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Synergizes HeXie management framework with program management approach for Industry 4.0 transformation

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1. INTRODUCTION AND RESEARCH QUESTIONS

This dissertation explores the methodology for building intelligent manufacturing factories in medium and small-sized enterprises. Synergising HeXie management theory with a program management approach increases the industry 4.0 project success rate. Eventually, help those SMEs to achieve their strategic goals as a practical contribution. Also, the article optimises HeXie management theory from a conception to an applicable implementation model for Industry 4.0 projects.

Since Germany proposed the concept of Industry 4.0, there has been research in academia and industry to explore the technology of Industry 4.0 and the improved competitiveness of enterprises. Some articles explain that SMEs will have more challenges in transitioning to Industry 4.0 than large ones. The HXMT management theory generated for the CCAU (complexity, change, ambiguity, and uncertainty) environment could be suitable for integrating the oriental and occidental wisdom through coupling various project and program management methods. This article will use a Chinese semiconductor company's business case to validate the HXMT theme's effectiveness. Project management skills are a critical sub-factor of HeXie coupling to affect project management success significantly. Moreover, sustainability is a vital He-principal factor which impacts project success.

This article is an exploratory dissertation validating that the HeXie management model improves the success rate of Industry 4.0 projects by integrating technology elements and non-technology enablers, especially in Chinese SMEs.

2. THEORY AND RESEARCH FRAMEWORK

To validate the modified HeXie management model for effectively guide the Industry 4.0 project results, questionnaires survey is involved two outputs and four input variables in Figure1

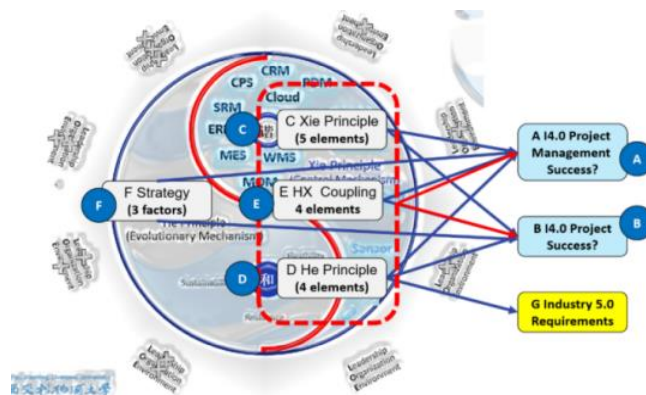


Figure 1. Research framework

There are three steps being planned for data analysis. These are verifying variables A and B's correlation to verify project management success impact on project success indicator, validating correlation between C, D, E, F and output A project management success, and identifying correlation between C, D, E, F and output B project success indicators.

3. RESULTS AND MAJOR FINDINGS

This study observed that the top sub-elements are knowing project management skills. The P-value reaches 0.059, which implies that project management skill is the dominant sub-factor affecting the success of smart factory project management in Table1. The other observation is that (D2) Sustainability has an apparent effect on project success in Table2. It proves that considering sustainability during the Industry 4.0 project is essential.

Table 1. Effect summary of HXMT sub-factors effect on project management success.







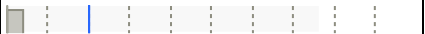
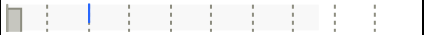
Source	LogWorth		PValue
E2: PM skills	1.226		0.05938
F3: Environment	0.752		0.17681
C2. MES readiness	0.726		0.18789
C1. ERP readiness	0.613		0.24394
C3. SCADA-EAP readiness	0.604		0.24864

Table 2. Effect summary of (D) He-principal sub-factors to project success.

Source	LogWorth		PValue
D2. sustainability	2.314		0.00485
D1. human-centricity	0.429		0.37204
D3. resilience	0.387		0.40975

4. CONTRIBUTIONS

Our research is deploying HeXie management theory in SMEs during digital transformation to help increase project & project management success. It improves the industry 4.0 project success by synergizing Xie-principal and He-principal enablers. Training project managers with professional PM skills is critical to increasing project management success. It belongs to the HeXie coupling factor, which integrates Xie and He principles. Such synergy could help Chinese SMEs realize the SMART manufacturing projects guided by Industry 4.0. To improve project success, He-principle will be recommended since the SMART manufacturing system needs to be sustainable and put people at the center of the whole system.

ACKNOWLEDGEMENT

This research was supported by the SICC Co.,Ltd. P.R.China.

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