times and develop innovative industries through continuous exploration in a volatile environment; When the natural environment remains stable, the use of learning also plays a more obvious role, helping entrepreneurs to efficiently digest,

absorb and use existing professional knowledge, refine and consolidate it, and combine it to generate new knowledge, ultimately improving the performance assessment of independent entrepreneurship or promoting the development of sports enterprises. Scholars found that both learning methods had a positive impact on the development of sports enterprises. As far as technological innovation is concerned, exploratory learning can be used to obtain more long-term capabilities, and exploitative learning is used to ensure the exploration of a special part of technological feature capabilities. Therefore, the improvement of technological capabilities is more conducive to the expansion of the core competitiveness of sports enterprises, and gradually lead to independent innovation. On the other hand, scientific research can provide multiple opportunities and help institutions introduce a new technology and product. The research shows that dual learning can greatly improve the performance evaluation of sports enterprises. One member of each alliance has united to promote exploratory learning. At the same time, it also promotes using learning through some patents and authorization. The two complement each other, thus promoting sports enterprises to obtain new knowledge and information, and finally improving their innovation performance.

It can be seen from the above that although there are many scientific researches on the outcome variables of dual learning in the enterprise, many of these scientific researches have risen to the level of the whole enterprise organization based on the harm of dual learning to the enterprise itself, so the scientific research on the outcome variables of dual learning in the enterprise is also applicable to the individual to a certain extent (Wang Zhiwei, 2022).

## 3. Hypothetical research on dual learning based on continuous innovation ability in the performance research of start-up sports enterprises

### 3.1 Dual learning and continuous innovation ability

The whole process of exploratory learning breaks the rest state of knowledge, and it is very likely that knowledge will begin to flow, transform and then be digested and absorbed by sports enterprises. Continuous innovation usually refers to the level of identification, acquisition, conversion, digestion, absorption and output of knowledge needed in the innovation process, with continuous innovation as the main goal. Different from the independent innovation ability, the continuous independent innovation ability is concerned with improving the enterprise's independent innovation ability in the dynamic change, which requires the enterprise to constantly acquire new knowledge, thus increasing the motivation for the improvement of the independent innovation ability (Asif, 2020). Exploratory learning is an important way for enterprises to acquire new knowledge. According to exploratory learning, enterprises can identify knowledge different from their own knowledge reserves, laying a foundation for independent innovation; At the same time, the increased knowledge reserve can enhance the acquisition, transformation and absorption of sports enterprises, and enterprises can absorb more knowledge. In this process, sports enterprises' continuous independent innovation ability has been improved. In view of this, this scientific research clearly puts forward the following assumptions: 1. Exploratory positively impacts on continuous independent innovation ability.

The key concern of the whole process of using learning is the new understanding of old knowledge generated by sports enterprises. Different from exploratory learning, the object of utilization learning is the existing knowledge reserve of sports enterprises. According to the whole process of knowledge reuse, the efficiency of sports enterprises' handling methods for similar problems has been greatly improved (Seo, Kim, & Lee, 2018). At the same time, knowledge reuse can improve sports enterprises' breakthrough cognitive ability and promote the breakthrough of solutions. The continuous use of knowledge is the essence of using learning. In the process of communication between knowledge sources and knowledge receivers, knowledge reserves are usually improved, which is also based on improving the ability of knowledge receivers. When an enterprise makes use of its knowledge, it will often be able to integrate and apply the methods or work experience to all aspects. In this process, the level of knowledge digestion, absorption and export will also be improved. In view of this, this scientific research clearly puts forward the following assumption 2: the utilization learning positively affects the continuous independent innovation ability.

According to the basic theory of cooperation, the subsystem effect is better than the sum of the functions of each system according to the differences of individual behaviors that complement each other (Choi, Han, & Kwak, 2021). In the field of dual learning, exploratory learning is based on the principle of acquiring new knowledge and digesting and absorbing enterprise knowledge reserves, which makes up for the deficiency of pioneering learning that only pays attention to old knowledge and ignores new knowledge. Open learning attaches great importance to old knowledge and creates new knowledge, which makes up for the defect that exploratory learning neglects the

knowledge reserve of the enterprise itself. Therefore, this scientific research finds the following hypothesis: The diversity of dual learning seriously affects the ability of continuous independent innovation.

**3.2 Intermediary role of sustainable innovation capability**

The study found that continuous innovation ability is an important variable in the performance evaluation of sports enterprises' international relations today, and dual learning has consolidated knowledge for sports enterprises' continuous innovation ability. Dual learning is two key methods for sports enterprises to acquire knowledge. The enterprise can dig, digest and absorb new knowledge stored inside and outside the enterprise through exploratory learning, and improve and develop the old knowledge acquired according to the utilization learning. The two of them went hand in hand. According to the SECI digital model, when the impact of new and old knowledge generates a spiral, the overall knowledge output rate of the enterprise will be improved to a certain extent (Xing & Yanxi, 2022). The improvement of continuous innovation ability also brings a better basis for the enterprise to continuously and effectively carry out technological innovation, and then to produce goods that meet the market demand of social development, natural environment, and economic development, thus improving the performance assessment of the enterprise's concept of sustainable development. In view of this, this scientific research clearly puts forward the following assumptions: 4: 1. Continuous innovation ability plays a mediating role between exploratory learning and sustainable innovation performance. 2. The ability of continuous innovation plays a mediating role between utilizable learning and sustainable innovation performance.

In the field of dual learning, some scholars believe that enterprise managers must change from a single perspective to multiple perspectives, and grasp more knowledge for sports enterprises according to the complementary role of research and learning (Long, Wood, & Bennett, 2023). Knowledge reserve enhances the knowledge of sports enterprises, and enterprises can acquire or enhance the use of more new and old knowledge. In this process, according to the continuous innovation ability of sports enterprises, cooperative enterprises with continuous innovation ability will transform more knowledge into products and labor dispatching companies that meet the requirements of social status quo, and have performance evaluation. Therefore, the undergraduate research clearly puts forward the following assumption 5: the ability of continuous innovation plays a mediating role between the diversity of dual learning and the performance evaluation of the concept of sustainable development.

**3.3 Regulation of environmental dynamics**

Environmental dynamism describes the transformation level of environmental factors in the business process of sports enterprises, mainly in the speed of technological revolution and the level of environmental turbulence (Lv Chaolin, 2022). Contingency theory emphasizes that the production and operation activities of sports enterprises will also be restricted by many conditions such as environment, and enterprises need to adjust their production and operation activities appropriately according to the changes of environment. When the external environment is dynamic, the operating environment of the enterprise changes quickly and the technology update rate is relatively fast, which increases the difficulty for the enterprise to obtain professional knowledge, but at the same time, the relativity of the enterprise is relatively easy to grasp new knowledge, so the effect of inquiry learning is improved; However, when the external knowledge iterates rapidly, affected by the environment, it is easier for enterprises to form a new understanding of the old professional knowledge they have mastered. Therefore, the effect of using learning will also be improved. When the dynamics of the external environment is relatively low, it is difficult for sports enterprises to realize the change of the external environment, and the slow rate of technology update makes it difficult for sports enterprises to master new knowledge, thus affecting the actual effect of inquiry learning; When the results of inquiry learning become weak, sports enterprises will shift the focus of learning to the use of learning. However, because it is difficult to absorb the original concept, sports enterprises will be blocked to optimize the old knowledge to a certain extent, so the use of learning effect is often reduced. In view of this, this scientific research clearly puts forward the following assumptions: 6: 1. The positive direction of environmental dynamics is to adjust the relationship between inquiry learning and maintaining the ability of independent innovation. 2. The positive direction of environmental dynamics is to adjust the relationship between utilization learning and maintaining independent innovation ability.

It has been confirmed by scientific research that although environmental dynamics positively adjust the relationship between internal and external learning and organizational performance, environmental dynamics also play a negative role in the relationship between external environmental

learning synergy and organizational performance, mainly because of the difficult integration caused by the differences in knowledge acquired by the external environment (Shuwu., 2018). Because the objects and methods of acquiring professional knowledge are different, it is unknown whether the view of external environment learning can be used in the dual learning industry. In view of this, this scientific research clearly puts forward the following assumption 7: the dynamic environment negatively adjusts the relationship between dual learning diversity and maintaining independent innovation ability.

Sports Enterprises with strong innovation ability can continuously and effectively promote new knowledge, new products, new technologies and new service projects that meet customer needs, integrate into industry competition and meet sustainable development standards according to changes in the external environment and the needs of sustainable development, so as to obtain higher sustainable development performance assessment. In this process, whether the enterprise can timely release products and services that meet the social development, environmental and economic standards, thus effectively improving the performance assessment of sustainable development of the enterprise, will be harmed by environmental changes to a certain extent. In a relatively dynamic environment, the environment, social development and other factors faced by the enterprise are changing rapidly. It is difficult for the enterprise to ensure that it will release high return products or labor service companies on the premise of meeting environmental maintenance and social and economic development, which may lead to a reduction in the performance assessment of sustainable development; On the other hand, in a relatively low dynamic environment, sports enterprises with strong capability of continuous independent innovation can carry out technological innovation more calmly and effectively, thus laying a solid foundation for sustainable development of enterprises (Guo, Yang, & Han, 2019). Because the technology update rate is relatively slow and the pressure of survival in the sales market is relatively small, the independent innovation products and services provided by enterprises will be easier to meet the needs of sustainable development. Therefore, The performance appraisal of enterprise sustainable development will be improved. In view of this, this scientific research clearly puts forward the following assumptions: 8. The relationship between the continuous independent innovation capability and the sustainable development performance assessment is the negative adjustment of environmental dynamics. To sum up, the theoretical model of this exploration is made, as shown in Figure 3 below.

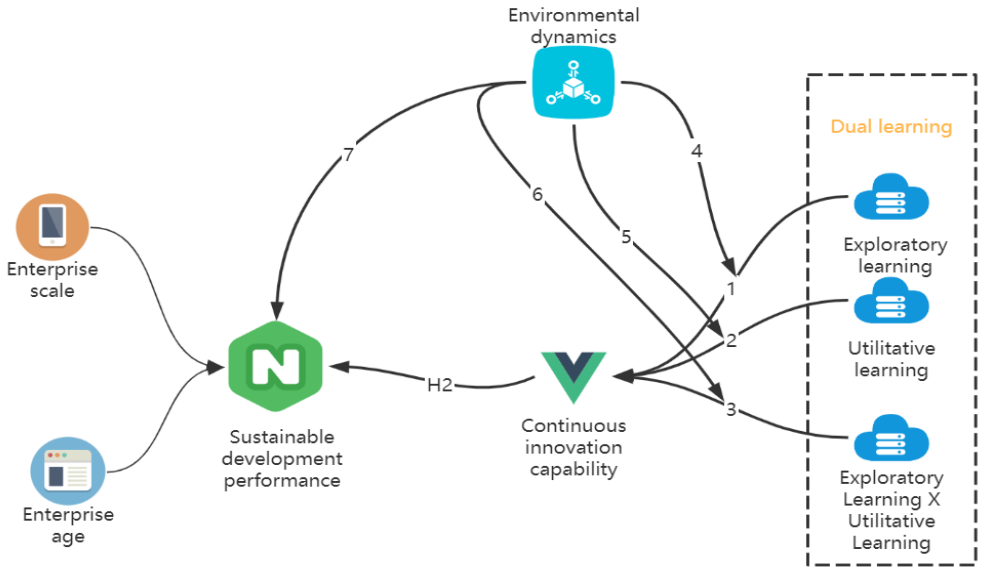


***Figure 3.*** Research theoretical model

## 4. Research Design

### 4.1 Sample and data collection

Taking the start-up enterprises as the research object, the business circle with the start-up period less than 8 years is included in the start-up period. Collect information according to the questionnaire. In the process of questionnaire design, in order to refer to the scientific research achievements published in the humanities magazines around the world and ensure the rationality of the humanized questionnaire that accurately measures

important research variables with the extensive development trend evaluation scale, four senior experts who started their own businesses were invited to review the questionnaire, and the questionnaire was continuously modified according to his proposal. In order to ensure the reliability and validity of the questionnaire, a preliminary survey was conducted on 8 start-ups in Changchun, the questionnaire was improved by integrating the research results and forming the final questionnaire.

According to the report of China's Urban Self Entrepreneurship Activity Index (2015), Guangzhou, Beijing, Tianjin and Changchun were selected as the data collection areas, and questionnaires were distributed to start-ups according to local entrepreneurship parks. The questionnaire was distributed in the form of paper questionnaire or electronic product questionnaire, and the CEO, CEO or senior management of the company responded (Njoroge, 2018). This research originated in May 2020. By September 2020, a total of 400 questionnaires had been distributed and 337 were recycled, thus 285 valid questionnaires were obtained, with an effective utilization rate of 71.25%. In terms of the establishment stage of new companies, 50.53% of the total number of new companies have been established for 3-5 years. In addition, 4.21%, 21.75% and 23.51% of them are within 1 year, 1~3 years and 5~8 years respectively. In terms of company size, sports enterprises with less than 10 people, 11-30 people, 31-50 people, 51-100 people, 101-200 people and more than 200 people are 25.26%, 36.49%, 21.05%, 13.33% and 2.11% respectively.

### 4.2 Data analysis and results

#### 4.2.1 Homologous variance test

If the information loaded by the same subject is measured properly in this way, it may cause phase error, so even if the variables are not related in theory, it may also indicate correlation. Therefore, the Harman single factor test represents the exploratory factors of all the contents of the scale. The four non-conversion factors deposit, accounting for 70.969% of the variance. The description rate of the total variance of the first factor is 39.355%, which is less than 50% of the zero point (Gu & Su, 2018). Therefore, the sample data will not have a very serious problem of homologous standard deviation, as shown in Table 1.

**Table 1**

*Correlation Analysis of Variables*

| variable | Mean | standard deviation | YE | SI | NA | EAL | EIL | SIC | SDP |
|---|---|---|---|---|---|---|---|---|---|
| YE | 2.190 | 0.780 | | | | | | | |
| SI | 1.840 | 1.228 | 0.115 | | | | | | |
| NA | 3.140 | 1.389 | 0.027 | -0.309** | | | | | |
| EAL | 2.560 | 0.810 | -0.063 | 0.070 | -0.047 | | | | |
| EIL | 2.540 | 0.830 | -0.098 | 0.105 | -0.142 | 0.615** | | | |
| SIC | 2.310 | 0.760 | 0.075 | 0.198** | -0.145 | 0.165* | 0.331** | | |
| SDP | 2.420 | 0.710 | 0.028 | 0.130 | -0.136 | 0.535** | 0.776** | 0.378** | |

#### 4.2.2 Reliability and validity test

Cronbach's index and component reliability and validity (Cr) are used to evaluate the reliability and validity of the scale. The analysis of SPSS 26.0app shows that the Lasmozart index value of each variable is higher than 0.7, and the Cr value of each variable is higher than 0.7, indicating that the new items of accurate measurement of each variable are consistent and relevant. According to reliability testing.

The validity of the rating scale was verified from two aspects: actual content validity and construct validity. In terms of the effectiveness of creativity, all important variables have gone through the precise and accurate measurement of the extreme scale. Through expert verification and pre-research, the excellent effectiveness of the main content has been ensured. In terms of structural validity, Amos 26.0 mobile phone app was used to carry out confirmatory factor analysis to verify the convergence and differential discrimination validity of the assessment scale. First, distinguish the convergence effectiveness according to factor load value, AVE value and adaptability index. The data shows that the load value of all variables is above 0.5, and the AVE value is above 0.5, which indicates that the new project of accurate measurement of all variables has a good consistency, and the size has good convergence effectiveness. The overall linear fitting index value shows that 2/df=2.222, CFI=0.923, TLI=0.917, RMSEA=0.066 meet the requirements, and the linear fitting of the model is good. Next, use the square root of AVE and the square root of the positive intermediate correlation coefficient r of the

variable to verify the effectiveness of the resolution. The results are shown in Table 2. The square root of each variable AVE on the diagonal is higher than the square root of the correlation function of this variable and other variables, indicating that each variable has good content validity and size has good system partition discrimination validity (Yao Meifang, 2022). As shown in Table 2.

**Table 2**

*Confirmatory factor analysis of variables*

| Model | factor | Chi square | freedom | Chi Square/Degrees of Freedom | Fitting index | Comparison fit index | Root mean square of approximate error |
|---|---|---|---|---|---|---|---|
| Single factor model | EAL+EIL+SIC+SDP+EDM | 861.260 | 275 | 3.132 | 0.598 | 0.674 | 0.109 |
| Two factor model | EAL+EIL + SIC + EDM, SDP | 857.625 | 274 | 3.130 | 0.598 | 0.675 | 0.109 |
| Three factor model | EAL+EIL, SIC +EDM, SDP | 488.149 | 272 | 1.795 | 0.819 | 0.880 | 0.067 |
| Four factor model | EAL+EIL, SIC, EDM, SDP | 452.565 | 269 | 1.682 | 0.832 | 0.898 | 0.062 |
| Five factor model | EAL, EIL, SIC, SDP, EDM | 411.343 | 265 | 1.552 | 0.846 | 0.919 | 0.056 |

#### 4.2.3 Descriptive Statistical Analysis

SPSS 26.0 was used to conduct statistical analysis on the mean value, standard deviation and Pearson correlation coefficient of variables. The conclusions are shown in Table 3. It can be seen from the index among key variables that Internet orientation is positively correlated with exploratory learning (r=0.652, P < 0.01) and exploitative learning (r=0.427, P < 0.01) respectively. At the same time, exploratory learning (r=0.517, P < 0.01) and exploitative learning (r=0.444, P < 0.01) are positively correlated with the performance appraisal of start-ups, and the correlation coefficients between key variables are all lower than 0.7, It indicates that there will be no serious heteroscedasticity problem in data information (Yunqi., 2022). Conclusion It is basically confirmed that the entity model and assumptions in this paper are logically reasonable, which supports further multiple regression analysis.

**Table 3**

*Results of descriptive statistical analysis*

| variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Enterprise scale | 1 | | | | | | | |
| Enterprise age | 0.370** | 1 | | | | | | |
| Industry category | -0.152* | 0.046 | 1 | | | | | |
| Network oriented | 0.195** | 0.032 | -0.022 | 0.765 | | | | |
| Exploratory learning | 0.131* | 0.034 | -0.023 | 0.652** | 0.889 | | | |
| Utilitative learning | 0.093 | -0.076 | -0.025 | 0.427** | 0.251** | 0.867 | | |
| Environmental dynamics | 0.012 | -0.017 | -0.098 | -0.010 | 0.054 | 0.062 | 0.861 | |
| Startup performance | 0.053 | -0.043 | -0.090 | 0.387** | 0.517** | 0.444** | 0.667** | 0.866 |
| mean value | 2.933 | 2.358 | 0.070 | 4.918 | 4.458 | 4.426 | 3.093 | 4.281 |
| standard deviation | 0.787 | 1.159 | 0.256 | 0.858 | 0.820 | 0.740 | 0.692 | 0.811 |

## 5. Hypothesis test

From the perspective of the connection between the certification of dual learning training, diversity, continuous innovation ability and the performance evaluation of the core concept of green development, SPSS20.0 mobile phone app was used to conduct linear regression analysis on the relevant independent variables. The assumptions proposed

by the certification and the results of the regression are shown in Table 4. Among them, Model 1 detects the impact of the adjusted variable on the independent variable, Model 2~Model 4 detects the relationship between the variable [dual learning and diversity] and the meta variable [continuous innovation ability], Model 8 detects the meta variable [continuous innovation ability] and the independent variable [sustainable development concept performance assessment], and Model 1 shows that the change variables selected by the laboratory conform to the regulation variable setting specification, without obvious independent variable damage, It is suitable for the later significance test. The certification results of model 2 show that hypothesis 1, variables (inquiry learning) and intermediary variables (continuous innovation ability) are positively correlated (=0.1450, p 0.05); The certification results of model 3 show that the variable (using learning and training) is significantly positively correlated with the intermediary variable (continuous innovation ability))=0.2910, P0.01, hypothesis 2. Model 4 certification data shows that the hypothesis proves that 3. The variable (dual learning and training diversity) is significantly positively correlated with the intermediary variable (intermediary variable) continuous innovation ability)=0.1160, p 0.05); The test result of model 8 shows that the intermediate variable (continuous innovation ability) in hypothesis verification 4 is=0.3350, P0.01) and the independent variable (performance evaluation of the concept of sustainable development) are positively correlated (Liu Ruhan, 2022).

On the level of intermediary role of continuous innovation capability of certification, SPSS20.0 mobile app was used to verify the intermediary role of continuous innovation capability in the form of linear regression analysis. The results are shown in Table 4. Among them, Model 2, Model 5 and Model 9 prove the intermediary effect between independent variables (inquiry learning) and variables (sustainable development performance evaluation). Model 3, Model 6 and Model 10 are independent variables (using learning and training) and variables. After adding intermediate variables, the initial return is still significant, but the correlation coefficient r decreases significantly (00 P0.01), It shows that continuous innovation ability plays a part of intermediary role between learning and the performance evaluation of the core concept of sustainable development. Assume that 5 is the verification; The inspection results of model 3, model 6 and model 10 showed that the initial regression was still significant after adding intermediate variables, but the correlation coefficient r decreased significantly (0.6650.632); P0.01) It shows that the ability of continuous innovation plays an intermediary role in the middle part of the performance evaluation of the application of the core concept of learning and sustainable development. Assumption 6 has been verified; The inspection results of model 4, model 7 and model 11 showed that the initial regression was still significant after adding intermediate variables, but the correlation coefficient r decreased significantly (0.4700.440); P0.01) shows that the ability of continuous innovation plays an intermediary role in the performance evaluation of the diversity of dual learning and training and the concept of sustainable development. Assumption 7 has been verified (Choi et al., 2021).

**Table 4**

*Hypothesis linear regression analysis test（I）*

| variable | Sustainable development performance | | | Sustainable innovation capability | | Sustainable development performance | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 |
| YE | 0.018 | 0.068 | 0.09 | 0.043 | 0.052 | 0.092 | -0.038 | -0.001 |
| SI | 0.054 | 0.093 | 0.084 | 0.091 | 0.033 | 0.018 | 0.018 | 0.021 |
| NA | -0.054 | -0.051 | -0.033 | -0.066 | -0.048 | -0.107 | -0.107 | -0.037 |
| EAL | | 0.145* | | | 0.463** | | | |
| EIL | | | 0.291** | | | 0.665** | | |
| EAL*EIL | | | | 0.116* | | | 0.470** | |
| SIC | | | | | | | | 0.335** |
| $R^2$ | 0.027 | 0.074 | 0.147 | 0.069 | 0.306 | 0.615 | 0.392 | 0.151 |
| F | 1.640 | 3.468** | 7.521** | 3.247* | 19.150** | 69.355** | 28.042** | 7.734** |

At the level of environmental dynamic adjustment, SPSS20.0 mobile phone software was used to test the adjustment of environmental dynamics in the form of linear regression analysis. The conclusions are shown in Table 5. Among them, Entity Model 12 examined the moderating effect of the moderating variable (environmental dynamics) between the

variable (inquiry learning training) and the intermediary variable (continuous innovation ability), and Entity Model 13 examined the moderating effect of the moderating variable (environmental dynamics) between the variable (applied learning) and the intermediary variable (continuous innovation ability), The Entity Model 14 examined the moderating effect of the moderating variable (environmental dynamics) between the variable (diversity of dual learning and training) and the intermediary variable (continuous innovation capability), and the Entity Model 15 examined the moderating effect of the moderating variable (environmental dynamics) between the intermediary variable (continuous innovation capability) and the independent variable (performance assessment of the concept of sustainable development). According to the test conclusion of entity model 12, the continuous innovation ability cannot be significantly adjusted in a positive direction. The impact of inquiry learning training on the continuous innovation ability（β=- 0.127<0, P>0.05), it is assumed that 6.1 is not recognized; According to the test conclusion of entity model 13, the environmental dynamics cannot be adjusted in a positive direction. The impact of applied learning on continuous innovation ability（ β=- 0.021<0, P>0.05), it is assumed that 6.2 is not recognized; According to the test conclusion of entity model 14, the environmental dynamics cannot negatively adjust the impact of diversity of dual learning and training on continuous innovation ability（ β=- 0.028<0, P>0.05), assuming that 7 is not recognized; It is known from the test conclusion of entity model 15 that the environmental dynamics are significantly negative, and the continuous innovation ability has an impact on the performance assessment of the concept of sustainable development（ β=- 0.202<0, P<0.01), assuming that 8 is proved. In order to test whether there is heteroscedasticity, this scientific research has proved the standard deviation inflation factor (VIF) in the reversion process of each variable, and the data shows that it is lower than the normal value of 5, so we can think that the influence of heteroscedasticity in the reversion conclusion is acceptable.

Hypothesis 6.1 has not been verified, but a conclusion contrary to the hypothesis has been obtained. The regulatory effects of hypothesis 6.1 and 8 are shown in Figure 4 and Figure 5 respectively.

**Table 5**

*Hypothesis linear regression analysis test (II)*

| variable | Sustainable development performance Sustainable innovation capability Sustainable development performance | | | | | | |
|---|---|---|---|---|---|---|---|
| | Model9 | Model10 | Model11 | Model12 | Model13 | Model14 | Model15 |
| YE | 0.034 | 0.082 | -0.05 | 0.024 | 0.015 | 0.027 | -0.007 |
| SI | 0.008 | 0.008 | -0.005 | 0.036 | 0.029 | 0.033 | 0.006 |
| NA | -0.035 | -0.006 | -0.09 | 0.016 | 0.000 | 0.020 | -0.006 |
| EAL | 0.425** | | | -0.001 | | | |
| EIL | | 0.632** | | | -0.024 | | |
| EAL*EIL | | | 0.44** | | | -0.118 | |
| SIC | 0.263** | 0.113* | 0.259** | | | | 0.202 |
| EDM | | | | 0.670** | 0.648** | 0.706** | 0.511** |
| EAL*EDM | | | | -0.127 | | | |
| EIL*EDM | | | | | -0.021 | | |
| EAL*EIL*EDM | | | | | | -0.028 | |
| SIC*EDM | | | | | | | -0.202** |
| $R^2$ | 0.380 | 0.627 | 0.464 | 0.526 | 0.509 | 0.533 | 0.332 |
| F | 21.170** | 58.209** | 29.962** | 37.793** | 29.755** | 32.769** | 14.258** |

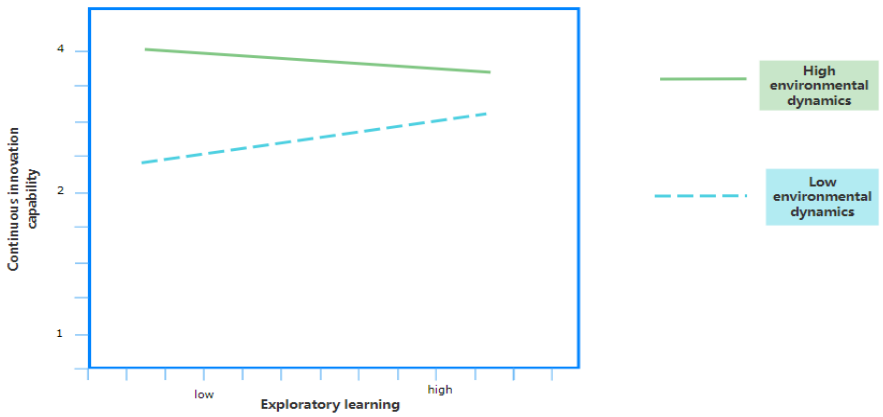


***Figure 4.*** The moderating effect of environmental dynamics on the relationship between exploratory learning and sustainable innovation ability

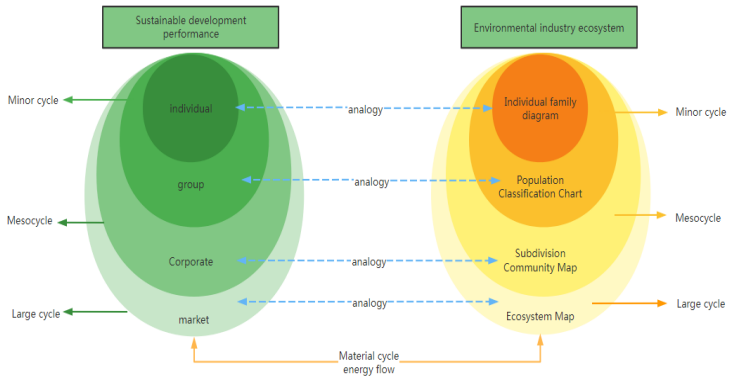


***Figure 5.*** The moderating effect of environmental dynamics on the relationship between sustainable innovation capability and sustainable development performance

## 6. Conclusion

Based on cognitive learning theory, collaboration theory and basic theory of weight value, and under the premise of causality analysis and empirical research certification, this study discusses the relationship between dual learning and sustainable development performance evaluation and other related variables, but has the following shortcomings: First, all necessary data and information are obtained by means of questionnaire report, Even if all the question type analysis of a questionnaire is completed by one person at the same time, it is also easy to harm the homologous variance. Although we have tested the homologous variance in the research, we still expect that the research can be improved in the future. Therefore, in the future research, in order to reduce the impact of the same variance, in the step of studying the harmfulness of dual learning and training on the performance evaluation of sustainable development, only the intermediary variable of continuous technological innovation ability is concerned. In fact, other variables such as knowledge transfer, knowledge sharing, absorptive capacity and intellectual capital are also likely to be intermediary variables between dual learning and sustainable development performance evaluation.

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